



OPPORTUNITY
EduFinance

STRESS TEST CALCULATOR GUIDE

Education Finance Technical Assistance

TABLE OF CONTENTS

BACKGROUND AND CONTEXT	2
OBJECTIVES AND OUTPUT	2
STRESS TEST CALCULATOR	3
Section A: LCR (Liquidity coverage ratio)	3
Section B: Stress Test.....	7
DEFINITIONS AND ACRONYMS	9

BACKGROUND AND CONTEXT

Opportunity EduFinance provides technical assistance to financial institutions to build profitable education lending portfolios. EduFinance’s priorities are to:

- **Expand** education loan portfolios
- Make education loans **profitable**
- Improve education loan portfolio **quality**
- Increase children’s **access** to quality education

In the context of COVID-19, EduFinance is providing a stress test calculator to financial institution to offer support for capital and liquidity management. Depending on the country and local regulations, financial institutions may need to conduct periodic reviews of their liquidity, capital reserves and risk management process to ensure their integrity, accuracy and capital reserve adequacy. The actual stress test calculator is available in a separate excel workbook (Stress Testing Calculator ETAF.xlsx). This guide explains the steps of how to use it.

The stress test calculator can provide additional control of internal liquidity calculations and stress test scenarios. However, the stress test calculator should be adapted by each financial institution to their local regulation and internal policy. The tool is based on practices developed by the Basel Committee on Banking Supervision, albeit simplified. Its goal is to provide a quick and rough assessment of an financial institution’s capital and liquidity position.

OBJECTIVES AND OUTPUT

The objective of the tool is to assess a financial institution’s capital and liquidity positions:

- **Capital:** if the result of the stress test is a **capital deficit**, the financial institution should explore ways to increase its capital buffer.
- **Liquidity:** if the result of the stress test is a liquidity coverage ratio (LCR) below 100% (meaning that there is not enough liquidity to meet current obligations in 30 days), the financial institution should enact measures to increase the levels of liquid assets or reduce the expected cash outflow.

STRESS TEST CALCULATOR

The stress test calculator consists of three parts:

- **LCR (Liquidity coverage ratio):** computation of the liquidity coverage ratio (*section A below*)
- **Stress test:** computation of the capital reserves under certain stress test scenarios (*section B below*)
- **Summary dashboard:** overview of the main results (liquidity coverage ratio and capital deficit/surplus under certain stress test scenarios, see the Stress Test excel file)

Only the cells coloured in grey in the first two sections (tabs) of the tool should be filled out. The rest of the cells will be calculated automatically. Note also that the stress test includes items that are probably less relevant for typical financial institutions.

Section A: LCR (Liquidity coverage ratio)

The LCR aims to ensure that a financial institution maintains an adequate level of high-quality liquid assets that can be converted into cash to meet liquidity needs in the coming 30 days. The ratio of a financial institution's high-quality liquid assets to its net cash outflows over the 30-day period should not be less than 100%, otherwise the institution will not be able to cover its short-term liabilities. Based on the local regulation or internal policy of the financial institution, it may be required to maintain a higher LCR ratio. This could also be if the regulator has concerns about the financial institution's liquidity risk profile or the quality of its liquidity risk management.

Using the LCR tool is divided in four steps:

- **Step A1:** Calculation of high-quality liquid assets (HQLA)
- **Step A2:** Calculation of total cash outflows
- **Step A3:** Calculation of total cash inflows
- **Step A4:** Calculation of LCR

Note that some of the used asset categories might not be applicable for your financial institution or might have a different denomination. The allocation of assets has been based on the directive of the Central Bank of Rwanda, which has been recognised by the International Monetary Fund as a best practice (<https://www.imf.org/external/pubs/ft/scr/2011/cr11244.pdf>). Please adapt these categories according to local regulations and internal policy. The most important issue for a financial institution is to assess the value of its asset categories, the tool then automatically calculates the level of high-quality liquid assets.

