National Bank of Ukraine

Description of model for stress testing banks in 2025

Main specifics of stress testing in 2025

- In 2025, the NBU returns to the pre-war practice of stress tests under two scenarios, a **baseline** and an **adverse** one.

Memo: previous resilience assessment in 2023 did not provide for stress testing under an adverse scenario, only an estimation of bank indicators under a baseline scenario.

- The **baseline** scenario builds on public NBU forecasts. Exchange rate projections for the baseline scenario are based on consensus forecast by «Focus Economics».
- The **adverse** scenario provides for a rather deep and lasting crisis, which is probable but not catastrophic. This should be enough to ensure resilience of the banks under crisis environment without regulatory easing.
- Under the **adverse** scenario**, credit, interest rate, FX, and operational** risks materialize:
  - ✓ **Credit risk** emerges because of loan quality deterioration. Parameters of loan quality deterioration are set individually for large corporate exposures and on portfolio basis for the rest of loans.
  - ✓ **Interest rate risk** materializes because of unchanged rates on assets and rising cost of liabilities under the adverse scenario.
  - ✓ **FX risks** has a direct impact through revaluation of open currency positions, change in FX risk component of the market risk, as well as indirect impact through credit and interest rate risks.
  - ✓ **Operational risk** materializes through extra losses from operational risk in the year one of the adverse scenario.

Adverse scenario reflects a moderate lasting crisis

- The **baseline** scenario builds on public NBU forecasts. Projected exchange rates for the baseline scenario come from consensus forecast by “Focus Economics” (April 2025).
- The NBU designs the **adverse** scenario based on NBU’s macrofinancial model, taking into account parameters of scenarios of leading central banks regarding the decline of real GDP.
- The NBU assumes :
  - ✓ Real GDP declines by 3.1% in 2025 and gradually recovers in 2027.
  - ✓ The hryvnia depreciates vs US dollar by 25.6% over the forecast period, with most of the weakening occurring in 2025, by 11.2%.
  - ✓ Inflation accelerates because of the decline in economic activity and depreciation.

Indicator	2024	Baseline scenario			Adverse scenario		
		2025	2026	2027	2025	2026	2027
		NBU estimates					
Real GDP, % (yoy)	2.9	3.1	3.7	3.9	-3.1	-2.2	3.3
Nominal GDP, % (yoy)	15.6	16.4	10.9	9.8	24.4	17.7	10.9
Consumer price index, % eop	12.0	8.7	5.0	5.0	17.9	12.5	6.0
		Focus Economics estimates			*NBU estimates**		
Change in UAH/USD rate (period average), % (yoy)	9.0	5.9	6.2	3.2	11.2	10.6	6.4

* The exchange rate indicators are not NBU’s forecast: these are only assumptions under the stress test

Real GDP change under adverse scenario

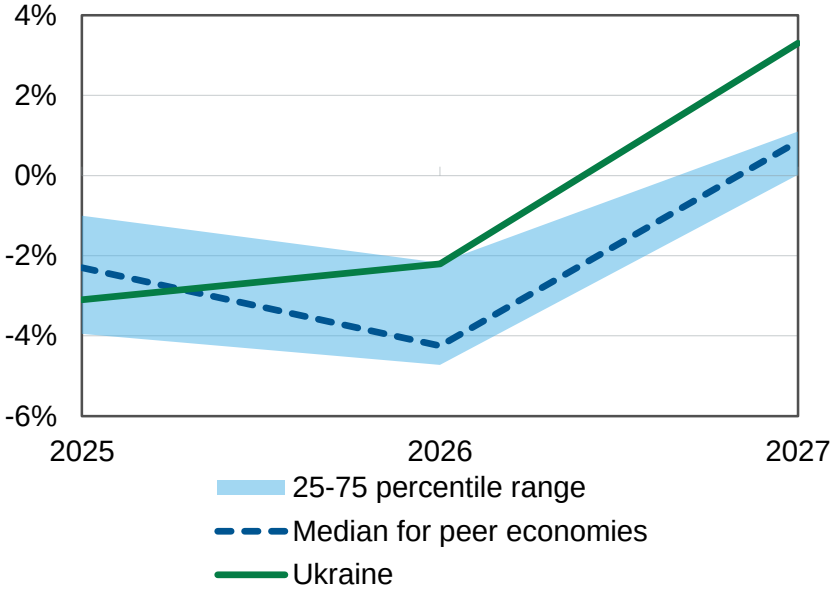
Projected change in real GDP under adverse scenario according to leading regulators, %

