



TECHNICAL ASSISTANCE REPORT

GEORGIA

Stress Testing the Central Bank Balance
Sheet and Developing Hedging Markets

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Prepared By

Darryl King (Mission Chief), Istvan Mak, Roger McLeod, Yuji Sakurai (all MCM), and Kei Moriya (ITD)

Authoring Department:

**Monetary and Capital Markets
Department**

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GLOSSARY

BIS	Bank for International Settlements
BMatch	Bloomberg BMatch Foreign Exchange Trading Platform
BPS	Basis Points
CiC	Currency in Circulation
FX	Foreign Exchange
GDP	Gross Domestic Product
GEL	Georgian Lari
GFMTA	Georgian Financial Markets Treasuries Association
LIBOR	London Interbank Offered Rate
MCM	Monetary and Capital Markets Department
MFI	Microfinance Institution
NBFI	Non-Bank Financial Intermediary
NBG	National Bank of Georgia
NFC	Non-Financial Corporate
OIS	Overnight Indexed Swap
PA	Pension Agency
RTGS	Real-Time Gross Settlement
TIBR	Tbilisi Interbank Rate
USD	United States Dollar

PREFACE

At the request of the National Bank of Georgia (NBG), a Monetary and Capital Markets (MCM) Department mission visited Tbilisi from May 29 to June 9, 2023, to assist the authorities in stress testing the NBG balance sheet and to develop hedging markets.

The mission met with various NBG officials, including Archil Mestvirishvili, vice-governor and acting governor; Papuna Lezhava, vice-governor; and Nikoloz Gauga, vice-governor. It also met with representatives of Georgia's Pension Agency, the Georgian Financial Markets Treasuries Association, Bank of Georgia, Basis Bank, Liberty Bank, TBC Bank, RICO Group, NOVA, and Nutrimax. The mission wishes to thank Alexander Khazaradze, Iralki Kvirkevelia, Giorgi Laliashvili, Mamuka Machaidze, Shalva Mkhatriashvili, and David Tutberidze for their cooperation, productive discussions, and their hospitality.

EXECUTIVE SUMMARY

This report addresses two distinct issues to help the National Bank of Georgia (NBG) deliver on its price stability mandate. Firstly, it provides a forward-looking analysis of the NBG's balance sheet to assess its policy solvency and to help institutionalize such a process. Separately, it outlines a strategy to develop hedging instruments in interest rate and foreign exchange (FX) markets to support monetary policy transmission.

A central bank can be considered “policy solvent” if, over time, it has realized earnings that are greater than its monetary policy and operating costs. While central banks do not face a liquidity constraint, they must be policy solvent to meet their monetary policy objective. Central banks can operate with a negative equity, but to do so effectively requires strong institutional arrangements, underlying profitability, and sufficient fiscal buffers. To assess the risks to policy solvency, the central bank balance sheet is stressed-tested under different macroeconomic scenarios.

The Central Bank Balance Sheet (CBBS) model forecasts balance sheet items based on scenarios of macroeconomic variables. Projections for real GDP, inflation, and the exchange rate are aligned with assumptions from area departments. The model incorporates accounting rules and equations derived from macroeconomics or finance. The model generates total equity decomposed into realized earnings and the revaluation account. Satellite models are developed for forecasting several key balance sheet items (e.g., currency in circulation) given the macroeconomic scenarios.

The Georgian economy has performed well recently despite the COVID-19 pandemic and Russia's war in Ukraine. Two macro-scenarios are analyzed. In the base scenario, assuming continued strong tourism and FX inflows, GDP growth is expected to be robust and accompanied by mild inflation. In the adverse scenario, unexpected increase in commodity prices, slowdown in trading partners, and decrease in foreign exchange (FX) inflows lead to a temporary negative macroeconomic shock with an assumed recovery after 2025.

The NBG balance sheet is robust because it has virtually no interest-bearing liabilities. It has positive net foreign assets and positive net claims on the government. It also has claims on banks signifying the liquidity shortage that banks must meet by borrowing (i.e., through open market operations) from the NBG. Under the adverse shock, the NBG's balance sheet improves on account of revaluation gains arising from the greater expected depreciation of USD/GEL. Higher inflation also helps, since the need for a higher policy rate generates larger domestic interest income via open market operations and investments in GEL government bonds.

Institutionalizing CBBS modeling will allow for early warning of the need to reduce dividend payments (or for re-capitalization) thereby supporting operational independence. This process requires dedicated NBG staff to run the model on a regular basis. It is also recommended that macroeconomic inputs to the central bank balance sheet model are consistent with the internal macroeconomic projections used for policy making.

There is good potential to develop hedging markets, but several structural factors provide challenges. The financial system is bank-centric and highly concentrated with two banks accounting for around 80 percent of banking sector assets. The spot FX market is liquid, but activity in FX forwards and swap markets is very low. Interest rate derivatives are also rarely traded. The floating exchange rate should incentivize FX hedging, but the high level of dollarization remains a major constraint on financial market development.

Markets targeted first for development should be those associated with the most relevant risks for the potential users, and where there are relatively fewer preconditions. FX risks are prominent given the openness of the economy. Hence, development of the FX forward market is a priority, given that it can deepen the spot market. Georgia's forward market activity is below international comparisons, highlighting room for development. Developing interest rate derivatives is also important, given the lack of term instruments. This is, however, more challenging, although there is potential in the overnight indexed swap (OIS) market.

Georgia has made good progress on many of the enabling conditions for derivatives markets to develop. First, a coherent and supportive *regulatory environment* is in place. Second, the *market infrastructure* is robust, although market participants' treasury and risk management systems need improvement. Third, a range of financial instruments is available to serve as the *underlying instrument* for derivatives. However, a significant structural impediment is the lack of heterogeneity of financial risk profile and appetite amongst participants.

In the short and medium-term, authorities should focus their development efforts in seven key areas: (i) set up a standardized FX forward trading platform on BMatch (the platform currently used for spot FX transactions) to provide NFCs additional access to liquidity; (ii) push for swift implementation of a joint treasury management system; (iii) assess the impact of the NBG FX intervention strategy on the incentives for hedging FX risks; (iv) continue to support the targeted education and training efforts of the Georgian Financial Markets Treasuries Association (GFMTA); (v) review the possible barriers for the Pension Agency (PA) to participate in the derivatives market; (vi) consider revising the current FX forward index to be more informative by publishing outright transacted rates; and (vii) publish OIS benchmarks.

Table 1. Key Recommendations

Recommendations	Priority	Timeframe¹
<i>Institutionalizing Stress Testing of the NBG Balance Sheet</i>		
1. Identify dedicated staff and build relevant modeling capacity	Medium	Near-term
2. Further develop satellite models (i.e., for CiC).	Medium	Near-term
3. Run the model regularly (e.g., every six months) using policy-consistent macro-scenarios	Medium	Near-term
<i>Developing Hedging Markets</i>		
1. Set up a standardized FX forward trading platform on BMatch to provide NFCs additional access to liquidity (¶51).	High	Near-term
2. Push for swift implementation of a joint treasury management system (¶50).	High	Near-term
3. Assess the impact of a FX intervention strategy, consistent with monetary policy and financial stability objectives, on hedging incentives (¶54).	High	Near-term
4. Continue to support the targeted education and training efforts of the GFMTA (¶55).	High	Near-term
5. Review possible barriers for the Pension Agency (PA) to participate in the derivatives market within its investment mandate (¶56).	Medium	Near-term
6. Consider revising the currently published FX forward index to be more informative by publishing outright transacted rates (¶58).	Medium	Near-term
7. Consider publishing OIS benchmark rates on the NBG website (¶59).	Medium	Medium-term

¹ Near-term: < 12 months; Medium-term: 12 to 24 months.

I. INTRODUCTION

1. The Georgian economy has performed well recently with a staff-level agreement reached for the second review under the Stand-by Arrangement (approved June 2022). The economy grew by 7.2 percent year-on-year in the first quarter of 2023, with medium-term growth expected to be around 5 percent. There have been limited spillovers from the war in Ukraine, while relatedly, tourism has been buoyant, and there has been a surge in migrant and financial inflows. Headline inflation, after peaking at 13.9 percent in December 2021, has fallen to 1.5 percent (annual to May 2023), just below the NBG’s 3 percent target. Core inflation was higher at 3.9 percent but fell below target by the end of 2023.

2. The NBG has implemented an inflation-targeting regime since 2009. This regime ushered in lower inflation; however, inflation volatility has remained high, reflecting challenges faced by the authorities. One such challenge is dollarization (about 50 percent for deposits and 44 percent for loans), which, although on a steady downtrend trend, remains a material factor undermining the efficacy of monetary policy. The NBG introduced a de-dollarization program in 2016, which included the banning of foreign currency lending for small loans and implementing liquidity coverage ratios with preferential treatment for GEL-denominated liabilities.

3. The NBG recognizes the importance of “policy solvency” to deliver on its price stability mandate. While central banks do not face a liquidity constraint and can, in some circumstances, operate with negative equity, to be effective, they must be *policy solvent*.² This condition requires the central bank to have realized earnings (i.e., operating profits) on average over time; revaluation gains should not be considered.³ Other necessary conditions are strong institutional arrangements and a sound fiscal position. To assess the risks to policy solvency, central bank balance sheets can be stressed under different macro-scenarios. While central banks must not deviate from policy settings that keep inflation at target levels, an institutionalized approach to forecasting its balance sheet may provide early warning of the need to scale back dividend payments (or for recapitalization), thereby supporting its independence.

4. To further improve the efficacy of monetary policy, the NBG seeks to deepen its financial markets. Financial markets are the conduit through which central bank signals are transmitted to the real economy. Shallow or undeveloped markets inhibit transmission, and in Georgia, compound the challenges arising from dollarization. While the overnight unsecured market is sufficiently liquid, allowing for a representative benchmark rate, the repo market is very shallow. The secondary government bond market is illiquid amid buy-and-hold strategies pursued by domestic entities and in the absence of non-resident investors. The spot FX market is continuously liquid while there is little activity in the FX forward and swap markets.

² Examples of central banks operating effectively with negative equity include Chile, Czech Republic, and Israel.

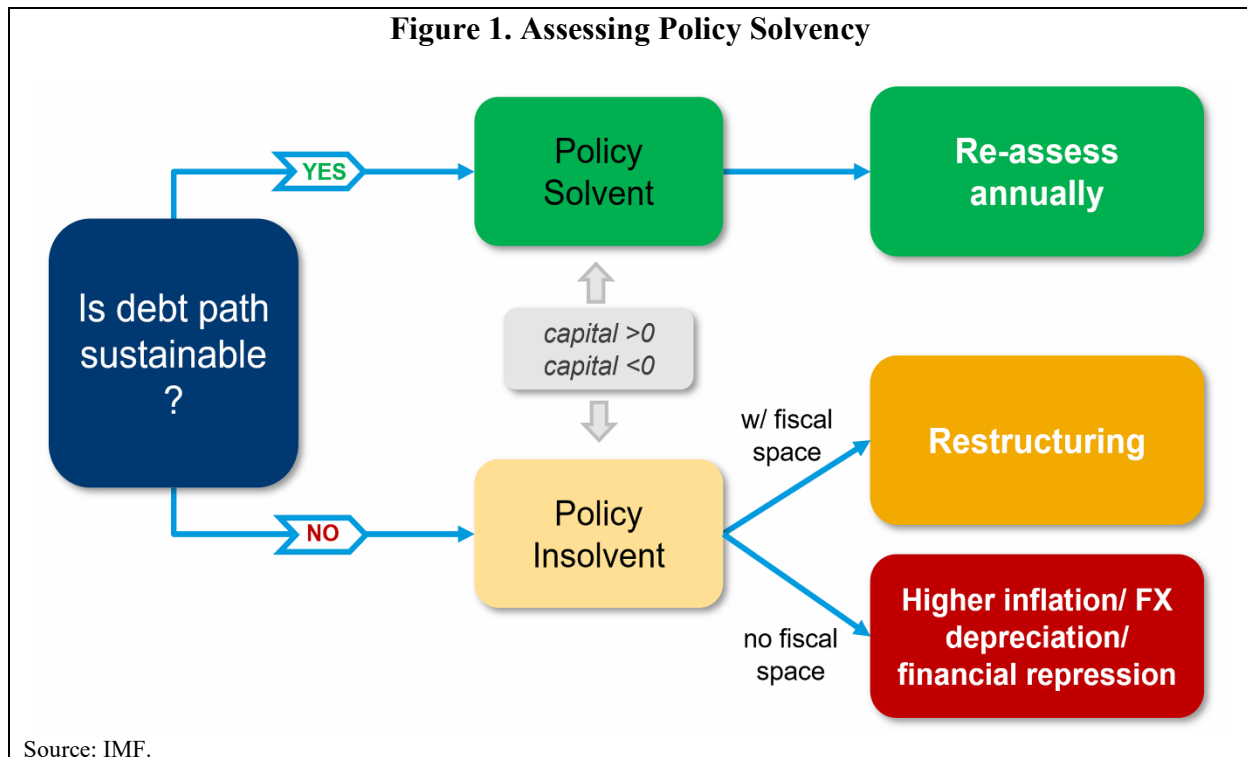
³ See Del Negro Sims (2015) and Hall and Reis (2015).

II. STRESS TESTING THE NBG BALANCE SHEET

A. Policy Solvency

5. A central bank is assessed to be policy solvent if its debt is on a sustainable path, which is a condition that requires positive realized earnings on average, over time. The absolute level of equity is less important as there are some examples of central banks having operated effectively with negative equity. All these cases involved strong institutional frameworks, central banks with underlying (i.e., realized) profitability, and governments with strong fiscal positions. The dynamics of the realized earnings are important since revaluation gains cannot be relied upon to meet the operational costs, since they may not be sustainable and could be reversed. Similarly, dividends should not be paid from the revaluation gains, as to do so would monetize the gains, possibly undermining policy effectiveness.

6. If the central bank is not policy solvent, there are two possible outcomes (Figure 1). If the government has the fiscal space to recapitalize the central bank, then it should do so. Alternatively, if the government does not have the fiscal space, then the outcomes are limited to either financial repression (e.g., capital controls, negative real interest rates) or a loss of control over financial conditions (e.g., the exchange rate) and consequently over inflation.

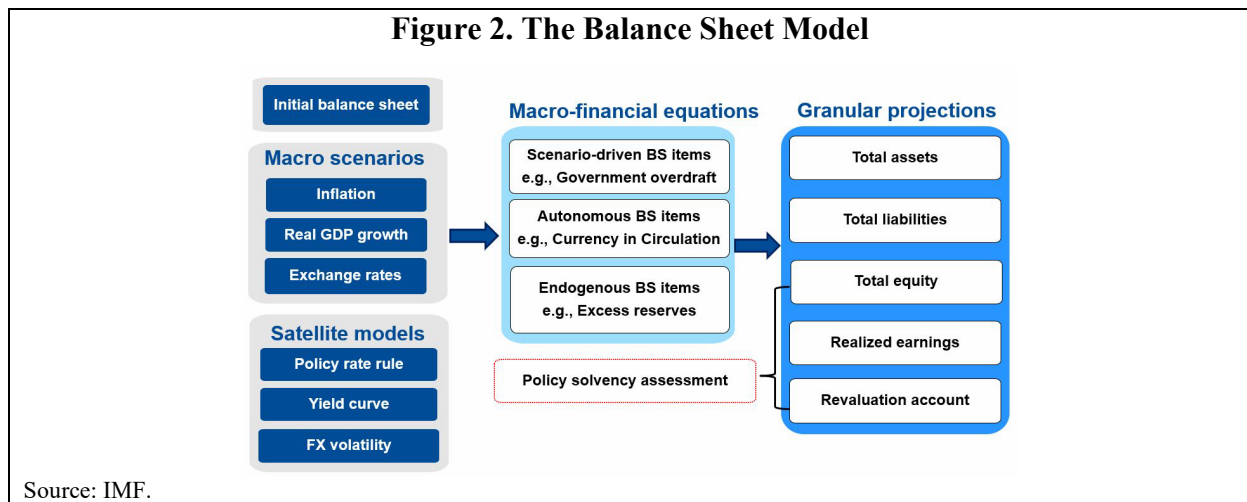


B. Central Bank Balance Sheet Model

Overview

7. The Central Bank Balance Sheet (CBBS) model forecasts balance sheet items from the initial balance sheet using scenarios of macroeconomic variables (Figure 2) on a five-year horizon. Projections of real GDP, inflation, and the exchange rate are centered on area department assumptions while the policy rate is based on a Taylor rule.⁴ The model incorporates accounting rules and equations derived from macroeconomics and finance. All material items on the balance sheet are modeled, deriving a path for total equity that is split between retained earnings and the revaluation account. The items can be classified into three groups:

- Exogenous or policy-determined items. These include net purchases of foreign currency and investments in domestic government bonds. These items are not estimated but derived from policy decisions (e.g., regarding the target level of net international reserves).
- Autonomous items determined by macroeconomic variables that do not explicitly depend on other items on the balance sheet (i.e., currency in circulation). These items are outside the direct and immediate control of the central bank and therefore not directly related to monetary policy operations but can influence the amount of liquidity in the banking system. Therefore, they need to be forecasted using the satellite models.
- Endogenously determined items. Excess reserves are the key endogenously determined item as they are determined by changes in currency in circulation (CiC) and required reserves on the liability side and net purchases of USD and investment in government bonds on the asset side. Excess reserves also reflect interest expenses and operating cost.