STEP A1: Calculation of high-quality liquid assets (HQLA)

A financial institution's high-quality liquid assets are assets that are considered liquid during periods of market stress because they:

- Are low risk, easily valued, have a low correlation with risky assets. High quality liquid assets might also be eligible for purchase (or for sale and repurchase transactions) by the financial authorities
- Are traded in active sale at all times, have low volatility and are assets into which the market has tended to move during crises
- Have no operational restrictions on the availability of the assets, which can prevent them from being converted into cash

To calculate the HQLA, the user should input the value of the following category of assets in the calculation of their LCR: Level 1 Assets, Level 2A Assets (Max 25% of HQLA), and Level 2B Assets (Max 15% of HQLA). The following overview shows the explanation of the used asset levels:

Asset level	Type	Count
1 (can be up to 100% of HQLA)	Cash in Local + Foreign Currency, (LCY+ FCY)	100%
	Balance at the Central Bank including claims held to meet the Central Bank's cash reserve requirement (LCY+ FCY)	100%
	Marketable securities issued by and being claims on the Government, Central Banks, Multilateral Development banks: - Securities with a residual maturity of one year or less - Securities with a residual maturity of more than one year	98% 95%
	Other qualifying marketable securities with a 0% risk weight	90%
2A (can constitute maximum of 25% of HQLA)	Marketable securities with a 20% risk weight	85%
	Corporate debt securities (incl. commercial paper and promissory notes)	85%
	Investments backed by the Government	85%
	Level 2A assets are limited to the following conditions to be included in HQLA: <ul style="list-style-type: none"> Proven record as a reliable source of liquidity in the markets even during stressed market conditions (i.e. maximum decline of price not exceeding 10% or increase in haircut not exceeding 10% over a 30-day period during a relevant period of significant liquidity stress) Not an obligation of the financial institution itself or any of its affiliated entities. <p>Corporate debt securities (including commercial paper) and bonds also need to meet the following additional condition:</p> <ul style="list-style-type: none"> Have a long-term credit rating from a recognized external credit assessment institution of at least AA- or in the absence of a long-term rating, are internally rated as having a probability of default (PD) corresponding to a credit rating of at least AA-. 	
2B (can constitute maximum of 15% of HQLA)	Qualifying corporate debt securities (including commercial paper and promissory notes) with an External Credit Rating between A+ to BBB-	50%
	Qualifying non-financial common equity shares	50%
	Level 2B assets are limited to the following conditions in order to be included in HQLA: <ul style="list-style-type: none"> Corporate debt securities (including commercial paper): <ul style="list-style-type: none"> Not issued by the bank or any of its affiliated entities Either have a long-term credit rating from a recognized external credit assessment institution between A+ and BBB- or a short-term rating equivalent in quality to the long-term rating; or are internally rated as having a probability of default (PD) corresponding to a credit rating of between A+ and BBB- Have a proven record as a reliable source of liquidity in the markets even during stressed market conditions, i.e. a maximum decline of price not exceeding 20% or increase in haircut over a 30-day period not exceeding 20% during a relevant period of significant liquidity stress. Non-financial common equity shares: <ul style="list-style-type: none"> Not issued by the bank or any of its affiliated entities Exchange traded and centrally cleared Listed on the Stock Market Have a proven record as a reliable source of liquidity in the markets (repo or sale) even during stressed market conditions, i.e. a maximum decline of share price not exceeding 40% or increase in haircut not exceeding 40% over a 30-day period during a relevant period of significant liquidity stress. 	

STEP A2: Calculation of total cash outflows

Financial institutions shall calculate the total expected cash outflows by multiplying the outstanding balances of various categories or types of liabilities and off-balance sheet commitments due within 30 days. The calculation is done by the rates at which they are expected to run off or be drawn down.

Please note that some of the following category of liabilities might not be applicable for your financial institution or have a different denomination. The runoff rate of liabilities has been done based on the directives of the Central Bank of Rwanda. Please adapt these categories and rates according your local regulation and internal policy.