	Economy	2024*	2025	2026	2027
Bank of England	USA	2.8	-0.9	-1.9	1.2
	UK	0.9	-2.2	-2.4	1.3
	Euro area	0.8	-1.6	-1.8	1.0
EBA	USA	2.8	-5.1	-2.5	4.3
	UK	1.1	-4.5	-4.5	-1.3
	Euro area	0.7	-2.3	-4.0	0.0
FED	USA	2.8	-3.9	-2.4	4.9
	UK	0.8	-1.8	-2.0	3.9
	Euro area	0.8	-2.1	-2.1	4.0

* Actual.

Source: regulators' approaches to stress tests in 2024-2025.

Forecast of real GDP change under adverse scenario for Ukraine (NBU scenario) and peer* economies (EBA forecast), %



* Czechia, Hungary, Poland, Latvia, Lithuania, Croatia, Türkiye, Romania, Columbia, and Peru.

- Ukraine's GDP fall under the NBU scenario over the first two years of the forecast horizon is in the 25-75 percentile range of readings of peer European countries. In the third year, a growth is assumed given the depth of fall of Ukrainian economy during the preceding crisis (so that the cumulative decline against the baseline scenario is comparable with European countries).
- **The adverse scenario is not a forecast**, its materialization is normally **not expected** by central banks in the near future, but leading regulators admit adverse scenario assuming economic contraction over the forecast horizon.

Stress testing assets on portfolio basis

- Rates of migration of performing loans into defaulted ones are calculated on the basis of the macrofinancial model and with regard on ban of lending to households in FX.
- The macrofinancial model is a semi-structural model designed for macroprudential analysis through a scenario analysis taking into account bilateral links of the financial sector with real economy.
- The minimum loss given default (LGD) rates for businesses and households are set depending on portfolio type and currency based on historic observations on recovery from default loans.
- No cures from default are assumed.

Rates of migration of performing loans (PL) into default (DL) and minimum rates of loss given default (LGD), %

Segment	Cur-rency	Baseline scenario					Adverse scenario				
		2025	2026	2027	min LGD		2025	2026	2027	min LGD	
					PL	DL				PL	DL
Other business loans	UAH	3.9	3.5	3.1	-	-	5.3	6.7	3.1	-	40.0
	FX	5.9	5.3	4.6	-	-	7.9	10.0	4.6	-	40.0
Retail mortgages	UAH	3.0	2.8	2.6	-	-	3.7	4.2	2.6	-	40.0
	FX	100.0	0.0	0.0	85.0	85.0	100.0	0.0	0.0	85.0	85.0
Retail loans secured with cars	UAH	3.9	3.6	3.3	-	-	4.8	5.5	3.3	-	60.0
	FX	100.0	0.0	0.0	100.0	100.0	100.0	0.0	0.0	100.0	100.0
Other retail loans	UAH	7.8	7.3	6.7	-	85.0	9.6	11.0	6.7	-	85.0
	FX	100.0	0.0	0.0	100.0	100.0	100.0	0.0	0.0	100.0	100.0

Stress testing large exposures

01 The largest 20 to 40 borrowers of each bank are stress tested.

Stress test takes into account the impact of groups of related companies/under the same controller — **Yes**

State-owned enterprises | Non-residents | Clients without loans* — **Not stress tested, adjusted for FX rate change and collateral revaluation**

02 For each borrower, the NBU projects profit and loss statement (form 2) over three years under the baseline and adverse scenario. The balance sheet (form 1) is assumed static (including assumption of unchanged amount and specifics of outstanding debt).

03 Capacity of the borrower to service the debt is evaluated through two indicators:

- Modified ratio of interest coverage with EBITDA, ICRm (in default if the ratio is less than 1)
- Debt burden level through Debt/EBITDA ratio (9th class if the ratio is over 6 by the end of the first forecast year and over 5 for the second and third years).