⁴ We employ a simplified Taylor rule for the policy rate. See Appendix VII for more details.

Core Model Equations

8. The equations in the core model follow the accounting identities as follows:

- *Equity*: The total equity can be obtained in two ways, which together provide for a consistency check.

$$(1) \text{ Equity}_t = \text{Total Assets}_t - \text{Total Liabilities}_t$$

$$(2) \text{ Equity}_t = \text{Equity}_{t-1} + \text{Realized earnings}_t + \text{Reval Account}_t$$

- *A clearing item*: Depending upon the operational framework, either open market operations (OMO) or excess reserves are a clearing item which captures changes in the assets and liabilities that impact realized earnings (Box 1). Revaluation gains or losses in items are not captured as they go directly against the revaluation account.⁵ Where excess reserves are low and constant, the changes in the balance sheet (that impact realized earnings) will be reflected in changes in the OMO. This is given by: (i) net USD purchases for NFR ΔFXInt_t ; (ii) net increases in government bond investments $\Delta \text{GovBond}_t$; (iii) changes in currency in circulation ΔCiC_t ; (iv) changes in the required reserves ΔRR_t ; and (v) interest income IRIncome_t and operating costs Op_t . In the case of NBG, the refinancing loan (i.e., OMO) is the main monetary policy tool, which earns interest at the policy rate (Box 1).

$$\text{OMO}_t = \text{OMO}_{t-1} + [-\Delta \text{FXInt}_t - \Delta \text{GovBond}_t + \Delta \text{CiC}_t + \Delta \text{RR}_t + \text{IRIncome}_t - \text{Op}_t]$$

- *Foreign reserve accumulation*: The dynamics for gross foreign reserve accumulation is driven by three terms:⁶ (i) foreign currency interest income; (ii) FX revaluation gains or losses; and (iii) net USD purchases for NFR accumulation.⁷ Note that the equation below is shown in the simplest case. For example, when there is net inflow to USD required reserves from financial institutions, there is an additional term ΔFXRes_t to account for the equivalent change in gross foreign reserves. Our benchmark assumption is conservative with no such an inflow, but the model is flexible to allow such reserves to increase, depending on the macroeconomic environment.⁸ In the equation below, FXRes_t is the foreign reserves at time t. FIRIncome_t is the foreign interest income. $\text{Revaluation}_t^{\text{FXRes}}$

⁵ The transfer to the Ministry of Finance is captured as an increase in the deposit from the government.

⁶ The equation follows Franta, Holub, and Saxa (2022).

⁷ For expository simplicity, we describe this item as the net USD purchase for NFR accumulation, but it includes the net USD inflow from any sources.

⁸ Under a zero remuneration rate on USD required reserves, if there is a positive inflow to such reserves, it increases foreign interest income as there is an equivalent increase in the gross foreign reserves on the asset side, which is interest-bearing.

is the revaluation gain due to the change in exchange rates. $\Delta FXInt_t$ is the net amount of the purchase of foreign currencies, which is primarily USD.

$$FXRes_t = FXRes_{t-1} + FIRIncome_t + Revaluation_t^{FXRes} + \Delta FXInt_t$$

Box 1. National Bank of Georgia: Monetary Operations

The NBG implements an inflation-targeting framework with the short-term interbank interest rate as the operational target. The NBG aligns this market interest rate with its *monetary policy rate*, which it announces to signal the stance of monetary policy. The 15 licensed commercial banks are the monetary policy counterparts. There is a structural liquidity deficit, which routinely requires banks to borrow from the NBG to meet their payment obligations. The main monetary instrument is the weekly refinancing loan (seven-day maturity), which is calibrated using forecasts of liquidity deficit. These loans are offered through multiple-price auctions and are fully collateralized.

Standing facilities contain short-term interest rate volatility. The interest rate on overnight loans is 75 basis points above the monetary policy rate, and 175 basis points below for overnight deposits (this corridor is symmetric after allowing for the tax treatment on the deposit facility). Reserve requirements are imposed on banks' *domestic currency deposits* of one year and less. The maintenance period is 14-days, with full reserve averaging. The current ratio is 5 percent, and the reserves are remunerated at the monetary policy rate. Requirements are applied on *foreign currency deposits* of two years and less. The ratio is set between 10 and 20 percent for deposits of 1 year and less, and between 10 and 15 percent for deposits between one and two years. In both cases, the ratio depends on the deposit dollarization rate of the respective bank. The maintenance period is also 14 days, averaging is not permitted, and remuneration is set at zero.

One-month refinancing loans are used occasionally to manage the structural deficit and are offered on the same basis as the seven-day instrument. Three-month certificates of deposit may also be issued but there has been no recent increase in issuance (the stock of certificates is at a low level to encourage market activity in that part of the yield curve).

Key Satellite Models

9. Satellite models are developed for three items that have material impacts on equity dynamics. Unlike the core model equations described above, assumptions are based on specific macroeconomic circumstances. What follows are parsimonious but still sufficiently flexible models for the key balance sheet items. These satellite models can be replaced with simpler models or more sophisticated models depending upon the purpose of the CBBS model users.

- **CiC dynamics:** CiC is assumed to linearly increase with nominal GDP and depends on the policy rate.⁹ The economic intuition is that a larger economy requires more CiC for transactional purposes, and households hold less cash if interest rates are higher (i.e., opportunity cost). The policy rate serves as the proxy for the deposit rate. The interest-sensitivity parameter is calibrated using the historical data.

⁹ For the Georgian economy, the ratio of CiC to nominal GDP was stable during the 2015–2022 period. The historical average is 8 percent, and the standard deviation is 0.7 percent.

$$CiC_t = \eta_{CiC} NGDP_t \cdot \left(\frac{i_0}{i_t}\right)^{Y_{CiC}}$$

- Required reserves in GEL: Required reserves are assumed to increase with nominal GDP. This is because required reserves increase as total bank deposits grow (given a constant ratio on the reserve requirement), and total deposits increase with nominal GDP. Interest paid on required reserves is calculated at the policy rate.

$$ResReq_t = \eta_{Req} NGDP_t + i_{req,t-1} ResReq_{t-1}$$

- Required reserves in foreign currency: Required reserves in foreign currency are also assumed to move linearly with nominal GDP. The intuition is the same as for GEL while accounting for the fact that no remuneration is paid on foreign currency required reserves. In the default setting, the parameter η_{USDReq} is set equal to zero by assuming that U.S. dollars in the banking system are stable even if nominal GDP changes over time.

$$USD_ResReq_t = \eta_{USDReq} (NGDP_t - NGDP_{t-1}) + \frac{FX_t}{FX_{t-1}} USD_ResReq_{t-1}$$

C. Application to the National Bank of Georgia

Financial Relations Between the NBG and the Government

10. The equity of NBG comprises charter (authorized) capital (GEL 15 million), the general reserve fund, and the revaluation reserve. The NBG Law, which governs the institutional arrangements, establishes how profits should be transferred internally to the different components of equity, and externally to the State budget of Georgia. These transfers are overseen by the Council, which is the only statutory body entitled to make decisions on the distribution of annual net profits.

11. The NBG’s annual net operating profit (i.e., realized earnings) is transferred to the reserve fund, while unrealized net gains are transferred to the revaluation reserve. The NBG Law stipulates that transfers of annual net profits should be used to fill the reserve fund until the reserve fund reaches 15 percent of reserve money. The remaining portion of annual net profit should then be transferred to the State budget of Georgia within six months after the end of the financial year. It is important to note that the NBG Law allows the NBG Board to transfer annual net profits to the government before the reserve fund is filled to the threshold of 15 percent of reserve money.

12. The recapitalization procedure is well-defined in the NBG Law. If the capital of the NBG falls below the authorized capital (GEL 15 million), the Ministry of Finance shall, within five months after the year-end, unconditionally issue circulating government bonds to the NBG under terms and conditions similar to those of other government securities to replenish authorized capital to the minimum level.

The NBG Balance Sheet

13. The NBG balance sheet is strong, with few interest-bearing liabilities (Table 2). Total equity (March 2023) was GEL 2.3 billion (3.3 percent of GDP). On the asset side, all assets are income generating; 75 percent are foreign assets, and the remaining are domestic assets (government bonds and OMO). The OMO on the asset side highlights that the Georgian banking system faces liquidity shortages and must borrow from the NBG each day to meet its obligations. On the liability side, interest costs accrue to the Fund's Extended Funding Facility (EFF) and SDR allocations, which are 15 percent of the total liabilities. Five percent of the total liabilities incur cost at domestic interest rates, all of which relate to GEL required reserves. The balance of the liabilities is non-interest bearing, with foreign currency required reserves and CiC accounting for 33 percent and 32 percent of the total liabilities, respectively. An aggregation of the balance sheet (Table 3) facilitates the detailed analysis.

Table 2. NBG Balance Sheet—March 31, 2023

Asset	GEL (thousands)	Liabilities	GEL (thousands)
Cash in USD	1,791,386	Due to FIs in USD	4,019,259
Cash in EUR	1,178,241	Due to FIs in EUR	935,776
Cash in CAD	500	Due to FIs in CAD	-
Cash in other currencies	169,120	Due to FIs in other currencies	-
FVOCI investment in USD	7,246,523	Deposit from Gov't in USD	107,671
FVOCI investment in EUR	558,206	Deposit from Gov't in EUR	463,970
FVOCI investment in CAD	383,885	Deposit from Gov't in CAD	-
SDR holdings	1,198,135	Deposit from Gov't in other currencies	10,472
FVPL investment in FX	260,061	Extended Fund Facility from IMF	1,134,243
Assets related to derivative instruments	26,068	SDR allocations	1,174,582
FVOCI investment in GEL	2,348,120	Liabilities related to derivative instruments	-
Amortised investment in GEL	81,231	Deposit from gov't	931,289
Due from resident financial institutions	2,025,165	Excess reserves	0
Property and equipments	52,753	Due to resident financial institutions	703,785
Miscellaneous assets	17,083	Currency in circulation	4,858,849
		Due to International Monetary Fund	2,175
		Miscellaneous liabilities	645,826
		Total Equity	2,348,581
Total assets	17,336,477	Total liabilities plus equity	17,336,477

Sources: NBG and IMF.

Note: FI = financial institutions; FVOCI = fair value through other comprehensive income; FVPL = fair value through profit or loss.

Table 3. NBG Aggregated Balance Sheet—March 31, 2023

Asset	GEL (thousand)	Liabilities	GEL (thousand)
Net foreign asset	4,940,085	Currency in circulation	4,858,849
Net claim on government	1,498,062	Other liabilities	648,001
Net claim on banks	1,321,380	Total equity	2,348,581
Others assets	95,904		
Total assets after netting	7,855,431	Total liabilities plus equity after netting	7,855,431

Sources: NBG and IMF.

Stress Testing the Balance Sheet

Base Scenario

14. Supported by continued strong tourism, transit trades through Georgia, and FX inflows, real GDP is forecasted to grow 5.2 percent in 2023. Each of these three key macro variables shows stable paths (Figure 3). The USD/GEL exchange rate is relatively stable at around 2.7. Inflation is forecasted to increase marginally, from 2.6 percent to 3 percent, which is the long-term target inflation level.

15. Under this scenario, the balance sheet, after dividend payments consistent with the NBG law, strengthens considerably. Equity increases from GEL 2.3 billion (3.3 percent of GDP) to GEL 5.7 billion (5.5 percent of GDP) in 2027Q4. The main driver is the realized earnings, which come from both the GEL interest income on refinancing loans, the investment in the government bonds, and foreign interest income on the international reserves.

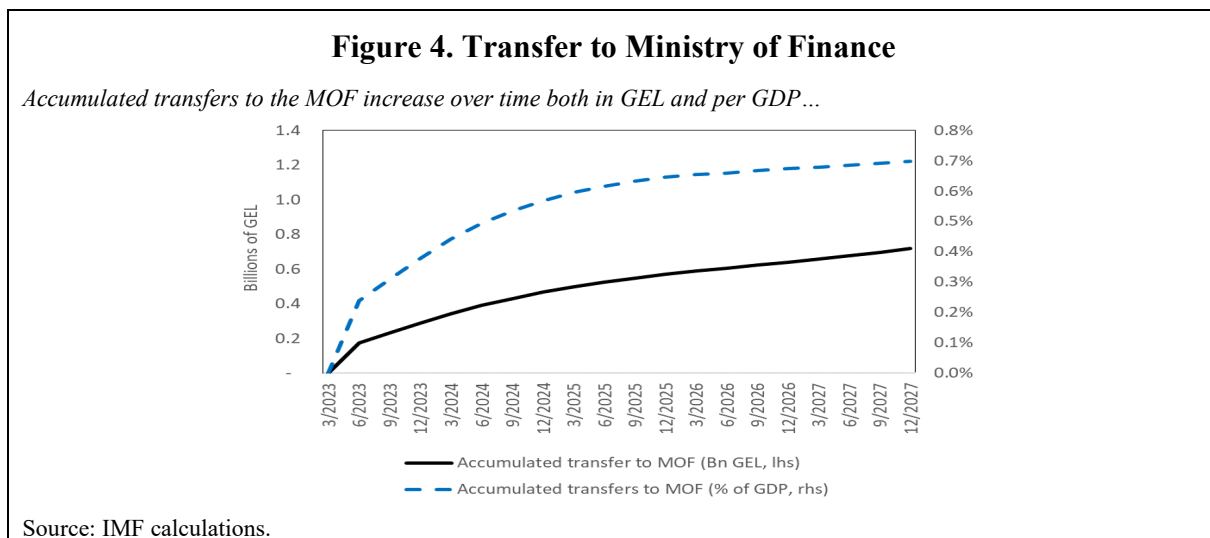
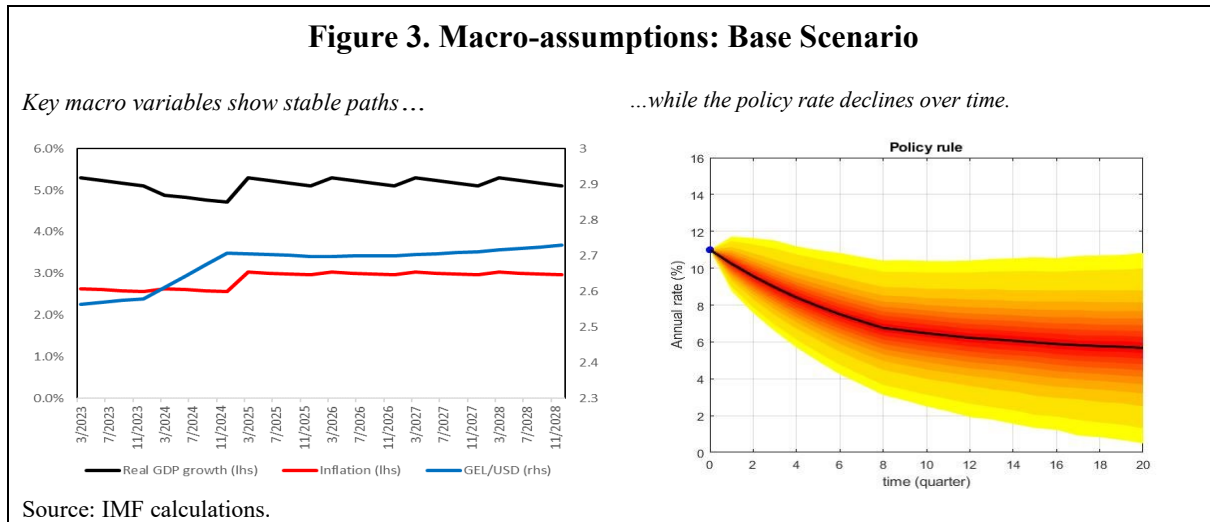
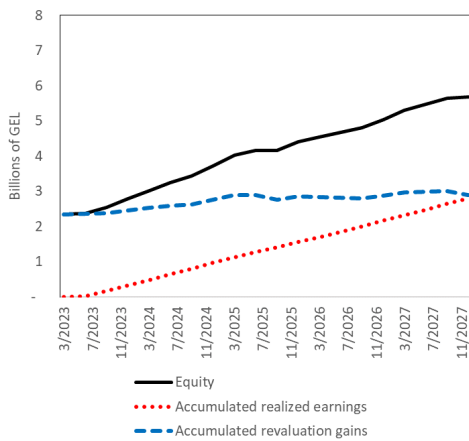
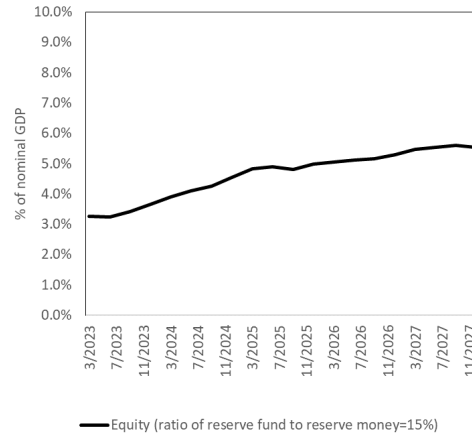