Financial institutions shall include the following in their outflow calculation. In calculating the value of the outflows, banks shall apply a run-down factor to each of the outflow categories (the rate at which the liability is expected to run-down):

Run-down per 30 days	Type	Rate
Demand and savings deposits and short-term deposits by retail (up to 30 days)	Stable deposits: deposits from retail or natural person, where the deposit is insured by an insurance fund or the deposits are in transactional accounts (e.g. account where salaries are automatically credited):	3%
	Less stable deposits: deposits from other retail that are not stable or in excess of deposit insurance limit	10%
Unsecured wholesale funding	Demand and term deposits (less than 30 days maturity) provided by small business customers: <i>stable deposits/less stable deposits</i>	3%/10%
	Operational deposits generated by banks for clearing, custody and cash management activities/ <i>if covered by deposit insurance fund</i>	25%/5%
	Cooperative banks in an institutional network	25%
	Deposits from non-financial corporates, sovereigns, central banks, PSEs, multilateral development banks (maturing in up to and including 30 days)/ <i>if covered by deposit insurance scheme</i>	40%/20%
	Due to banks, insurance companies, funds from local and abroad (maturing in 30 days)	100%
	Any other legal entity customers not included above: All notes, bonds and other debt securities issued by the bank are to be included in this category regardless of the holder	100%
Committed credit and liquidity facilities by customers (maturing within 30 days)	Retail and small business customers	5%
	Non-financial corporate, sovereigns and central banks, multilateral development banks, and PSEs for <i>credit/for liquidity facilities</i>	10%/30%
	Banks subject to prudential supervision	40%
	Other financial institutions (include securities firms, insurance companies) for <i>credit/for liquidity facilities</i>	40%/100%
	Other legal entity customers, credit and liquidity facilities	100%
Other contingent funding liabilities (such as revocable credit and liquidity facilities, guarantees, letters of credit)	Trade finance	5%
	Customer short positions covered by customers' collateral	50%
	Other	100%
	Net derivatives cash outflow (sum of all net cash outflows due within 30 days. The financial institution shall calculate, in accordance with its existing valuation methodologies, expected cash inflows and outflows from its derivative contracts.	100%

	All other contractual cashflows (maturing in 30 days). Any other contractual cash outflows within the next 30 calendar days shall be captured in this category, such as outflows to cover unsecured collateral borrowings, uncovered short positions, dividends or contractual interest payments.	100%
Secured funding	Secured funding transactions with central bank counterparty or backed by level 1 HQLA with any counterparty	0%
	Secured funding transactions backed by level 2A HQLA, with any counterparty	15%
	Secured funding transactions backed by non-level 1 or non-level 2A HQLA, with domestic sovereigns, multilateral development banks, or domestic PSEs with risk weight of 20% or lower as a counterparty	25%
	All other secured funding transactions	100%

The financial institution shall include as secured funding cash outflows, any liabilities and general obligations that are collateralized by legal rights. This regards specifically designated assets owned by the borrowing institution in the case of bankruptcy, insolvency, liquidation or resolution. The bank shall include forward repurchase transactions and collateral swaps that mature within the 30-day LCR horizon in this category.

STEP A3: Calculation of total cash inflows

The financial institution shall calculate the total expected cash inflow by multiplying the outstanding balance of various categories of contractual receivables due within 30 days. The calculation is done by the rates at which they are expected to flow in up to an aggregate cap of 75% of the total expected cash outflows.