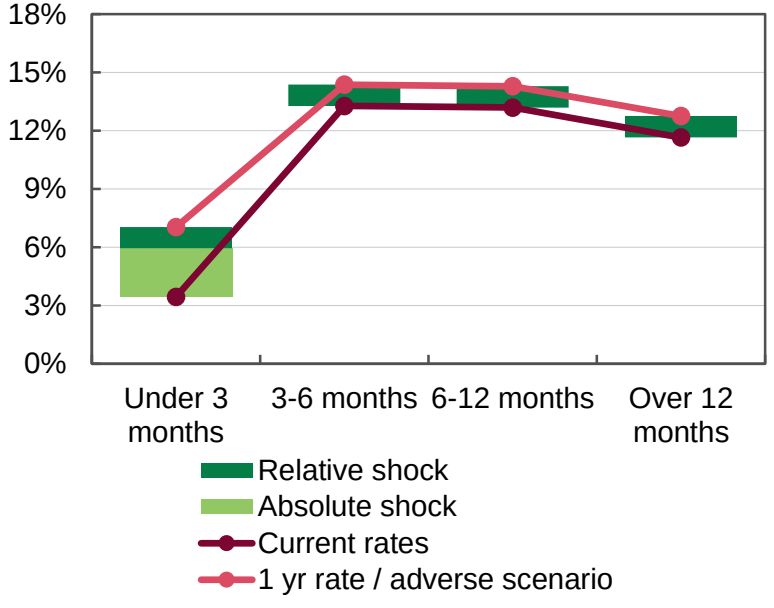
04 In order to increase the assessment robustness, financial reporting for the base year is adjusted for one-off incomes and expenses and debt subordination is taken into account.

05 Borrowers' reports are projected based on clusterization into seven areas of activity and a detailed industry-level forecast.

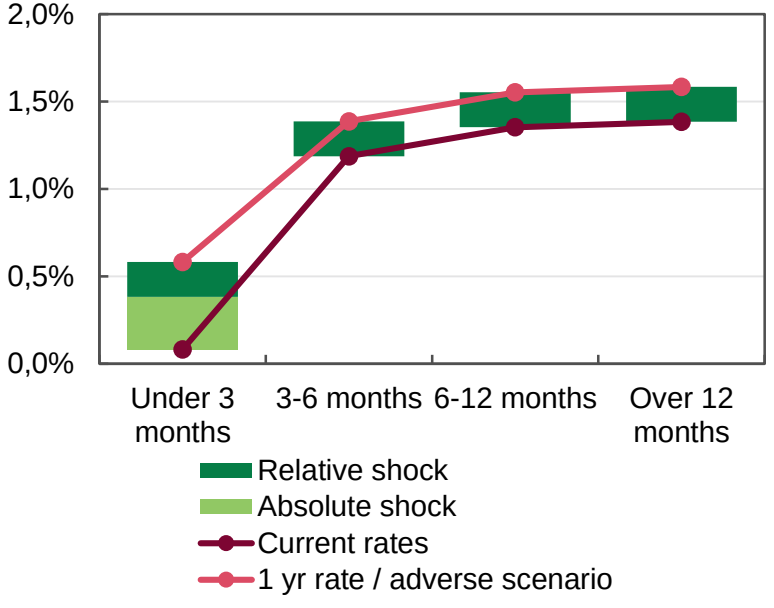
* Assets of borrowers that in the basis selection include only off-balance sheet financial assets with no outstanding loans on the bank's balance sheet..