Figure 5. Base Scenario Projections

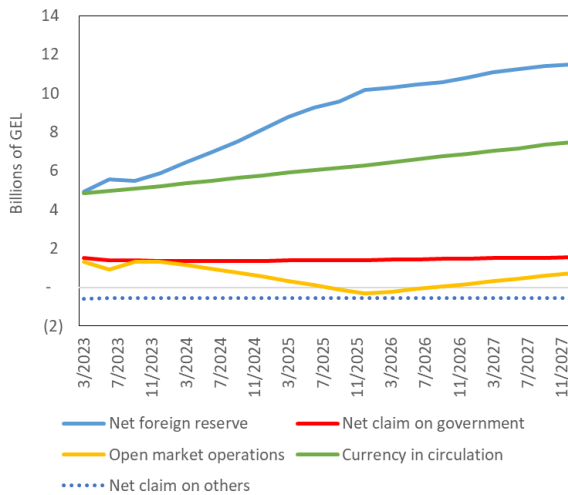
Equity increases over time, driven by realized earnings...



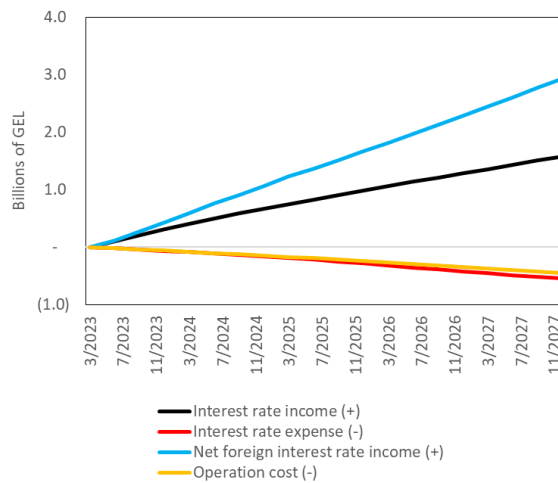
... as does equity per GDP.



Projection of balance sheet by category shows that net foreign reserves and CiC increase over time...



...and that foreign and domestic interest income are larger than interest expenses and operation cost.



Source: IMF staff computation.

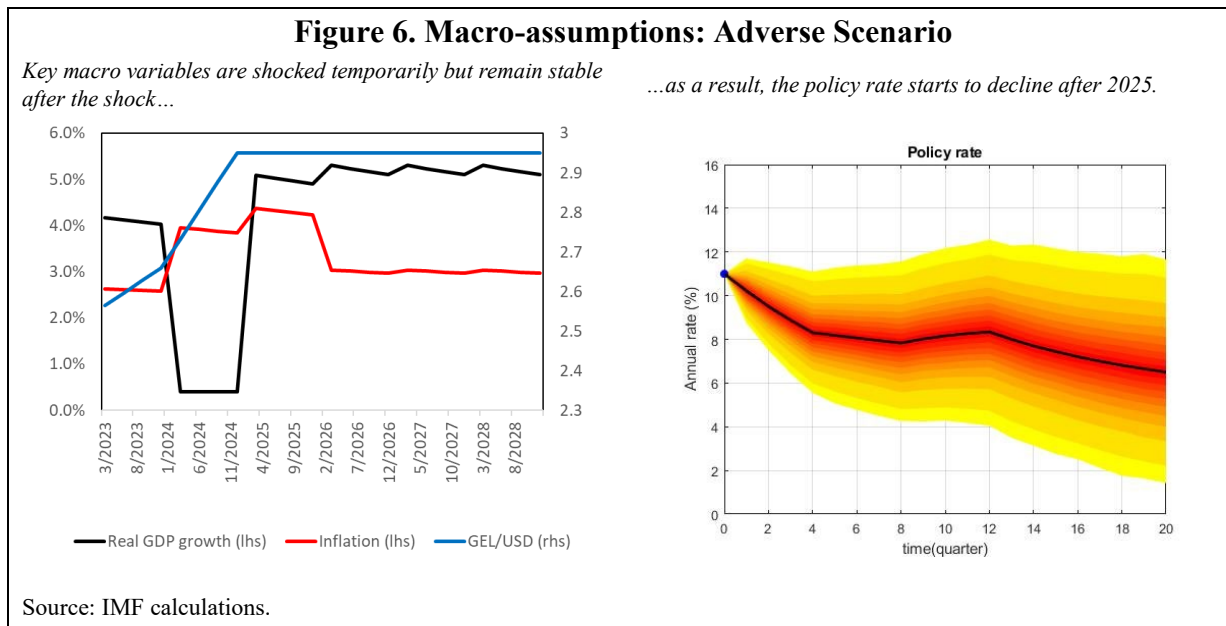
Note: Income flows are cumulative. Balance sheet items are presented in level.

Adverse Scenario

16. The adverse scenario incorporates an increase in commodity prices, a slowdown in trading partners' GDP, and a decrease in FX inflows.¹⁰ GDP is lower in 2023H2 and 2024 but recovers after 2024. All three key macro variables are shocked temporarily but then stabilize (Figure 6). Real GDP growth drops to 0.4 percent but then recovers to 5.1 percent. The

¹⁰ There are other adverse scenario candidates. For example, the appreciation of the domestic currency against the USD might lead to revaluation losses given the positive net foreign assets. This particular scenario is not analyzed because the revaluation losses due to a stronger domestic currency would not damage the central bank's policy solvency.

USD/GEL falls to 2.95 in 2024 and stabilizes at that level after the shock. Inflation increases from 2.6 percent to 4.3 percent before falling back to the 3 percent target.



17. Equity increases from GEL 2.3 billion to 6.3 billion in 2027Q4 (Figure 7). It also increases as a percentage of GDP, from 3.3 to 6.2 percent. This is an improvement relative to the base scenario, which highlights the resilience of the balance sheet. The main driver of the increase is the larger currency depreciation, which provides a bigger FX revaluation gain.

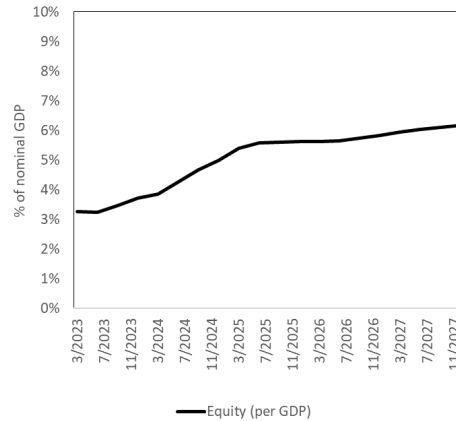
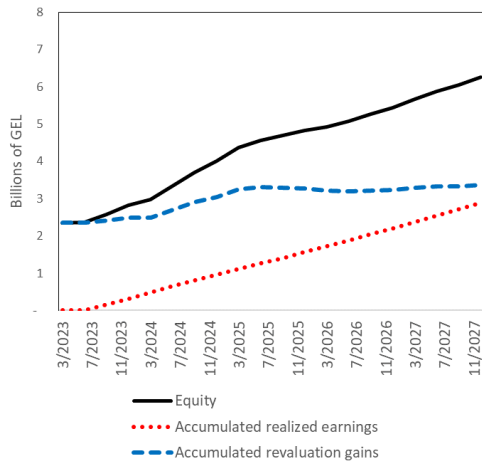
Capital Surges: Exchange Rate and Dollarization Impacts

18. The NBG’s balance sheet is stressed with a dollarization shock. An econometric model links the dollarization ratio with macroeconomic variables and estimates the model based on historical data. The scenario is motivated by the events from January 2021 to December 2022, when the USD/GEL appreciated by approximately 19 percent. In 2022, this was driven predominantly by Russians migrating to Georgia at the commencement of Russia’s war in Ukraine, causing significant capital inflows. This analysis assumes this appreciation to be completely reversed over a two-year period starting in January 2024 because of an emerging dollarization trend through intensified private FC borrowing and, hence, debt-servicing. Satellite models are estimated to calibrate the impact of this latter depreciation shock on inflation and the domestic policy rate.

Figure 7. Adverse Scenario Projections

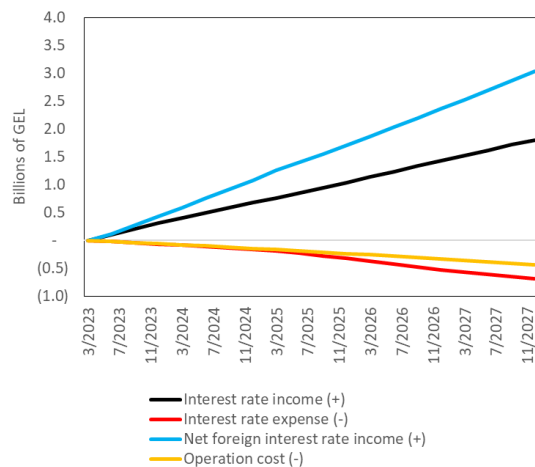
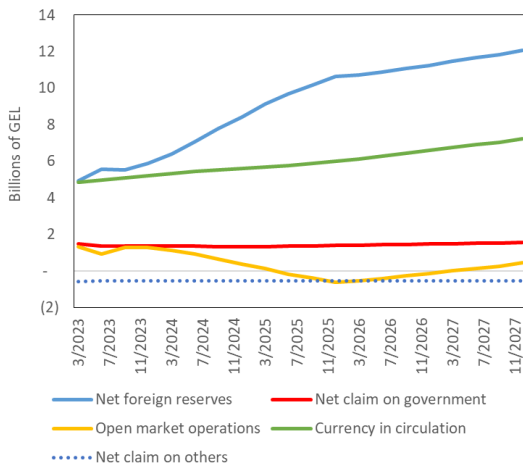
Rising equity is mainly driven by realized earnings but also by FX revaluation gains.

Consequently, the ratio of equity to GDP (equity per GDP) increases more rapidly than in the base scenario.



The net foreign reserves also increase more rapidly than in the base scenario...

... while projections of income and expenses are qualitatively similar to the base scenario.



Source: IMF staff computation.

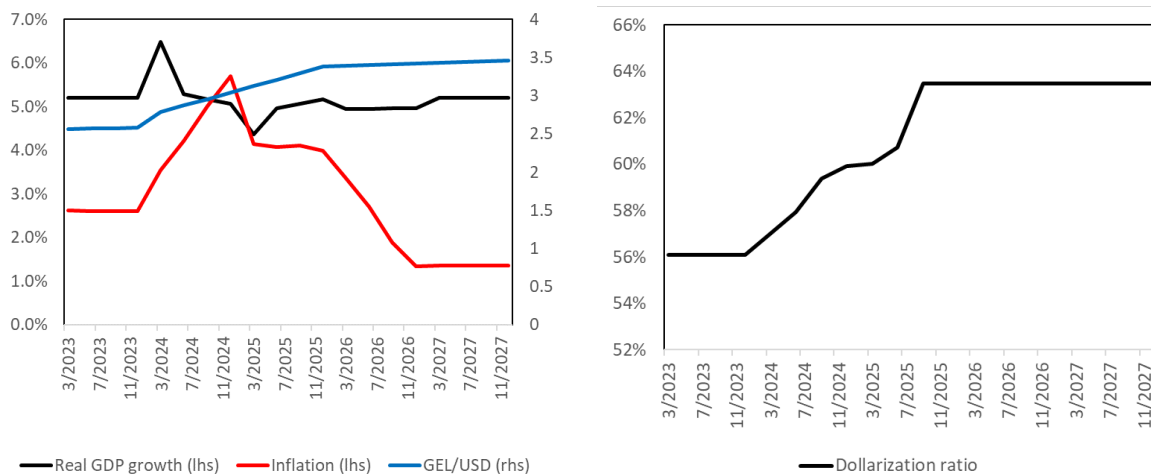
Note: Income flows are cumulative. Balance sheet items are presented in level.

19. A satellite model for dollarization was estimated to assess the impact of exchange rate depreciation on dollarization. From this model, a 25 percent appreciation in the exchange rate (as seen from 2021 to 2022) causes dollarization to increase by approximately seven percentage points. The impact is delayed, however, which is consistent with the actual dollarization trend seen during 2021 to 2022. This observed delay results in pent-up demand for foreign currency loans, causing dollarization to eventually start to increase in January 2024. Specifically, it is assumed that dollarization increases by an estimated seven percent over the period January 2024 to December 2025. Dollarization is then assumed to stabilize over 2026 to 2027, returning to its long-term trend of marginal quarterly reductions.

Figure 8. Capital Surge Scenario: Macro-variables and Dollarization

Severe depreciation of the exchange rate leads to higher inflation in the short term...

...which is driven by increases in dollarization.



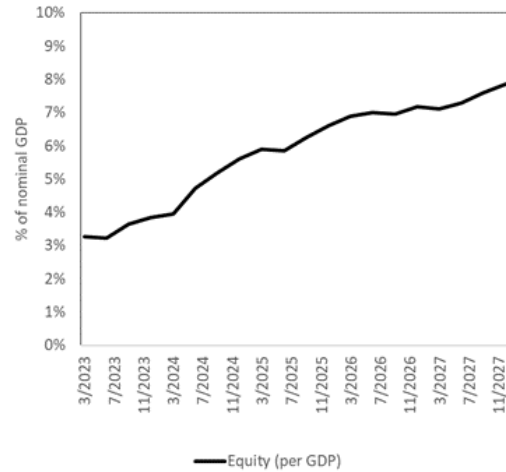
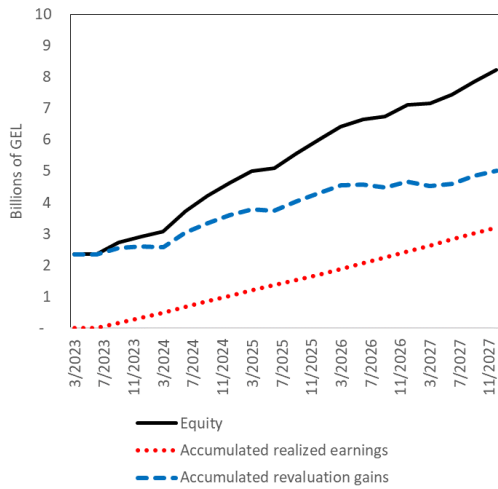
Source: IMF calculations.