The financial institution must include the following in their calculation of inflows. In calculating the value of the inflows that they may include, banks must apply the following factors to each category of inflow items:

Cash inflow per 30 days	Type	Rate
Maturing secured lending transactions, including reverse repos and securities borrowing backed by the following collateral	Level 1 HQLA	100%
	Level 2A HQLA	85%
	Other level HQLA or non-HQLA	50%
	Margin lending backed by all other collateral:	50%
	All other assets	0%
Inflows from fully performing loans and advances by counterparts (includes interest payments and instalments) maturing in up to 30 days are included in the cash inflow calculation	Retail and small businesses	50%
	Amount to be received from wholesale counterparties; non-financial corporates, sovereigns, multilateral development banks, and PSEs, with transactions other than those listed in above inflow categories	50%
	Amounts due from financial institutions (banks-including due from abroad, insurance companies, pension funds) and Central Banks, from transactions other than those listed in above inflow categories	0%
	Operational deposits held at other financial institutions (include deposits held at central institutions of cooperative banks)	100%
Other	Credit or liquidity facilities provided to the reporting bank	100%
	Net derivative cash inflows	0%
	Other contractual cash inflows	0%

STEP A4: calculation of the net cash outflow for the Liquidity coverage ratio (LCR)

The net cash outflow for the LCR is calculated automatically based on the above steps as following:

Calculation of net cash outflow

Net cash outflow over the next 30 calendar days	Total expected cash outflow – minus (total expected cash inflow; 75% of total expected cash outflow)
LCR	High-quality liquid assets (HQLA, step 1) / Net cash outflows over the next 30 calendar days (step 4)

Section B: Stress Test

The stress test aims to ensure that a financial institution has enough capital to survive plausible adverse economic conditions. These tests are meant to measure the institution's ability to maintain enough capital to continue operating under extreme scenarios. The approach used for the current stress test is top-down, where the objective is to evaluate the impact of shocks to macroeconomic variables on a financial institution's balance.

This model is based on some assumptions and presents some limitations:

- The model ignores issues of changes to interest rates, funding, correlations between portfolios (though it is implicitly included in the assumptions made for the Stress Scenario PAR ratios).
- Assumptions on the level of future profitability and on other types of risk (operational, market, liquidity, investment).
- The estimation using a summarised "Additional Losses" cell C14 of the tab "Stress Test". The base assumption is an additional loss of 2% (the amount of capital losses experienced by European banks in their stress tests). This percentage can be adapted.

The objective of this tool is to estimate the capital position under a base case, worst case and a best-case scenario. Note that the assumptions for PAR1/30/90/180) should be defined by the financial institution for each scenario.

The stress test part of this tool is divided in three steps:

- **Step B1:** Local regulation requirements, historical data and provision allocations
- **Step B2:** Current portfolio and Portfolio at risk
- **Step B3:** Calculation of net capital position

STEP B1: local regulation requirements, historical data and provision allocations

The first step is for the financial to input the following in the model:

- Based on your local regulation, what share of regulatory capital are you required to hold (as a percentage of Risk Weighted Assets)?
- How much regulatory capital do you currently hold (in local currency)?
- What is the current level of existing provisions (in local currency)?
- What was your average profit after tax in the past three years (before dividends to equity holders)?
- Can you estimate additional losses related to operational risk, market risk, liquidity risk, etc?
- Provide provision allocation at risk categories PAR1/30/90/180

STEP B2: current portfolio and Portfolio at Risk

The segmentation of portfolio by sector in the excel sheet (education, agriculture, SME Loans, petty traders, home loans, emergency loan and renewable energy) is illustrative and should be adapted to the financial portfolio categories and balance sheet.

The financial institution should input the value of the gross loan portfolio by sector (once defined) and a risk weight percentage. Once the gross loan portfolio is populated, assumptions of the value of the portfolio at risk should be defined by the financial institution. This is done after an assessment of the external and internal environment factors impacting the portfolio at risk.