Assumption on return on assets or cost of liabilities

Interest rates on household deposits in hryvnia



Interest rates on household deposits in FX

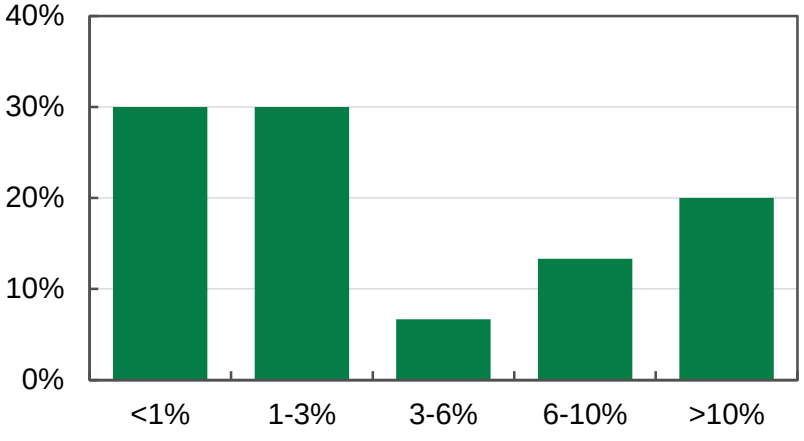


- Under the **baseline** scenario, interest rates on loans decline, while rates on deposits moderately rise in year one and decrease in the following years.
- Under the **adverse** scenario, interest rates are flat for loans and are rising for deposits. Thus, net interest margin of banks narrows.
- An additional absolute shock is applied to short-term deposits (up to three months). The shock reflects the need for banks to respond more actively to crisis with rate revision in order to maintain funding.

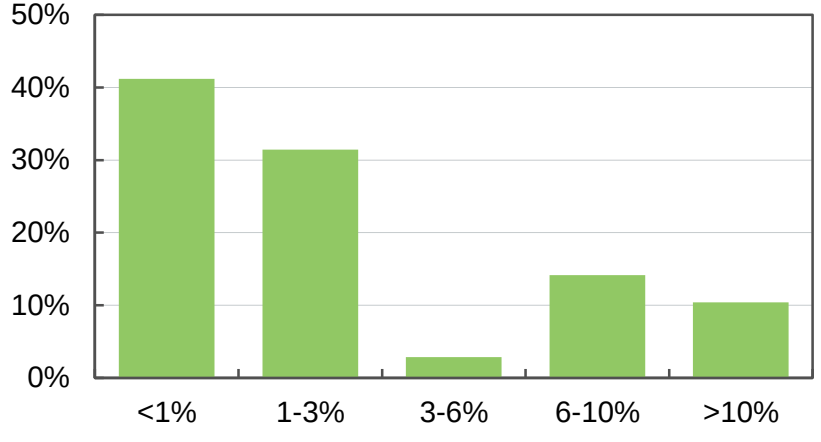
Assumptions on losses from materialization of operational risk

Ratio of capital required to cover losses from OR in ICAAP under stress conditions* and RWA for OR for 30 largest banks

share by number



share by volume of assets



* If information on the stress scenario is not available, takes in data on volume of losses from materialization of OR under normal conditions.

- Losses from operational risk (OP) are assumed only in year one of the adverse scenario at 2.5% of risk-weighted assets for operational risk (RWA for OR) for reporting date.
- Total banks' losses from OR are calculated under the median approach on data from 30 largest banks on capital needed to cover losses from operational risk under stress conditions from the report on bank Internal Capital Adequacy Assessment Proses (ICAAP) in 2024.
- Linking the level of losses to the share of RWA for OR takes into account bank's risk profile and does not bring excessive additional losses under the stress scenario for financial institutions, for which other types of risks are more significant (like credit or market risk).

Projecting items of income and loss statement (1/2)

Interest income:

- ✓ Assessed at lower of two interest rates, on actual cash inflows or on accrued income (excluding income from securities).
- ✓ The interest rates are calculated separately for performing and default loans by segment of loan portfolio. Interest rate on default loans is limited to 25% of rate on performing loans.
- ✓ Return on loans can not exceed by more than three times the average return on respective loans under macroeconomic scenarios.
- ✓ Return on investment into government securities in domestic currency with maturity of up to six months is projected at the level not higher than forecast key policy rate.

Interest expenses: the cost of liabilities is adjusted for projected change in average level of respective interest rates under the baseline and adverse scenarios by type of client/currency/ maturity. Under the baseline scenario, an additional shock is applied on short-term (up to three months) interest rates.

Fee and commission incomes and expenses are assumed unchanged**.**

Administrative expenses increase proportionally to projected consumer price index (under the adverse scenario, two times slower given banks possible response and adjustment to a crisis).

Results of sale and purchase of FX is projected with regard to the degree of depreciation adjusted for historic response of this component of incomes.

Projecting items of income and loss statement (2/2)

Expenses on provisioning under the IFRS: provisioning is done in such a way that the volume of provisions would correspond individually to the amount of credit risk exposure to businesses and households and separately to other transactions in all currencies.

Result of transactions with financial instruments that are accounted through profit or loss is assumed to be at zero level over the forecast horizon.