20. The combination of greater exchange rate depreciation and higher inflation increases the level of equity (Figure 8). The equity in 2027Q4 is 7.9 percent of GDP, and higher than under the base case. The results indicate that the NBG’s balance sheet becomes stronger when dollarization increases.

Figure 9. Capital Surge Scenario: Projections

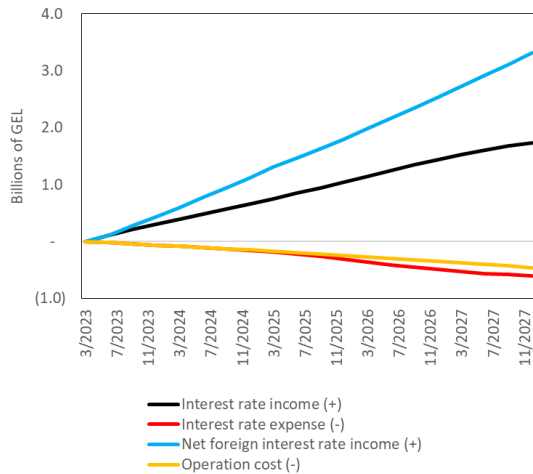
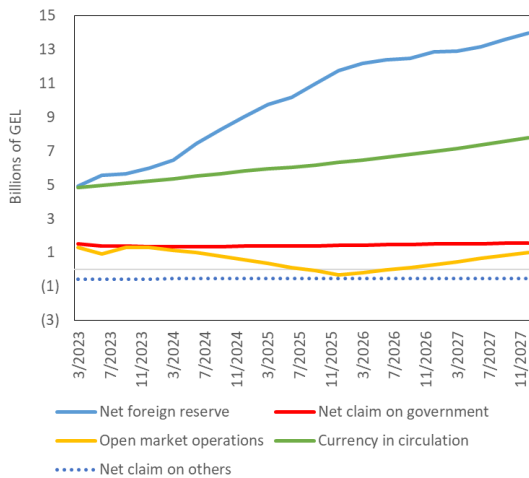
Increases in equity is accelerated by FX revaluation gains due to the severe depreciation of the GEL against the USD....

....and ratio of equity to GDP increases more strongly than in the base and adverse scenarios.



Net foreign reserves increase more strongly due to larger FX revaluation gains.

Accumulated foreign interest income is larger in terms of GEL.



Source: IMF calculations.

III. DEVELOPING HEDGING MARKETS

A. Financial Market Context

21. The financial system is bank-centric and highly concentrated. Banks account for 96 percent of the financial sector with two banks having around 80 percent of total banking assets. Non-bank Financial Intermediaries (NBFIs) are largely absent, although the recently established Pension Agency (Box 2) is a welcome initiative that incentivizes savings and will contribute to deeper financial markets. It currently has GEL 3.4 billion under management (around 5 percent of GDP). Foreign banks are absent, which has also held back financial market development.

Box 2. The Pension Agency of Georgia

The Pension Agency (PA), established in 2018, handles the mandatory defined contribution component of Georgia's pension scheme. The PA is regulated and supervised by the NBG and has a two-tiered governance structure which separates the oversight of pension administration (Supervisory Board) and that of investment management (Investment Board). The latter consists of independent members and selects the chief investment officer.

The PA is the largest NBFI in Georgia with GEL 3.4 billion under management, and it is expected to grow steadily as it receives a combined 6 percent of contributions of eligible contributors' salaries. Beginning in 2023Q3, following a five-year transition period, during which inflows were directed to the PA's low-risk portfolio, funds will also be invested in medium- and high-risk portfolios.

The increasing diversification entails a growing allocation to foreign assets. Currently, foreign currency denominated assets are capped at 20 percent, but that portion is expected to increase as the target weight of such assets in the medium and high-risk portfolios is 20-40 percent and 40-60 percent, respectively. As part of this asset allocation shift, the PA will likely convert a significant amount of GEL in the coming months and is anticipated to create a steady but moderate supply of GEL in the FX market in the long run.

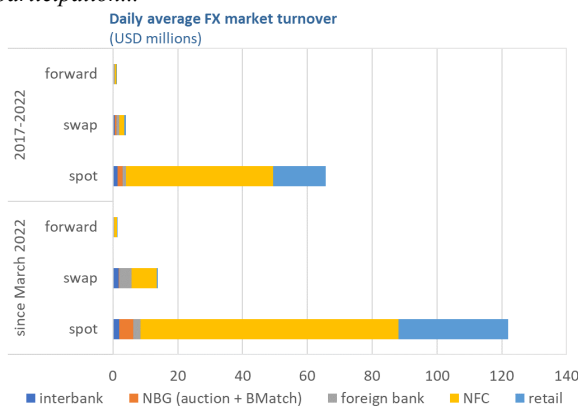
Exposure limit constraints and IT-system challenges currently prevent the PA from engaging in derivative transactions. The Investment Policy prohibits the use of options, futures, forwards, and other derivatives, except for portfolio hedging purposes. In addition, the PA, like many banks in Georgia, lacks the IT-system capacity to easily process derivatives transactions and is looking at treasury management options.

Once the infrastructure is in place and the riskier portfolios are built up, the PA could potentially become a regular user of financial derivatives within its mandate. In the case of its domestic fixed income assets, short-term or variable rate instruments can be hedged using OIS swaps to help align the interest rate risk of the assets with that of the liabilities. Exchange rate risk associated with foreign assets can be mitigated by selling foreign currency forward.

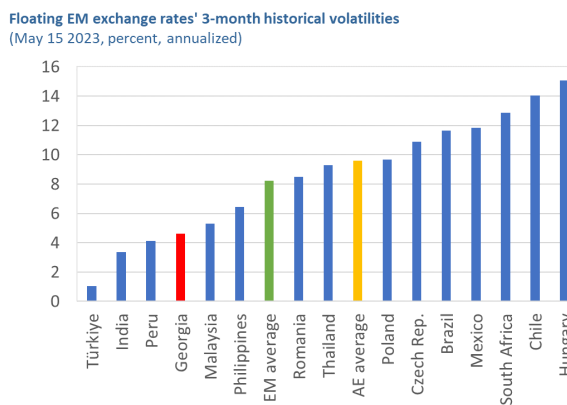
22. Dollarization remains a major constraint to further development of financial markets. The NBG successfully embarked on a de-dollarization program in 2016 which included the banning of foreign currency lending for small loans and liquidity coverage ratios with higher requirements for foreign currency liabilities. Still, although on a downward trend, dollarization remains material at 56 percent for deposits and 45 percent for loans (Figure 10).

Figure 10. Hedging Markets in Georgia

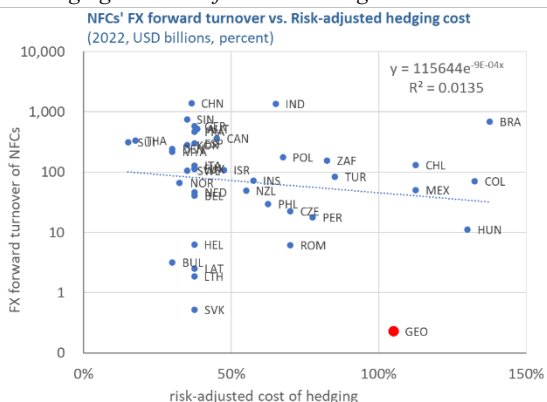
Interbank spot FX market is liquid with agile NBG participation...



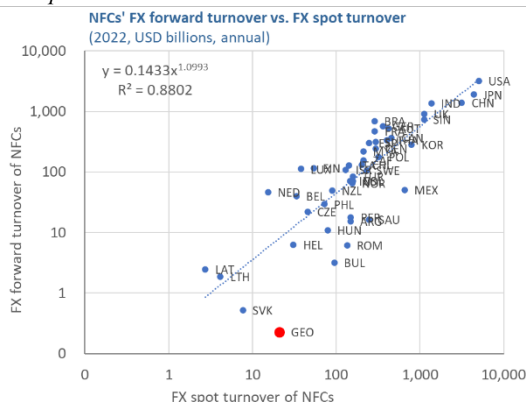
... aimed at alleviating FX volatility..



This, in turn, results in a high risk-adjusted cost of hedging, discouraging NFCs FX forward trading...



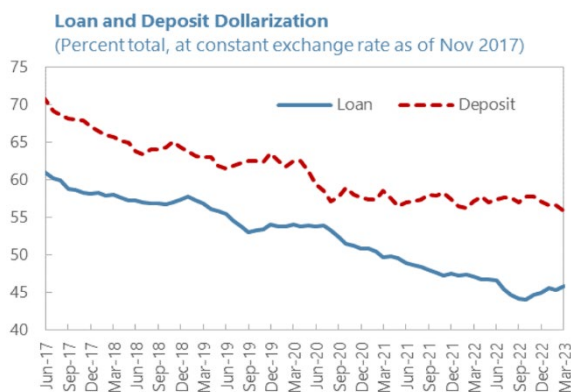
... which is already low by international standards compared to FX spot market volumes...



...and, to a lesser degree, in terms of the openness of the economy...



...as high dollarization enables natural hedging.



Source: IMF staff calculations based on BIS and NBG data.
 Note: AE = advanced economy; EM = emerging market;
 NFCs = non-financial corporates. For three-digit country codes, see <https://www.iban.com/country-codes>.

23. The NBG has implemented an inflation-targeting regime with a floating exchange rate. The USD/GEL depreciated by about 5 percent annually between April 2017 and March 2022, amid moderate volatility of 8-10 percent. Over the last three months, this volatility has decreased, falling below the levels observed in many other countries: 9.6 percent in advanced economies and 8.2 percent in emerging markets (Figure 10). Capital inflows from Russian immigrants since the start of the war have caused the USD/GEL to appreciate by about 20 percent, while daily volatility has fallen to 4 percent from 8-10 percent previously. The stability of the exchange rate has been supported by the NBG's regular FX interventions to meet several objectives, including accumulating foreign reserves, meeting government obligations, and countering excessive volatility.

24. The spot USD/GEL market is moderately liquid and appears competitive. The interbank segment is organized as a central limit orderbook (Bloomberg BMatch) where brokered customer flows are also executed. BMatch is accessible to 14 banks and their clients. Credit risk limits are applied automatically pre-trade. BMatch is granted or revoked by the NBG in its capacity as the FX market regulator. Daily average interbank volume, including brokered trades, is about \$12 million, one-third of which involves the NBG. The NBG also transacts with MoF Treasury for the benefit of state-owned enterprises at its official exchange rate.¹¹ The dealer-to-customer segment is large (more than \$100 million per day), most of which are offsetting customer flows matched internally within banks. Spot market competition is reportedly strong, with smaller banks being able to attract demand beyond the customers with which they have their major banking relationship. A significant portion of non-bank participation is reportedly related to Microfinance Institutions (MFIs), further strengthening competition (Box 3). As a result, bid-ask spreads in the interbank segment can be as low as 20 bps, while they remain close to 80 bps in dealer-to-customer activity.

25. Activity in FX forwards and swap markets is very low (Figure 10). Interbank forward activity is largely non-existent as the risks arising from the relatively small volume of customer transactions are managed internally, or via the spot market. Non-financial corporate (NFC) demand for forwards is limited to FX sales by a handful of exporters. Importers are reluctant to use forwards to hedge as they can pass on the effect of a potential lari depreciation to their domestic clients. FX bureaus and other financial institutions buy FX forward in small amounts. In the FX swap market, most trades are cross-border with large international names borrowing GEL. Onshore, smaller banks and MFIs that cannot lend their FX deposits due to size limits place their FX liquidity in FX swaps with the larger banks.

26. The money market is sufficiently liquid in the overnight unsecured segment. This segment has relatively high volume (GEL 150-200 million daily) with the NBG successfully managing rates close to its announced policy rate. This enables the NBG to produce a reliable

¹¹ The NBG's [official exchange rate](#) on a given day is the trimmed weighted average exchange rate of previous day's USD/GEL spot trades in the interbank market (including brokered trades on BMatch) and at NBG auctions. It is used mainly for balance sheet valuations.

and representative overnight benchmark interest rate, the Tbilisi Interbank Offered Rate (TIBR). Commercial bank certificates of deposit and term lari deposits are also available. Repo market activity is light as market participants manage their liquidity within unsecured limits, while there is no demand from the NBFIs sector for cash or security driven repos.

Box 3. Microfinance Institutions' Role in the Georgian FX Market

Microfinance institutions (MFIs) play an important role in the Georgian FX market, particularly through cash currency conversions and transfers. In recent years, as tourism has grown and with an increase in Russian immigrants, the inflow of U.S. dollars (USD) into Georgia has intensified.

Consequently, MFIs have emerged as significant intermediaries in distributing USD to the financial sector. This dynamic primarily unfolds through FX swaps with larger banks, which arise as MFIs lack alternative USD investment options due to regulatory restrictions on their lending activities. Specifically, their typical lending size falls below the minimum regulatory threshold of GEL 100,000 for FX lending, making it difficult for them to place USD loans. MFIs also extend their reach into the FX market through partnerships with recognized international money transfer service providers. Their competitive edge is further sharpened by their operational flexibility: MFIs remain open on weekends, allowing them to serve customer needs outside traditional banking hours.

Recent regulatory developments have provided MFIs with the opportunity to become microbanks. This transition could provide MFIs with access to the central bank's accounts and liquidity facilities, further boosting their position in the Georgian financial sector. However, this benefit comes at the cost of intensified supervision, which might discourage some market players.

Despite their critical role in FX operations, MFIs face challenges from larger banking institutions that view them as competitors. For instance, larger banks often impose high fees for wire transfers, which raises barriers for MFIs looking to expand into the FX business for larger corporates—a crucial part of the banks' business model.

To mitigate these challenges, MFIs resort to cash transactions, often conducting simultaneous withdrawals and deposits in both local and foreign currencies for their clients' accounts. This process, although practical, isn't a complete solution to the structural barriers imposed by the larger banks.

Recently, the central bank introduced a cap on local currency settlement fees, which is expected to somewhat lower these entry barriers. However, banks can still impose substantial fees on the FX transfer leg, which is not part of the real-time gross settlement (RTGS) system.

Further regulatory action could foster competition and contribute to the smooth functioning of the FX market. The incorporation of FX into the RTGS and the introduction of caps on FX settlement fees would be significant steps in this direction. By easing restrictions and fostering fair competition, these measures could enhance the vital role MFIs play in Georgia's FX market.

27. Government bonds are currently issued up to seven years, but the secondary market is illiquid.¹² The lack of heterogeneity in the investor base renders the secondary market largely inactive despite a primary dealer arrangement that incorporates market-making commitments. Domestic participants (mainly banks and, going forward, the pension fund) pursue buy-and-hold strategies while there are very few non-resident investors. With little secondary market activity and the absence of longer-term bonds (90 percent of the outstanding government bonds are shorter than five years, and only 0.3 percent of the portfolio is longer than seven years), price discovery is problematic. Consequently, market participants resort to theoretical values when

¹² The residual maturity of the currently issued 10-year bonds is eight years. The MoF plans to issue 11-year bonds later this year.

estimating the yield curve, while the NBG relies on primary market auction prices. The absence of a solid foundation for pricing the underlying (i.e., cash) market, undermines the development of the longer-term interest rate derivatives market.

28. Short-term interest rate derivatives are rarely traded. Four market participants regularly provide indicative OIS quotes for short tenors. A handful of OIS have been traded by the biggest banks with non-resident counterparties (e.g., the European Bank for Reconstruction and Development) but there have been none transacted between two domestic parties. Although banks have systems to manage foreign exchange risks, including those arising from customer trades, the same is not true for interest rate risks. Any trades currently conducted are processed and accounted for manually. There is therefore a need to modernize banks' treasury management systems. This shortcoming is recognized by the banking industry and the NBG, and a comprehensive project is underway to make improvements.¹³

29. The surveys of banks and NFCs provided some relevant findings. While NFCs view exchange risk as the most important risk, most never hedge with FX forwards because they find it too costly, while others can generate natural hedges (e.g., through FX liability management). Banks' use of FX forwards is also limited since they rarely need it for managing their FX positions. Their common view is that corporate demand for FX forwards is held back by the lack of awareness about exchange rate risks.