Once all the above data input has been finalised, the required provision, risk weighted assets (RWAs) and capital allocation by category of portfolio is calculated as following:

Calculation of risk weighted assets and capital allocation by category of portfolio

Required total provision	Gross Loan Portfolio Value (local currency) x [(Total Value of loans PAR180 x Provisions loans PAR180) + (Total Value of loans PAR90 - Total Value of loans PAR180) x Provisions loans PAR90 + (Total Value of loans PAR30 - Total Value of loans PAR90) x Provisions loans PAR30 + (Total Value of loans PAR1 - Total Value of loans PAR30) x Provisions loans PAR1]
Risk weighted assets (RWAs)	Gross Loan Portfolio Value (local currency) x Risk Weight %
Capital Allocation	Risk weighted assets (RWAs) x % Regulatory Capital

STEP B3: calculation of net capital position

The last step of the stress test is to calculate the Pro-Forma Net Capital Position, under a stress scenario and compare it to the required regulatory capital based on RWAs as following:

Pro-Forma Net Capital Position calculation

Pro-Forma Net Capital Position	(Initial Current Regulatory Capital + current level of pre-existing provisions + Future Earnings) – Additional Provision required
Capital (Deficit)/ Surplus, under stress scenarios	Pro-Forma Net Capital Position, under a stressed scenario - Required regulatory capital based on RWAs

DEFINITIONS AND ACRONYMS

Please find below the definition of terms used in the stress test calculator:

Encumbered assets	Assets that are pledged to secure, collateralize or credit-enhance any transaction. Encumbered assets include but are not limited to asset backed securities or covered bonds and assets pledged in securities financing transactions or collateral swaps.
Unencumbered assets	Assets that are free of legal, regulatory, contractual or other restrictions on the ability of the bank to liquidate, sell, transfer, or assign the asset.
Qualifying	Qualifying for inclusion as marketable assets or deposit
Wholesale funding	Liabilities and obligations that are raised from legal persons. Includes secured and unsecured funding that is callable within the LCR's horizon of 30 days or that has its contractual maturity date situated within this horizon (such as maturing term deposits and unsecured debt securities) as well as funding with an undetermined maturity. Wholesale funding that is callable by the fund's provider subject to a contractually defined and binding notice period surpassing the 30-day horizon is not included.
Committed facilities	Explicit contractual agreements or obligations to extend funds at a future date to retail or wholesale counterparties and only include contractually irrevocable or conditionally revocable agreements to extend funds in the future.
Less stable deposits	Deposits that are not fully covered by an effective deposit guarantee scheme or sovereign deposit guarantee, high-value deposits, deposits from sophisticated or high net worth individuals, deposits that can be withdrawn quickly and foreign currency deposits. Buckets of less stable deposits apply a run-off rate of 25%.
Stable deposits	The amount of the retail deposits that are fully insured by an effective deposit guarantee scheme or by a public guarantee that provides equivalent protection and where: the depositors have other established relationships with the bank that make deposit withdrawal highly unlikely; or the deposits are in transactional accounts (eg accounts where salaries are automatically deposited).
Liquidity	The capacity of a bank to gather or obtain sufficient cash or its equivalent at the right time and at a reasonable price in order to be able to meet its daily financial obligations.
LCY (Local Currency)	Currency that can be spent in a particular geographical locality
FCY (Foreign Currency)	Money of a country other than one's own
DFI	Development Financial Institution: financial Institution that provides risk capital for economic development projects on non-commercial basis. Also known as a Development Bank.
NFC (Non-Financial Counterparty)	An undertaking established in the European Union other than a financial counterparty (FC) or central counterparties (CCP)
PSE (Public Sector Entity)	State-owned institutions, including nationalized industries and services provided by local authorities
PAR	Portfolio at Risk: clients that are in arrears
SIL	School Improvement Loan: loan for Private schools who needs to finance their education activities
SFL	School Fee Loan: individual loan to respond to school tuition fee for primary and secondary school

TTL	Tertiary Tuition Loan: individual loan to respond to tuition fee related needs from students in College/University
TL	Teacher Loan: individual loan for private or public institution teachers to improve knowledge and skills or life's quality
TIL	Tertiary Improvement Loan: loan for College/University who needs to finance their education activities
SME	Small and Mid-size Enterprises: businesses that maintain revenues, assets or a number of employees below a certain threshold