FX revaluation is a result of revaluation of bank's FX positions.

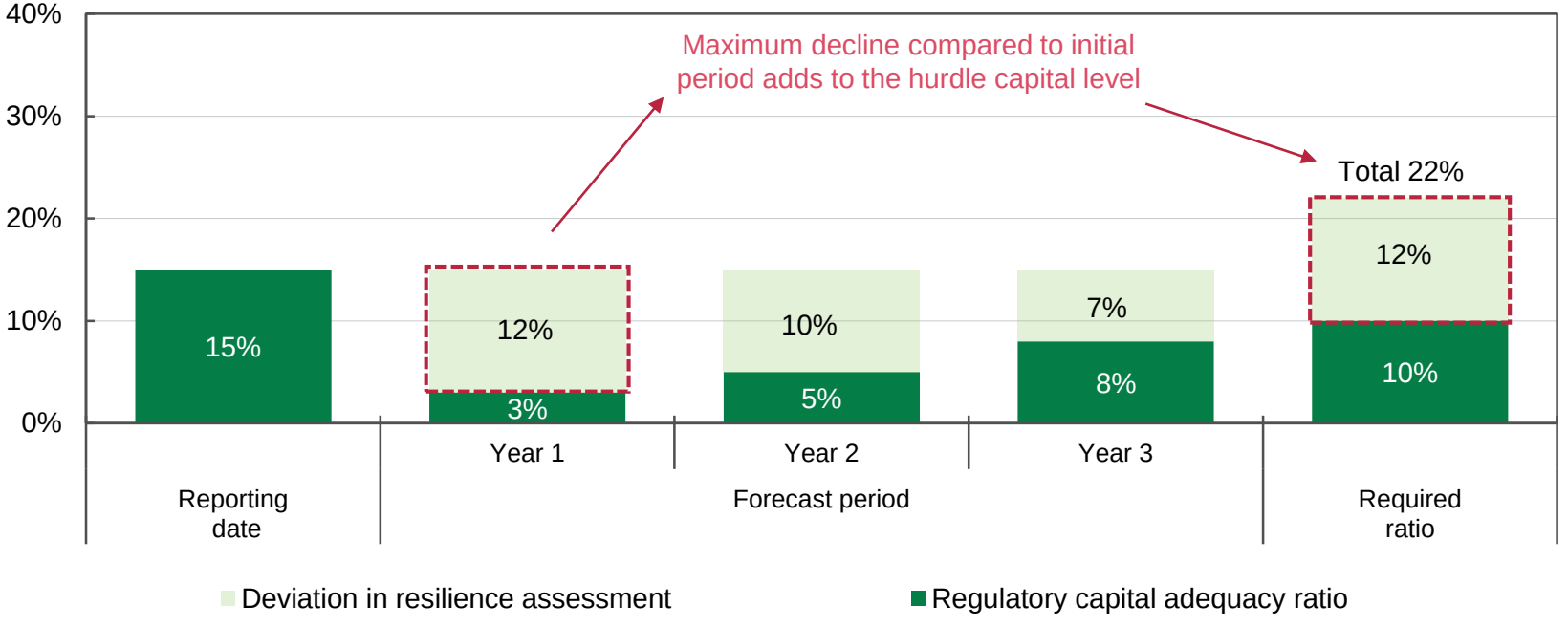
Other operating expenses under the adverse scenario:

- ✓ In year one of the forecast increases by an amount that reflects losses from operational risk (2.5% of exposure to operational risk as of the reporting date).
- ✓ Amount of losses is calibrated using information on assessment of capital to cover operational risks of banks under ICAAP and employing similar approach as other regulators by applying fixed ratio to calculation basis.

Other incomes and expenses are unchanged or at zero level given the static balance sheet assumption.

One-off components of incomes and expenses are not taken into account in forecast periods.

Approaches to identifying required capital ratio



- The hurdle capital ratios under both scenarios are thresholds set at the regulatory required ratios.
- The required capital adequacy ratio is calculated in a way that provides for maintaining bank capital at the minimum required level even during a crisis.
- For banks that go through all three stages of the resilience assessment, the required ratio is chosen as the highest of results of stage two and stage three.
- All three capital adequacy requirements are evaluated for each bank under both scenarios: for common equity Tier 1, for Tier 1, and for regulatory capital.