B. Which Hedging Markets?

30. The first markets to target for development are those associated with the most relevant risks for the potential users, and those with the most favorable conditions. In an open economy with a floating exchange rate, FX risks will likely dominate. According to the Bank for International Settlements' triennial FX and derivatives surveys (2022), in emerging markets, the turnover of FX derivatives was twice that of interest rate derivatives.¹⁴ Another consideration is that derivatives with relatively fewer preconditions should be prioritized. More complex derivatives, which rely on deeper markets and possibly on other derivatives, should wait. In the case of FX derivatives, this implies that a forward market be developed before an options market. And for interest rate derivatives, a focus on the local currency OIS market should precede that of the cross-currency swap market.

31. The FX forward market is important as it can strengthen spot market liquidity. Global shocks to domestic currencies, which typically spill over to the domestic market because

¹³ The GFMTA, with the support of the NBG, has been coordinating the joint procurement of a shared treasury management system (MX.3) by Murex for six Georgian commercial banks. This system would enable automated processing of transactions and valuations of a broad range of financial instruments, including local currency derivatives. The contract is expected to be signed in coming months, after which the implementation of the system may take 1-1.5 years.

¹⁴ In comparison, the two types of instruments are roughly at par in advanced economies.

of purchases and sales by non-residents, can be offset by domestic actors hedging their opposing exposures through FX forwards. Such hedging activity could lead to lower exchange rate volatility than in the case without it.

Box 4. OIS Mechanics

Interest rate swaps are agreements to exchange floating and fixed interest rates. In an overnight indexed swap (OIS), the floating leg of the swap is linked to an overnight reference interest rate (e.g., euro short-term rate, secured overnight financing rate, and sterling overnight index average), which is subject to daily changes. This is a key difference from longer-term interest rate swaps where the reference rates are modified less frequently (e.g., quarterly).

OIS transactions have limited impact on credit risk and liquidity. No cash is transferred at the inception of an OIS trade, and the parties only exchange the difference between fixed and floating interest rates upon maturity. Counterparties only need to take credit risk into account to the extent of the net present value of future interest payments, which puts little burden on the banks' counterparty limits.

The cash flow of the OIS transaction upon maturity is computed as the difference of the cash value of the two legs using the following formula:

$$\left\{ \left[\prod_{i=1}^n \left(1 + \frac{r_i^{o/n}}{360} \right) - 1 \right] - \left(r^{fix} \times \frac{n}{360} \right) \right\} \times \textit{notional value},$$

where n is the tenor of the OIS in days, $r_i^{o/n}$ is the overnight reference interest rate on day i , and r^{fix} is the interest rate on the fixed leg of the swap.

At inception, the fixed rate can be established using the above formula by setting a series of expected overnight rates over the swap's tenor, aiming to achieve a cash value of zero. Subsequently, a spread can be added or subtracted from this rate to reflect the compensation for market making.

Assuming strong monetary transmission, and a well-functioning OIS market, policy rate expectations can be derived from the fixed rate of the OIS. This could be a useful source of information for the central bank when formulating its policy decisions or the associated communication strategy.

The introduction of overnight risk-free rates (RFRs) and the phasing out of quote-based term benchmarks have created a structural shift in interest rate derivatives markets globally. The phasing out of LIBOR and the shift to compounded overnight RFRs removed the fixing risk associated with interest rate benchmarks, making forward rate agreements (FRAs) obsolete. As a result, interest rate swaps referencing the LIBOR have been replaced with OIS, which is linked to overnight RFRs. The latest BIS data corroborates this shift as it indicates a sharp decline of FRA trading and an increase in OIS trading in 2022 in jurisdictions where these transitions have taken place.

The abolition of the LIBOR also necessitated adjustments in the FX derivatives markets. Cross-currency interest rate swaps' conventions had to be modified to link the payments to RFRs instead of LIBOR rates. A well-functioning domestic OIS market would help align local market conventions with international ones and provide a forward-looking reference interest rate.

32. The importance of exchange rate risk is associated with the openness of the economy. From a sample of 46 countries (Figure 10), there is a positive correlation between the volume of a country's international trade and domestic NFCs FX forward trading. This relationship is non-linear, suggesting that other factors associated with the countries' size might also be at play. The relationship between NFCs forward volumes and spot activity (Figure 10) indicates stability around the relative size of the FX spot and forward markets.

33. Georgia is below international comparisons of forward market activity, indicating there is room for development. Georgia is on par with other countries when the forward

turnover is compared to the country's international trade volume (adjusted for size). It is, however, an outlier with its relatively small forward volumes by NFCs when compared with spot volumes. Some other Eastern European countries show similar patterns, albeit to a lesser magnitude.

34. Developing interest rate derivatives is more challenging. Intuitively, this makes sense as importers and exporters naturally generate significant financial exposures in their business operations. In contrast, interest rate risk typically involves more concentrated exposures in shorter maturities and is less dynamic. Moreover, price volatility in exchange rates higher than that for interest rates.¹⁵ With this very likely smaller market, the initial focus should be on short-term OIS tenors (up to 12 months). Participants would most likely seek to insure against adverse monetary policy actions, which potentially could hurt cashflow and jeopardize a business. Ultimately, as more participants enter the market with different risk profiles, longer-dated interest rate risk hedging products would follow.

C. Enabling Conditions for Market Development

35. There are four building blocks of derivatives markets' development, described in detail below. The situation in Georgia is assessed against these:

- *An enabling regulatory environment* that ensures legal certainty of the derivative contracts, covering aspects like covering of close-out netting, regulation of eligible collateral, hedge accounting, and margin requirements.
- *A robust market infrastructure*, encompassing payment and settlement systems, trading platforms, market data providers, trade repositories, and the treasury and risk management systems of market participants.
- *A diverse range of financial instruments*, available to serve as the source of the underlying product for derivatives (e.g., overnight interbank money market reference rates¹⁶ for the OIS and FX spot markets for FX forwards) as well as a potential tool for market participants to hedge their derivative positions if needed (i.e., assets with fixed or floating rate coupons for OIS).

¹⁵ For example, consider a one-year discount rate and an exchange rate with annualized standard deviations of 1 percentage point and 10 percent, respectively. Assuming a normal distribution, an asset with one-year duration would lose 20 percent of its value at the 2.5 percent tail, of which 19 percent would be attributable to the exchange rate. In contrast, a five-year duration asset would lose 24 percent of its value, of which 5 percentage points would be attributable to the interest rate change.

¹⁶ In Georgia, the TIBR rate is the weighted average interest rate on overnight unsecured loans issued in the national currency between domestic commercial banks.

- *A broad user base with heterogenous risk profiles*, possessing incentives and sufficient knowledge to manage financial risks.

Regulation

36. The Georgian authorities have implemented an array of legal and regulatory reforms to support development of the derivatives market (Table 4). These include introducing in Georgian legislation comprehensive definitions of the main types of derivatives. These follow International Swaps and Derivatives Association and International Capital Market Association guidelines, ensuring enforceability of derivatives contracts, perfecting netting, and close-out netting, and clarifying the rights of re-use of different types of financial collateral. An important prudential element of these reforms is that at least one counterparty in a derivative transaction must be a supervised financial institution. Authorities have chosen not to prescribe binding margin requirements. Instead, financial intermediaries may set initial and variation margins based on their internal risk management processes.

37. Appropriate treatment of hedge accounting is still to be addressed. Hedge accounting under International Financial Reporting Standards aligns the accounting treatment of financial instruments with the risk management activities of an organization to minimize volatility in profit or loss statement. In Georgia, there is no distinction between derivatives used for hedging or speculative purposes, and all unrealized mark-to-market gains on derivatives are taxed. This treatment undermines incentives for the use of derivatives since taxes may be incurred where no actual profit has accrued.

Table 4. Status of Derivatives Markets' Regulation¹⁷			
Regulation	Requirement	Availability	
		FX Forward	OIS
Close-out netting	Essential	Yes	Yes
Collateral	Essential	Yes	Yes
Hedge accounting	Good to have	Possible	Possible
Margin requirements	Good to have	No	No

Infrastructure

38. Financial market infrastructures have been implemented to support market activity (Table 2). These include a real-time gross settlement system and securities settlement system to facilitate delivery-versus-payment transfers of funds and securities between counterparties. Bloomberg is widely used as the standard data provider and trading platform (BMatch). The NBG requires granular reporting from participants for effective monitoring of financial market risks, including those arising from derivatives transactions. There is, however, no central

¹⁷ The colors in tables 4-7 correspond to the availability of the listed building block: available (green), partially available (yellow), and unavailable (red).

counterparty (CCP) for clearing of derivatives trades in Georgia and one could not currently be justified given that derivatives volumes are expected to remain low in the medium term. When considering establishing a CCP, the NBG should undertake a full cost/benefit analysis of the business case.¹⁸

39. Banks have recognized deficiencies in their treasury management systems regarding, specifically in the management of interest rate risks. While these shortcomings are not currently perceived to be important, due to the prominence of short-term and variable rate products (deposits and lending), addressing them is essential for market development. Accordingly, the NBG has facilitated a project in which six banks are collaborating to finance a new treasury system. This system would include functionality for managing interest rate risk, including that arising from derivatives transactions.¹⁹

Table 5. Status of Market Infrastructure

Market Infrastructure	Requirement	Availability	
		FX Forward	OIS
Trading platforms or exchanges	Good to have	Bloomberg	Bloomberg
Central counterparties	Good to have	No	No
Trade repositories	Good to have	NBG reporting	NBG reporting
Payment and settlement systems	Essential	RTGS, GSSS	RTGS, GSSS
Market data providers	Essential	Bloomberg	Bloomberg
Treasury and risk management systems	Essential	Yes	In progress

User Base

40. A lack of heterogeneity of financial risk profiles and appetite amongst participants is the biggest constraint to market development (Table 6). Financial markets facilitate the transfer of financial risks between participants, but to function, markets require participants that gain from such trades. Currently, these “gains from trade” are severely limited due to the bank-centered and highly concentrated nature of the financial sector. With hedging markets, participants must first be able to assess the extent and probability of potential losses arising from their financial exposure. Then they should be able to price that risk to make an informed decision on engaging in a hedging transaction; if the price of hedging is assessed as too high, they will not engage in the transaction. Important in this pricing is the extent to which there is another participant willing to take the other side—either because they have an opposite exposure, or they

¹⁸ See [World Bank \(2022\)](#).

¹⁹ The shared treasury management system (MX.3) by Murex (see Footnote 3) would enable automated processing of transactions and valuation of a broad range of financial instruments, including local currency derivatives.

are willing to assume the risk in expectation of profiting from a favorable move in the price (i.e., an open or speculative trade). The greater the number of participants with dynamic, heterogeneous risk profiles and appetites, the more liquid market activity will become.

41. The mission’s survey confirmed that there is limited awareness of hedging instruments among potential users. Corporates cited the lack of need, inadequate price transparency, and the relatively high cost as the main reasons for not using derivatives for hedging. Banks were of the view that corporate demand for FX forwards is held back by the lack of awareness about the exchange rate risk and the limited knowledge of the available hedging instruments.

42. The NBG has significantly contributed to the training and education of market participants in collaboration with the GFMTA. Established as Georgia's equivalent of an FX committee, essential for the effective adoption of the Global FX Code, the GFMTA has served as a consultative body for participants in the broader financial market beyond FX. In addition, one of its core activities has been organizing training courses offered by the International Capital Market Association for domestic market participants. In fact, the NBG set the attainment of relevant professional certificates by banks’ treasury staff as the precondition for participating in the domestic interbank FX market. This requirement has strengthened the incentives for banks to participate in these training programs.

43. The small size of the Georgian economy limits non-resident banks’ active participation in the local financial markets. In the past, several large international banks operated subsidiaries with various business models in Georgia, but the small size of the domestic market prevented the scale required for them to leverage on their competitive advantages, particularly in relation to the retail sector. The greatest value these banks could add would be in the case of export-oriented domestic subsidiaries of large multinational companies. This structural feature of the economy is difficult to overcome.

User/Investor Base	Requirement	Availability	
		FX Forward	OIS
Heterogeneity of risk profiles and appetites	Essential	In progress (hedging, speculation)	In progress (hedging, speculation)
Knowledge	Essential	In progress	Not significant
Foreign participation	Good to have	Not significant	Not significant

Underlying and Supporting Products

44. The FX spot and the unsecured overnight interbank money markets are liquid, facilitating representative and reliable reference rates for derivatives. The FX spot market is functioning well, allowing the NBG to produce its daily official reference rate in a representative

and robust manner. Similarly, trading volume in the unsecured overnight interbank money market is sufficient for setting the TIBR rate. Those reference rates are based on comprehensive frameworks that safeguard their credibility.

45. Alternative assets that can be used to hedge derivative positions are partially available. As for FX derivatives, the spot market is deep and liquid enough so that market participants with exposures from derivative instruments can effectively adjust their positions. Regarding the development of the OIS market, it is helpful that its underlying benchmark, the TIBR rate, is broadly used as a reference rate for a wide range of financial instruments, including floating rate bonds and bank loans.

46. The absence of a liquid market for financial instruments paying at a fixed rate hinders demand for OIS. Of the two sides of the market, participants who would pay fixed interest rates (e.g., fixed rate borrowers) in exchange for receiving floating rates include banks. On the other hand, fixed rate receivers are largely absent, or if present, seem inactive (e.g., insurance companies and pension funds). The reliable reference rate (i.e., the TIBR) is present. Of the potential hedging instruments, there are no net issuances of government bonds over the last three years, and secondary market activity is subdued.

47. Domestic funding markets are accessible for potential derivative users. FX forward users can access GEL funding locally. Currently, abundant U.S. dollar funding is available, as 45 percent of the deposits in Georgia are in dollars. The availability of funding markets is not essential for the development of the OIS market since OIS transactions do not impact liquidity (see Box 4).

Table 7. Status of Underlying Products			
Underlying and Supporting Products	Requirement	Availability	
		FX Forward	OIS
Liquid markets for the underlying assets	Essential	Yes	Yes
Representative and reliable reference rates	Essential	Yes	Yes
Assets to be hedged	Good to have	Yes	Government bond market not liquid
Funding markets	Essential	Yes	Not applicable

D. Medium-term Development Strategy

48. Based on the analysis in the previous section, a medium-term strategy is needed to close the identified gaps in each building block. The authorities have addressed all regulatory issues (building block 1) and made excellent progress on infrastructure issues (building block 2). The lack of a diversified investor base (building block 3) is the biggest challenge, given the size

and structure of the economy and concentration of the financial sector. Further progress can be made on the underlying and supporting products (building block 4) where competition issues come into play.

Infrastructure

49. There is room for improvement in terms of market participants' IT systems. Larger banks have modular treasury management systems that allow for automated processing of FX transactions, including forwards. In addition, these systems include risk management modules that ensure appropriate control over exposure limits. In contrast, domestic single currency interest rate derivatives cannot be processed by banks' treasury management systems.

50. The joint procurement of a treasury management system by domestic banks should be concluded swiftly. Six domestic banks are currently in the process of jointly procuring a coordinated system, with support from the NBG and the European Bank for Reconstruction and Development. This arrangement will enhance efficiency since it entails cost sharing. However, it complicates the procurement process. Once the negotiation phase is completed and a contract is signed, it may take 1-1.5 years to test and implement the system. Participants should prevent further delays as the absence of this system is an important bottleneck for the development of the onshore derivatives markets, especially OIS.

51. The NBG could set up a standardized FX forward trading platform on BMatch to provide NFCs additional access to liquidity. The envisaged trading platform would be similar to the one in place for FX spot trading. Based on market intelligence, the NBG should assess whether instruments should be priced as outright forward exchange rates or as swap points. The proposed instruments would have fixed maturities of initially 1-month, 2-months, and 3-months. Going forward, every month a new 3-month contract with a fixed maturity date would be added. Similar to spot trading, non-bank users would be able to place limit or market orders directly if they have Bloomberg Terminal or via a bank. The proposed trading venue would operate in parallel with the existing direct trading, allowing banks to provide their clients with tailored instruments. Clearing, settlement, and margining of such transactions would be identical to the existing OTC FX forwards.

52. These standardized BMatch-traded FX forwards would offer NFCs multiple benefits relative to the currently available OTC FX forwards. The standardization facilitates easier trading and improved liquidity, as it concentrates demand and supply on fewer forward tenors. The greater liquidity and higher level of transparency by trading on BMatch would enhance price discovery and fairness in the market. In addition, this platform ensures that all trades, prices, and volumes are visible to the NBG. However, for users, particularly NFCs with specific future cash flows to hedge, there is a certain degree of basis risk associated with the maturity date of the forward contract and the date of the expected cash flow.

User Base

53. The NBG should continue exploring strategies to broaden and incentivize the investor base to use hedging. The mission’s survey results confirmed that there is limited awareness of exchange rate risk in the corporate sector, which holds back participation in the FX derivatives market.

54. The NBG should assess how its FX intervention strategy influences incentives to hedge. The NBG’s agile response to market volatility removes exchange rate risk from the market, thereby reducing incentives to hedge. This is because the interventions serve as a form of cost-free insurance to the market. When market participants compare the relatively high cost of hedging with the relatively low level of perceived exchange rate risk, they do not find hedging attractive. While the cost of hedging—that is, the interest rate differential between the lari and the U.S. dollar—is given, more volatility makes hedging more attractive. Ultimately, the NBG needs to consider tradeoffs and should aim to do the minimal amount of intervention necessary to meet its primary objectives of price and financial stability. Intervening too early and too often may, in the short-term, help meet the statutory objectives. However, it will likely undermine incentives for market-based transfers of risk²⁰ and, therefore, market development²¹ in the longer term.

55. The NBG should continue to support the targeted education and training efforts. GFMTA has been proactively coordinating several education programs on various financial market segments. To help implement the best international standards, these programs involve reputable service providers from the FX industry in advanced markets. In the area of FX hedging, the GFMTA plans to engage with the corporate sector to provide targeted training on exchange rate risk management. The NBG should support these efforts to the greatest extent possible.

56. The NBG should investigate potential barriers preventing the Pension Agency (PA) from participating in the derivatives market, given its investment mandate. The PA has its strict investment mandate in which market development is not included. Therefore, its use of hedging instruments must come from its genuine investment interest. Nevertheless, the NBG, as the regulator of the PA, should explore if any regulatory constraints prevent the PA from enhancing its investment performance by using derivatives.

²⁰ Koosakul and Shim (2017) show the beneficial effect of exchange rate volatility on FX market liquidity measured by trading volume in Thailand’s FX spot market.

²¹ IMF (2020) suggests in the context of the Fund’s Integrated Policy Framework that persistent foreign exchange intervention is generally believed to slow market development.

Underlying and Supporting Products

57. Improving the functioning of the underlying markets requires attention. Derivatives are priced off underlying assets which, if not liquid, may increase perceived risks of dealing in derivatives markets. In this vein, net issuance of government bonds has been low in recent years. Increasing the availability of longer maturity government bonds would help underlying liquidity, and ultimately derivatives market development.²² Government bonds can be used as hedging instruments for OIS transactions and, conversely, government bond holders can use OIS to hedge their exposures. While it is reasonable to launch derivatives markets after the underlying asset is reasonably liquid, there is also a case to move earlier, particularly in core markets, since the introduction of derivatives themselves can spur activity in the underlying asset.

58. The NBG should revise its FX forward index to be more informative. Currently, the NBG publishes the average forward points of quoted FX forwards to make price information publicly available. As this information is quote-based, it may not accurately reflect actual market prices. Therefore, the indices should be based on transaction data. In addition, the data should be published in the form of forward rates instead of forward points to make it easier for market participants to compare them with the quotes they receive in the market.

59. The NBG could help price discovery and transparency by publishing OIS benchmark rates on its website. The OIS market is inactive, and trading is not expected to pick up in the near term. Nevertheless, it would be beneficial for a small number of market participants to provide indicative bid and offer quotes at benchmark tenors. Even if no transactions take place, market participants could view this as an opportunity to express their expectations for the TIBR interest rate and the NBG policy rate. Based on those quotes, the NBG should publish OIS benchmark rates on its website to improve transparency.

²² During the last three years, the outstanding government securities portfolio has increased from 3.8 billion GEL to 6.8 billion GEL. This is approximately 80 percent in nominal terms, but little changed in nominal GDP terms.

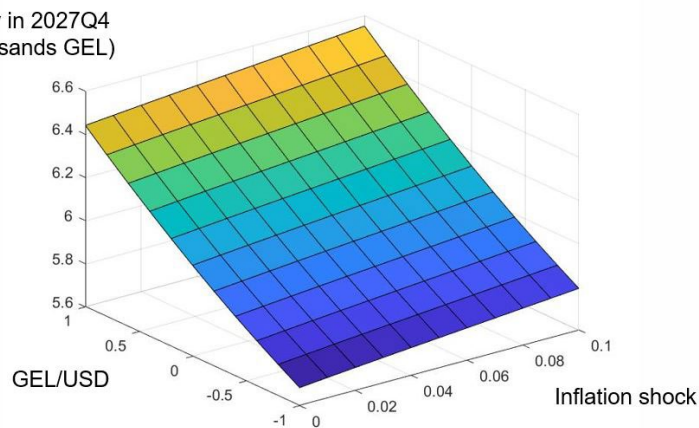
APPENDIX I. SENSITIVITY ANALYSIS

Risk sensitivities from a “bird’s eye view” are computed. Figure A-1-1 shows how equity changes as inflation and the exchange rate between the USD and Georgian lari (GEL/USD) change. First, depreciation of USD/GEL increases the equity because of the FX revaluation gain from the net foreign reserves. Second, higher inflation increases the equity mainly because of the interest income from the refinancing loans (OMO) and the investments in the government bonds in GEL.

Figure A-1-1. The Impact of Inflation and FX on Equity

Equity increases if the GEL depreciates against the USD or if inflation increases.

Equity in 2027Q4
(Thousands GEL)



Source: IMF staff calculations.

APPENDIX II. CAPTURING FX TAIL RISK

The impact of capturing FX tail risk or time-varying FX volatility is analyzed by employing the EGARCH model. Let us denote the log return of exchange rate (USD/GEL or EUR/USD) with r_t . The EGARCH (1,1) model is represented as:

$$r_t = \sigma_t \cdot \epsilon_t$$

$$\log \sigma_t^2 - \log \bar{\sigma}^2 = \rho(\log \sigma_{t-1}^2 - \log \bar{\sigma}^2) + \nu \left(|\epsilon_{t-1}| - \sqrt{\frac{2}{\pi}} \right) + \gamma \epsilon_{t-1},$$

Where ρ is the auto-coefficient, $\bar{\sigma}$ is the mean-reverting level of the volatility, and ν is the volatility of volatility. γ is the parameter to capture the feedback effect from the return to the volatility. The EGARCH model is estimated based on the maximum likelihood estimation.

Figure A-2-1 shows how the distribution of the equity differs between two FX volatility models for USD/GEL: (a) the constant volatility model and (b) the EGARCH volatility model specified as described above. The parameters of both models are estimated using historical data. Note that the EGARCH volatility model is one of the most parsimonious models to capture time-varying volatility and is easy to estimate. Figure A-2-2 shows the distributions of equity under two model choices. Compared to the constant volatility model, the distribution of equity under the EGARCH model is fat-tailed. The equity becomes negative with small probability due to revaluation losses. As the revaluation losses are caused by the appreciation of GEL against the USD, there is not much concern, but this exercise shows that the FX modeling impacts the results.

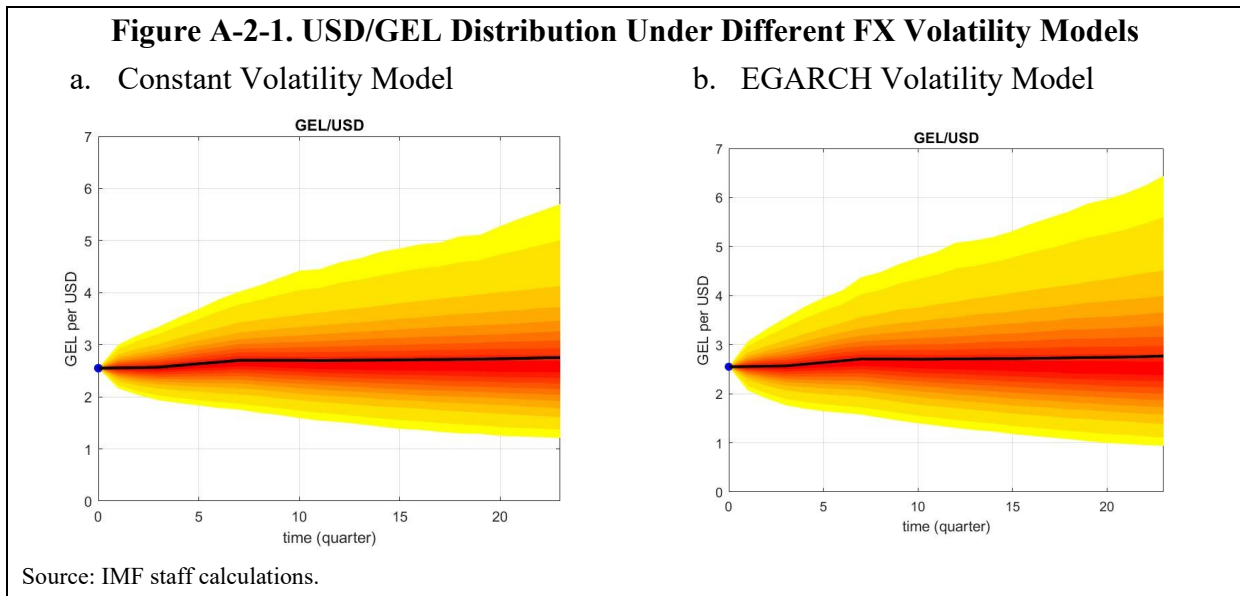
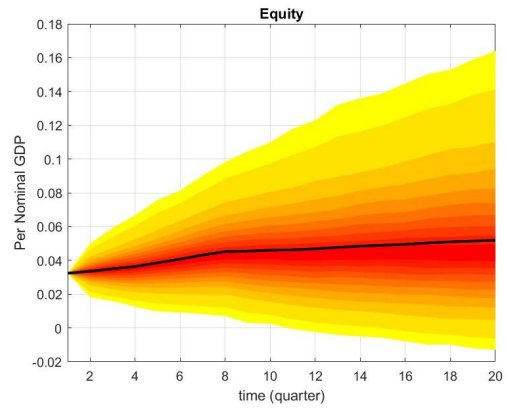
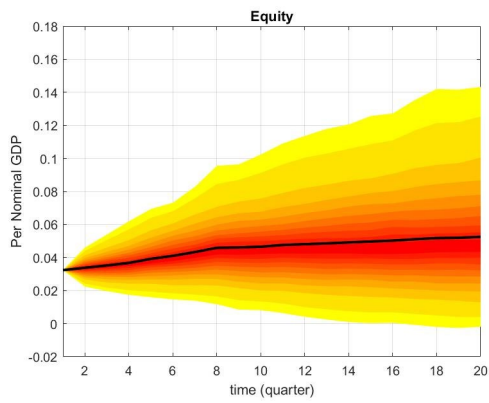


Figure A-2-2. Equity Distribution under Different FX Volatility Models

a. Constant Volatility Model

b. EGARCH Volatility Model



Source: IMF staff calculations.

APPENDIX III. MODELING TRANSFERS TO THE MOF

We assume that reserve money is defined as the sum of currency-in-circulation and required reserves:

$$ResMoney_t = CiC_t + ResReq_t$$

If reserve funds exceed the target level of reserve funds ($ResFund_t^{max}$), then the central bank transfers the net profit to the Ministry of Finance (MoF):

$$ResFund_{max,t} = \eta_{ResFund} \cdot ResMoney_t$$

$$Transfer_{MOF,t} = Realized\ earnings_t - (ResFund_t^{max} - ResFund_{t-1})$$

$$GovDepo_t = GovDepo_{t-1} + Transfer_{MOF,t}$$

The first term in the second equation represents realized earnings, while the second term represents the allocation of these earnings to reserve funds for maintaining the target level $ResFund_t^{max}$. The transfer to the MoF is captured as the increase in the government deposits.

APPENDIX IV. SATELLITE MODELS FOR CAPITAL SURGES

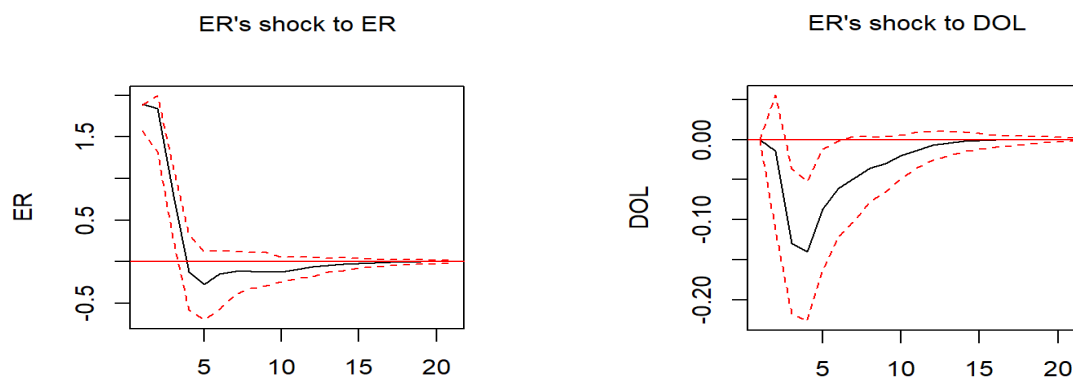
An eight variable VAR model was estimated to inform the drivers of dollarization in Georgia. The eight variables included in the model are shown in Table 1.0. The VAR is estimated using a standard Choleski decomposition, with the order as follows: (i) the prudential measures block; (ii) the development of the capital markets block; (iii) the dollarization variables block; and (iv) the macro variables block. The main results, however, are robust to different orderings of the variables in the model. The frequency of the data used is monthly, spanning 2003M10 to 2022M12. A similar methodological approach can be found in García-Escribano and Sosa (2011).

Table A.IV.1 Data Description for VAR Model

Macro Variables Block	
Inflation	Sum over t and t-1 of the monthly percentage change of the CPI.
Exchange Rate	Sum over t and t-1 of the monthly percentage change of the nominal exchange rate.
Exchange Rate STDV	Standard deviation (STDV) of daily percentage change of the nominal exchange rate over 90 days.
EMBI	First-difference of the JP Morgan Emerging Markets Bond Index (EMBI) spread, divided by 100.
Prudential Measures Block	
Reserve Requirement Spread	Difference over t and t-2 of the spread between the required reserve requirement rate on foreign currency deposits to the rate on domestic currency deposits (in percent).
Dummy_1	Dummy equal to 1 (for three months) after the introduction of prudential measures (other than changes in reserve requirements); zero otherwise.
Development of Capital Markets Block	
Dummy_2	Dummy equal to 1 if medium-to-long-term bonds (between 10 to 30 years, depending on the country) were issued in that month; zero otherwise.
Dollarization Variables Block	
Deposit Dollarization	Change over t and t-1 of the deposit dollarization ratio.
Credit Dollarization	Change over t and t-1 of the credit dollarization ratio.

This choice of variables in the VAR model was based mainly on the need to inform the drivers of dollarization in Georgia. We were particularly interested in the impact of exchange rate depreciation on dollarization for simulation purposes. The impulse response of dollarization to exchange rate shock is presented in Table 2. Using the estimated VAR model, we can conclude that the impact of a one standard deviation shock in exchange rate changes to itself results in a cumulative change of approximately 2.52 percent depreciation. Correspondingly, a one standard deviation shock to exchange rate changes leads to a cumulative response in credit dollarization of 0.68 percentage points (or 68 basis points). Similarly, a 25 percent depreciation in the exchange rate translates to an approximate 7 percentage point decline in credit dollarization.

Figure A-4-1. Response of Credit Dollarization from a Shock to the Exchange Rate



Source: IMF staff calculations.

Note: ER = exchange rate change; DOL = credit dollarization.

All impulse response results were in line with expectations, with satisfactory diagnostic checks.

The Portmanteau Test results failed to reject the null hypothesis of no serial autocorrelation with a p-value of 0.1205. The Auto-Regressive Conditional Heteroskedasticity (ARCH) test failed to reject the null hypothesis that the residuals are homoscedastic with a p-value of 0.374. In addition, the OLS-CUSUM type stability test indicated that the plot of the sum of recursive residuals were all within the acceptable bound.

A second satellite model (inflation equation model) was estimated to inform the impact on inflation from shocks to exchange rate depreciation and dollarization. It was important to include a satellite model that focuses on incorporating important inflation determinants, such as the interaction of dollarization and exchange rate changes, output, oil prices, and global food prices. In this context, the specification of this inflation equation model is as follows:

$$\pi_t = \alpha_0 + \alpha_1\pi_{t-1} + \alpha_2\Delta er_t + \alpha_3 dol_t * \Delta er_t + \alpha_4 X_t + \varepsilon_t,$$

Where π_t is the inflation rate, er_t is the USD/GEL exchange rate, dol_t is the dollarization rate, and X_t is a vector of control variables. This is inclusive of real GDP growth (denoted as Δg_t), changes in Brent oil prices (denoted as Δoil_t), and changes in the global food price index (denoted as Δfp_t). Quarterly data was used from 1996Q2 to 2022Q4.¹ The result of the estimated equation is shown in Table 3.

All coefficients were in line with expectations, while all diagnostic checks were satisfactory. The impact of the USD/GEL exchange rate was estimated to be 23.7, while the impact of dollarization, captured via the interaction term, was estimated to be 0.036. These results are broadly in line with prior research (see Caselli and Roitman 2016). Regarding diagnostic checks, there was no presence of

¹ Credit dollarization was not available prior to 2003. As a result, the deposit dollarization was used as a proxy. Quarterly data had to be used to incorporate real GDP. For the purpose of this analysis, the bilateral exchange rate was used instead of the trade-weighted exchange rate.

serially correlated or heteroscedastic errors (with the diagnostic test results shown in Table 3). The variance inflation forecast indicated no multicollinearity issues with values not exceeding 1.8.

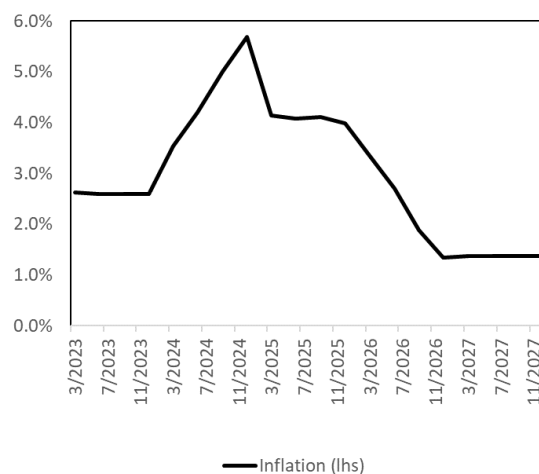
Table A.IV.2. Estimated Results of Inflation Equation

	Estimate	Standard Error	t-value	Pr(> t)
α_0	0.049	0.119	0.408	0.683
Δer_t	0.237***	0.064	3.704	0.000
$dol_t * \Delta er_t$	0.036***	0.009	3.698	0.000
Δg_{t-1}	0.087***	0.015	5.794	7.85e-08
Δfp_t	0.165***	0.042	3.916	0.000
Δoil_{t-1}	0.044**	0.013	3.355	0.001
Adjusted R-Sq	0.52			
Durbin Watson statistic = 2.18 (p-value = 0.8348)				
Breusch-Pagan statistic = 1.09 (p-value = 0.296)				
Variance inflation forecast ranges from 1.02 (Real GDP growth) to 1.88 (exchange rate changes)				

Note: Stars indicate statistical significance at the 1 percent (***), 5 percent (**), 10 percent (*).

Based on the estimated results in Table 3, inflation is forecasted over the medium term from 2024 to 2027. This inflation forecast is, as expected, higher than the 2.6 per cent assumed in the baseline scenario. For this forecast, the path for inflation is conditioned on scenario-driven assumptions for exchange rate depreciation and dollarization over the medium term. It is also assumed that food prices and oil prices grow according to their long-term average growth trend. This results in a forecasted path whereby inflation reaches a peak of 5.7 percent by the end of 2024. Inflation then stabilizes to approximately 1.5 percent by the end of 2027 when all inflation impulses are assumed to significantly weaken.

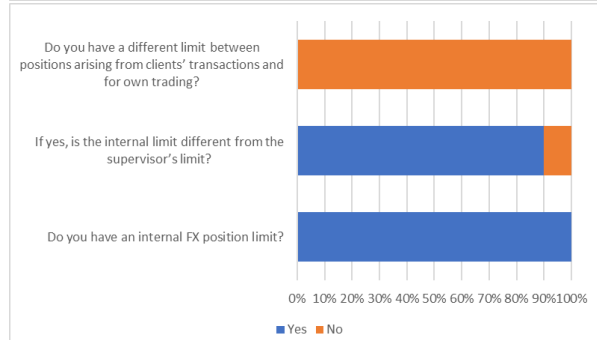
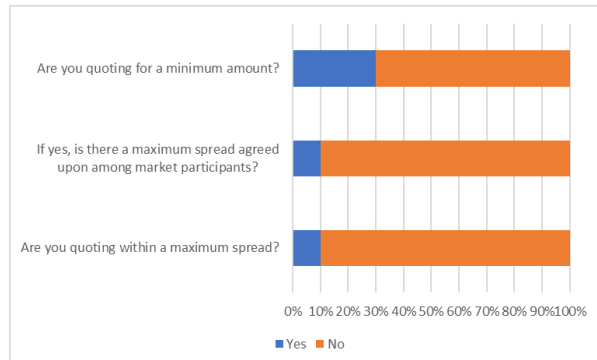
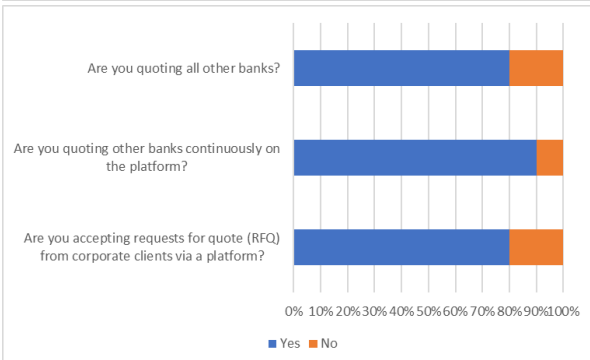
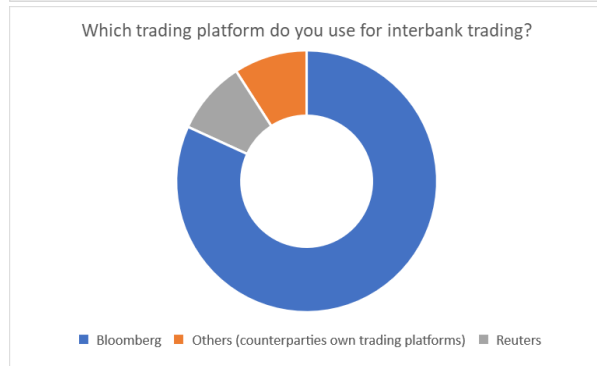
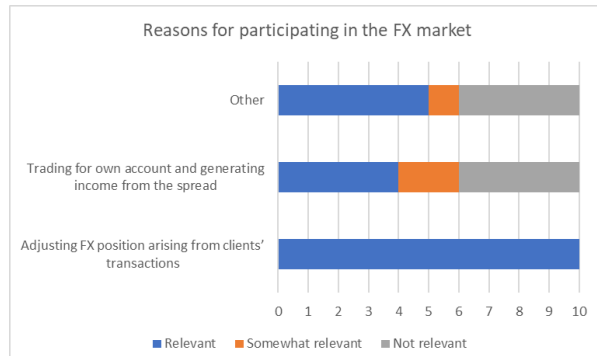
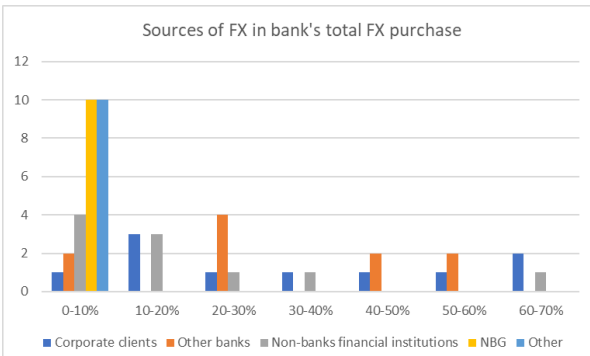
Figure A-4-2. Inflation Forecast

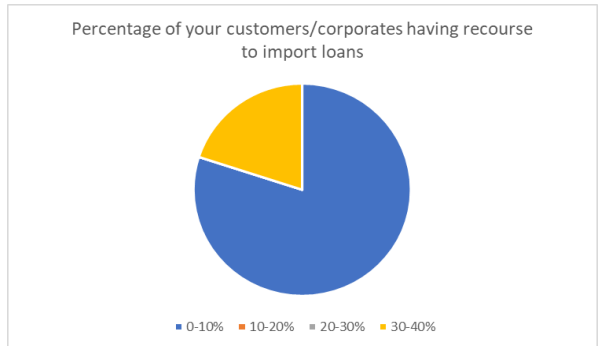
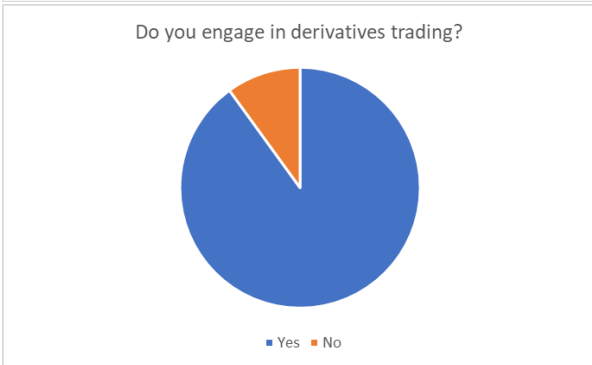
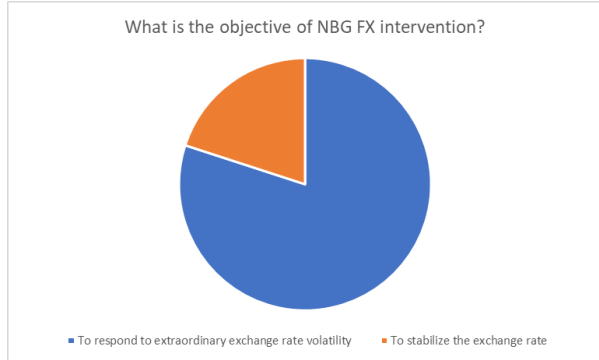
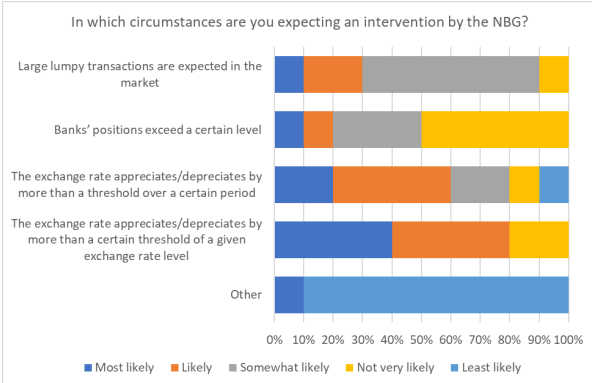
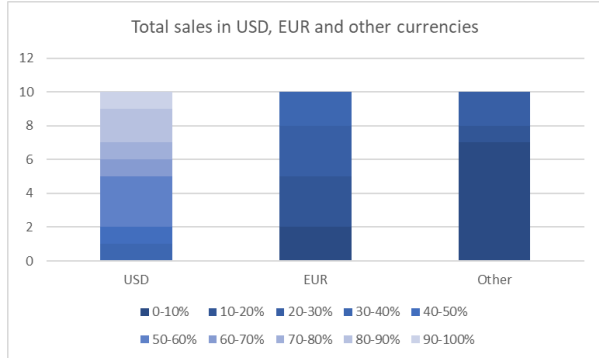
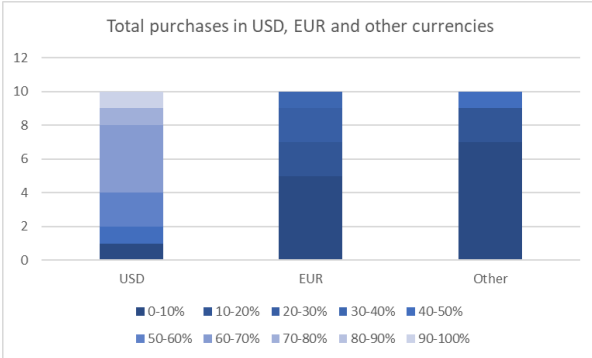
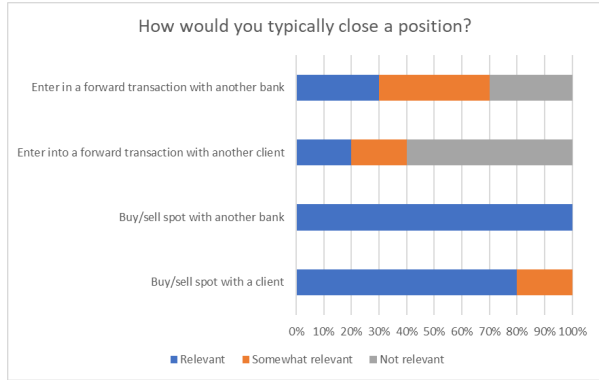
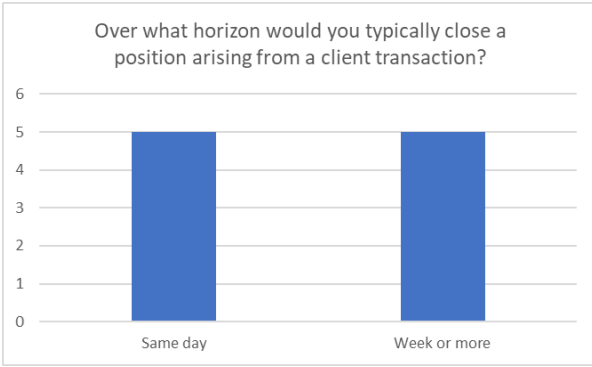


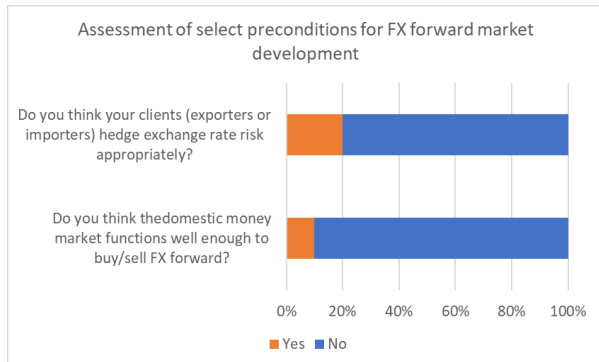
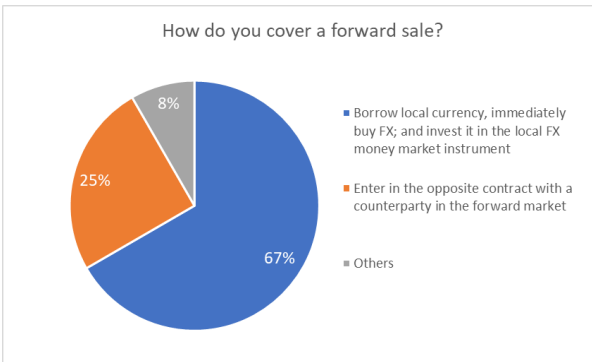
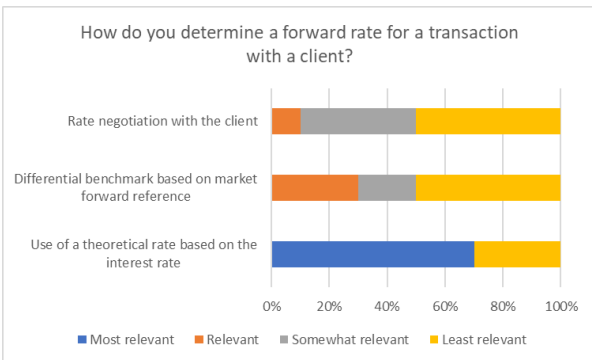
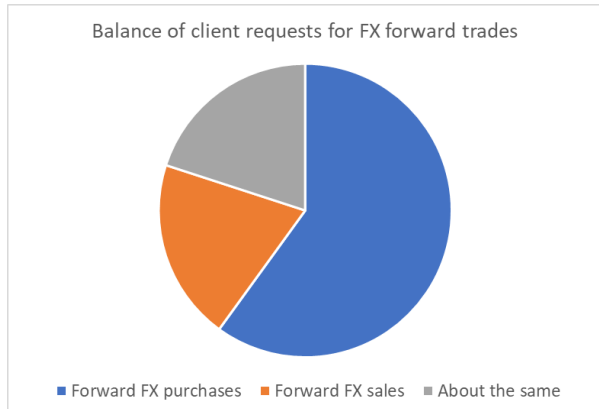
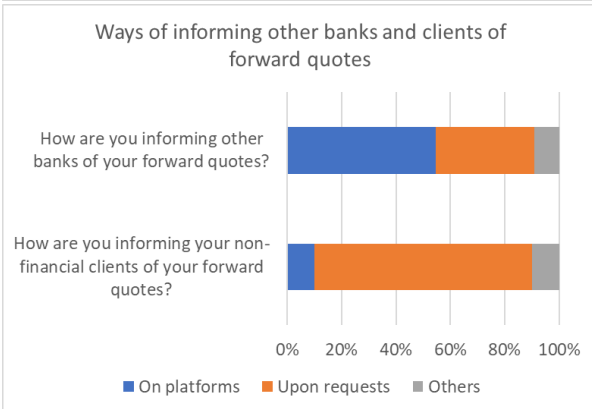
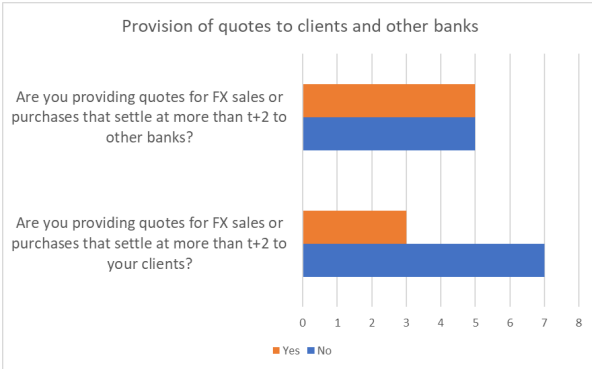
Source: IMF staff calculations.

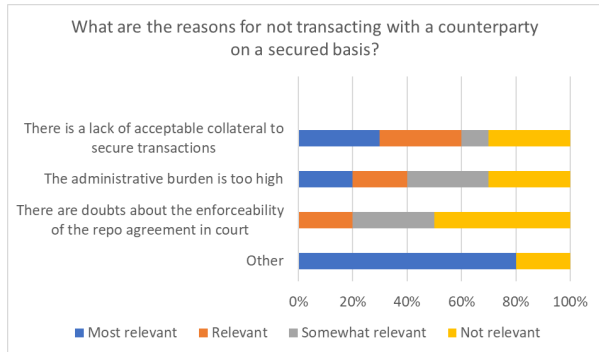
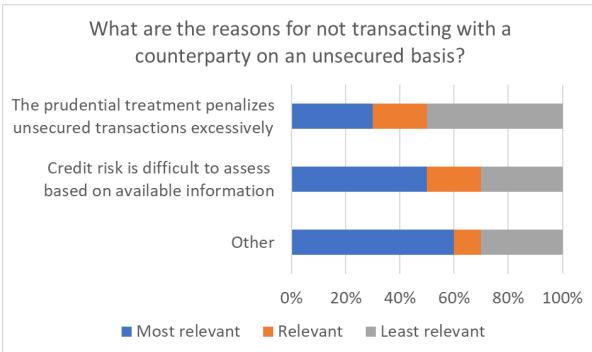
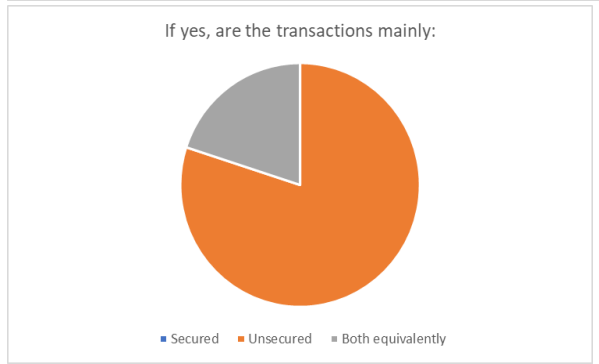
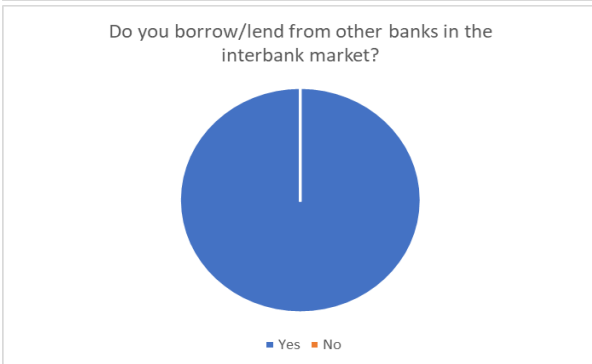
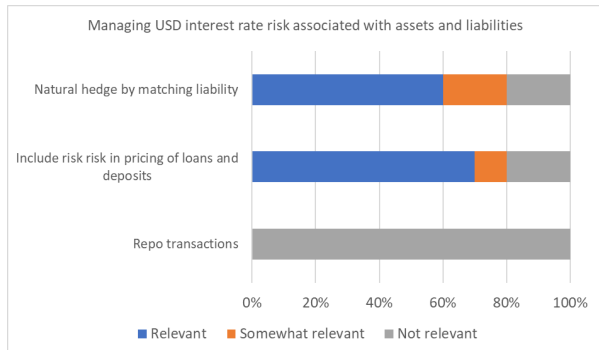
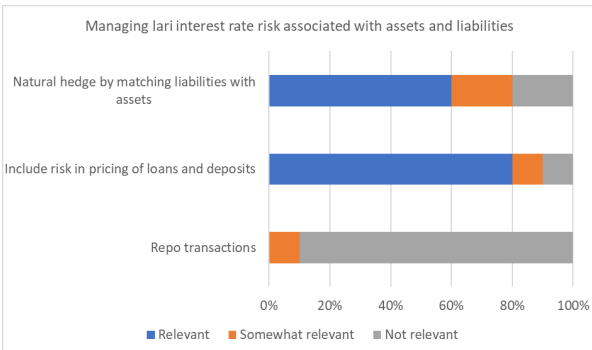
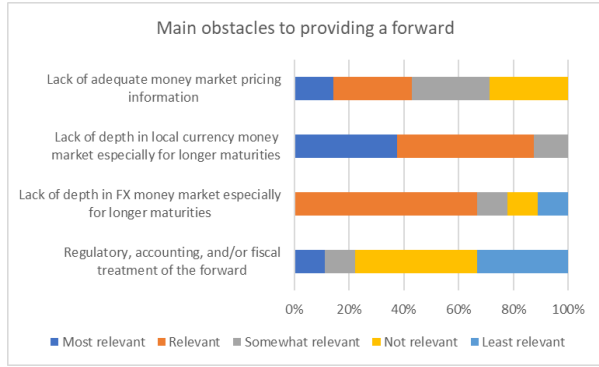
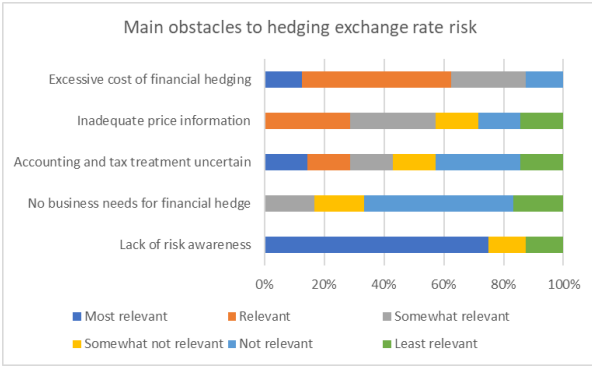
APPENDIX V. BANKS SURVEY RESULTS

Sample size: 10 banks responded to the survey.



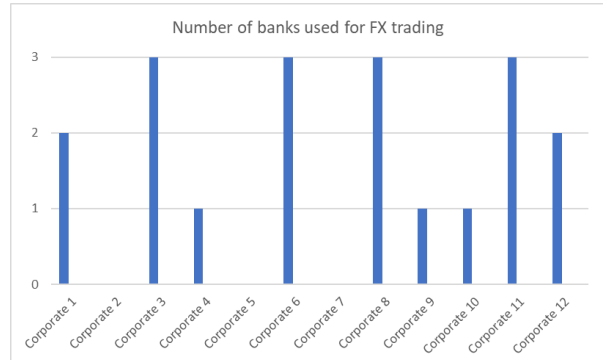
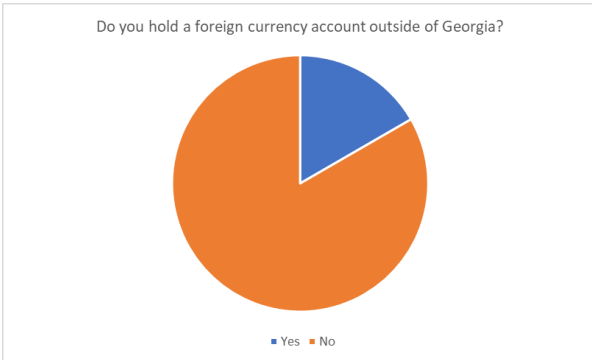
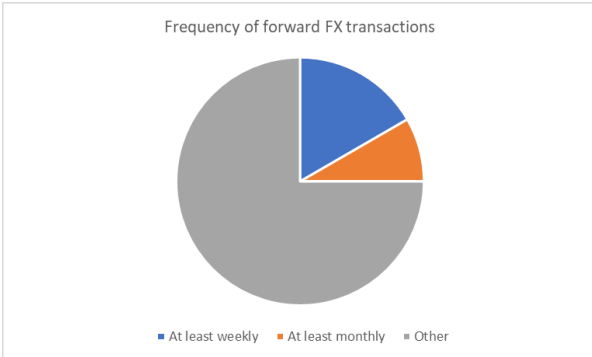
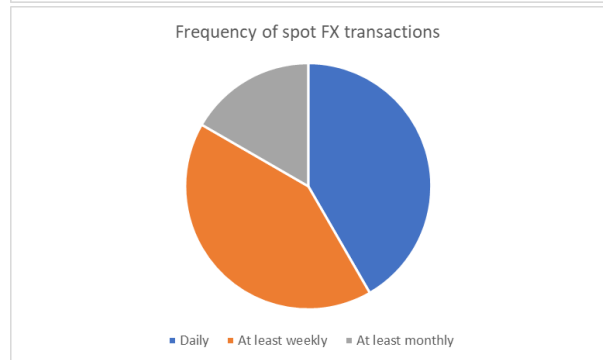
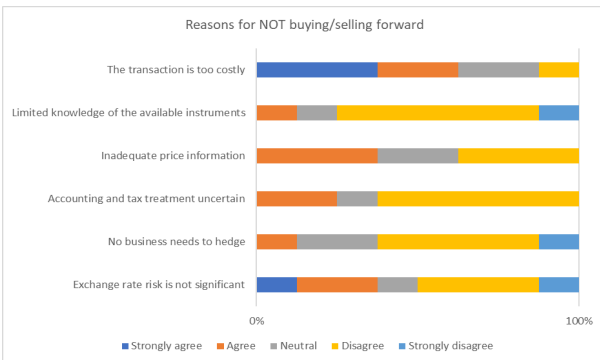
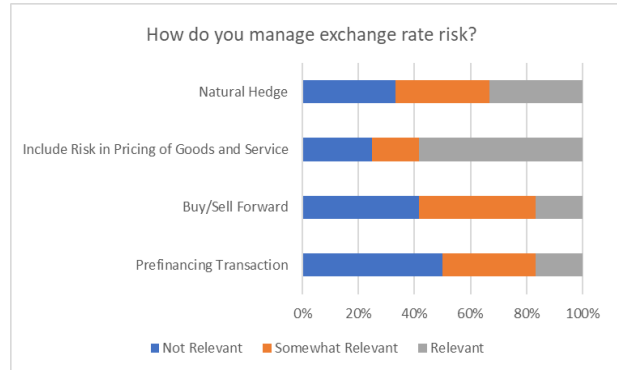
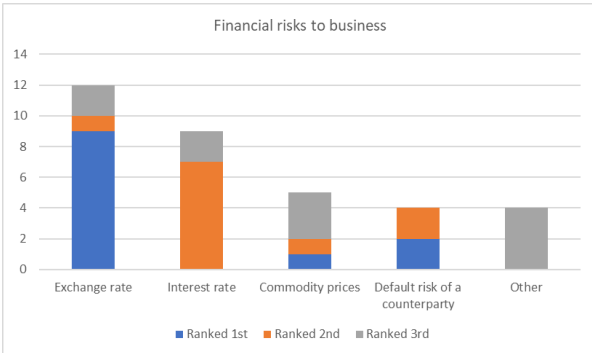


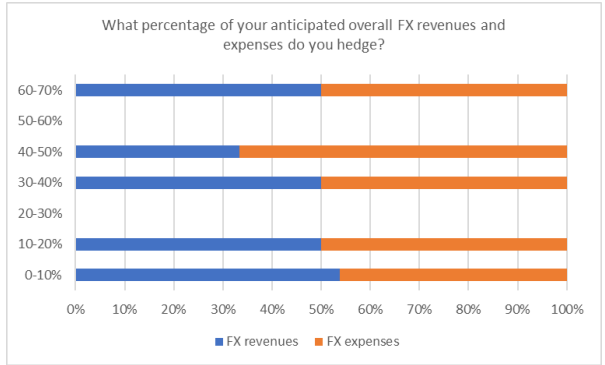
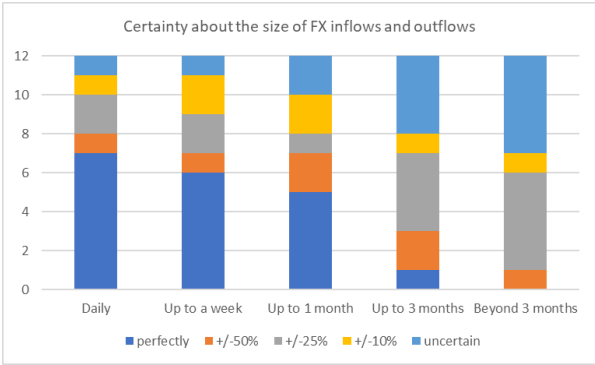




APPENDIX VI. NON-FINANCIAL CORPORATE SURVEY RESULTS

Sample size: 12 companies responded to the survey.





APPENDIX VII. POLICY RULE SPECIFICATION

We employ a simplified Taylor rule for the policy rate i_t , which is specified as:

$$i_t = \rho_i i_{t-1} + (1 - \rho_i) \left(r^* + \pi_t + \gamma_\pi (\pi_t - \bar{\pi}) + \gamma_g (g_t - \bar{g}) \right) + \epsilon_t,$$

Where r^* is the equilibrium real rate and π_t and g_t are inflation and real GDP growth, respectively. $\bar{\pi}$ and \bar{g} are the long-run level of inflation and real GDP growth. The parameters are either calibrated to the historical data or based on assumptions. Specifically, the long-run inflation level is set equal to the official target inflation (3 percent). Long-run real GDP growth is made consistent with the base scenario. The coefficients in the Taylor rule can vary depending on countries, as shown in Hofmann and Bogdanova (2012). We believe that our assumptions on the coefficients are reasonable.

Parameter	Value
Initial policy rate	11%
Equilibrium real rate r^*	2.3%
Autocoefficient	0.89
Volatility of the noise term	0.60%
Inflation gap coefficient	2
Output gap coefficient	0.2
long-run inflation	3%
long-run real GDP growth	5%

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