

Banking Stress Test A Risk Management Tool Simulation of a Combined Credit and Liquidity Stress Test on a Commercial Bank

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Received:19/09/2024

Accepted:27/10/2024

Published: 31/10/2024

Abstract:

In the aftermath of 2007 financial crisis, banking stress testing emerged as a crucial technique for enhancing the management of various banking risks. These tests assess the resilience of financial institutions by simulating extreme but plausible economic and financial shocks.

This article aims to conduct a combined liquidity and credit stress test using Financial Projection Model (FPM) on a commercial bank to examine its ability to withstand these simulated shocks. The stress test results reveal that the bank does not face a solvency risk. However, in terms of liquidity scenario indicates vulnerability, highlighting a significant liquidity issue that needs attention.

Keywords: Bank, Financial Stability, Crisis, Risks, Stress Test.

JEL Classification Codes: G21, E44, G01, G32.

1. Introduction :

The primary activity of a bank involves collecting deposits from the public and granting credits, which entails maturity transformation and exposes it to a multitude of risks. Risk management has become an key profession across various sectors, especially in banking, which is considered a cornerstone of any economy, particularly in debt-driven economies. Hence, a thorough understanding and management of risks inherent to banking activities are crucial. International monetary authorities such as the IMF, World Bank and the Basel Committee, alongside the National monetary authorities (Central Banks), monitor risk management within banking institutions through compliance with relevant legislative and regulatory provisions.

Among the tools used in the risk management process in banking, we find stress testing simulations, known as "stress tests." A stress test is an exercise designed to simulate extreme or unfavorable yet plausible economic and financial conditions to study their impact. Primarily, stress tests serve as tools to analyze the robustness of implemented strategies, offering periodic scenario analyses to consider risks stemming from potential market condition changes that could negatively affect managed portfolios (Trinnou, 2014).

These simulations are conducted either at the level of individual financial institutions, referred to as micro-prudential stress tests, or at the financial system level, known as macro-prudential stress tests.

Given the aforementioned aspects of stress tests, this article aims to provide a detailed overview of this tool by addressing the following question:

What is the contribution of stress testing to credit risk and liquidity management within a commercial bank?

This paper seeks to answer this question by adopting the following methodology: first, an overview of stress testing tools, including their definition, purpose, and significance. Then, we will present a practical framework dedicated to a case study, which involves conducting a stress test on bank (x) to evaluate its capital adequacy

in facing shocks, based on simulations performed using an Excel-based application called FPM.

It's important to recall prior studies that have addressed banking stress tests in the Algerian context. Notably:

- ✓ BOUCHETARA Mehdi presented a thesis titled "Financial Stability and Banking Crises Stress Tests in Algeria," aiming to analyze financial stability in Algeria during the 2012-2016 period using stress tests.
- ✓ TARI Mohamed Larbi (Tari, 2018) discussed credit risk stress tests by simulating shocks on credit risk parameters in a commercial bank.
- ✓ Selma & Hizia (2021) examined the ability of Algerian public banks to withstand a deposit flight scenario using a macro stress test of liquidity risk on a mini banking system composed of six public banks.

2. Stress Tests.

According to the Basel Committee on Banking Supervision (2009), stress tests are tools used by banks for internal risk management, allowing authorities to assess the impact of negative shocks and quantify the amount of capital needed to absorb losses in the event of a crisis.

Anand et al. (2014) considered stress tests in the banking system as tests designed to simulate unusual financial conditions at banks to monitor their reactions and behavior.

The goal is to demonstrate the resilience of the banking system and identify any potential weaknesses. This type of test has been implemented by central banks. The scenarios proposed to banks can range from probable to exceptional.

In other words, stress tests are considered as one of the risk management mechanisms used internally by banks and monetary authorities. They involve simulating a deterioration in unusual but plausible macroeconomic conditions, with the ultimate goal of verifying the resilience and robustness of the banking system.

The primary objective of stress testing is to measure the temporary impact of severe, pessimistic, but plausible scenarios on financial stability, particularly banking stability. These scenarios are based on shocks and micro-macro economic simulations. Stress tests identify the value of adequate capital needed to withstand and absorb losses resulting from the application of these scenarios.

They provide a well-determined analysis of contagion effects and the results related to the dysfunction of the interbank market or liquidity risks. Generally, the implementation of classic stress tests spans a horizon of 2 to 5 years for banks (Martin& Viol, 2013).

2.1. Typologies and Methods.

Stress testing varies in terms of scope, approaches, and typologies used. Regarding the scope of stress test application, we distinguish:

a. Micro-test:

These are tests used by banks for risk management at an individual level, using internal models specific to the banks.

b. Macro-Test: According to Grillet-Aubert (2018), these exercises are conducted by relevant authorities (central banks, market authorities) and are distinct from those carried out by actors within the framework of risk management. The objective of these tests is to evaluate the risks of the entire financial system for financial stability purposes. These simulations are intended for the entire financial system, through which monetary authorities examine both the solidity of banks and financial institutions and the stability of the entire system. These simulations are carried out by applying common crisis scenarios to all institutions.

According to Baudino (2018), an institution can choose between one of these two methods to conduct the stress test:

c. "Bottom-up stress testing": These are simulations conducted by the banks themselves using their data and internal models, but are based on common assumptions provided by the central authority (central bank or supervisory authority).

d. Top-down stress testing: These exercises are implemented by central banks or supervisory authorities. They use data from banks and/or supervision and apply appropriate assumptions and methods. The tests are **generally** conducted from the top down to measure the effect of global shocks on the entire banking system.

Stress tests vary according to their degree of complexity. Mainly three types are distinguished (Guellati, 2015):

e. Sensitivity Analysis

This type of test is the most basic level of stress testing. Its principle is based on varying a single risk factor while keeping others unchanged. The aim is to test the sensitivity of the bank's portfolio to the variation of a single risk factor and measure its impact. Several sensitivity tests can also be applied simultaneously and coherently to the bank's portfolio. This technique combines multiple shocks affecting major risk factors to create a more realistic adverse scenario.

f.Scenario Analysis

The aim of this type is to evaluate the impact of the simultaneous fluctuation of a complete set of factors, constituting an exceptional but plausible scenario, with the goal of reflecting an event that could materialize in the future.

g.Reverse Stress Test

In reverse stress tests, the process starts with the assumption of negative and significant outcomes achieved by the bank. Then, hypotheses about the variations of risk factors leading to such outcomes are established. Global adverse scenarios are designed by aligning the hypotheses.

1.2.Approaches of Stress test

Stress testing is conducted according to one of the following approaches

a. Historical Approach

This approach involves designing crisis scenarios by reproducing risk factors from past crises. The drawback is that banks prepare against past events instead of projecting and anticipating and forecasting new risks.

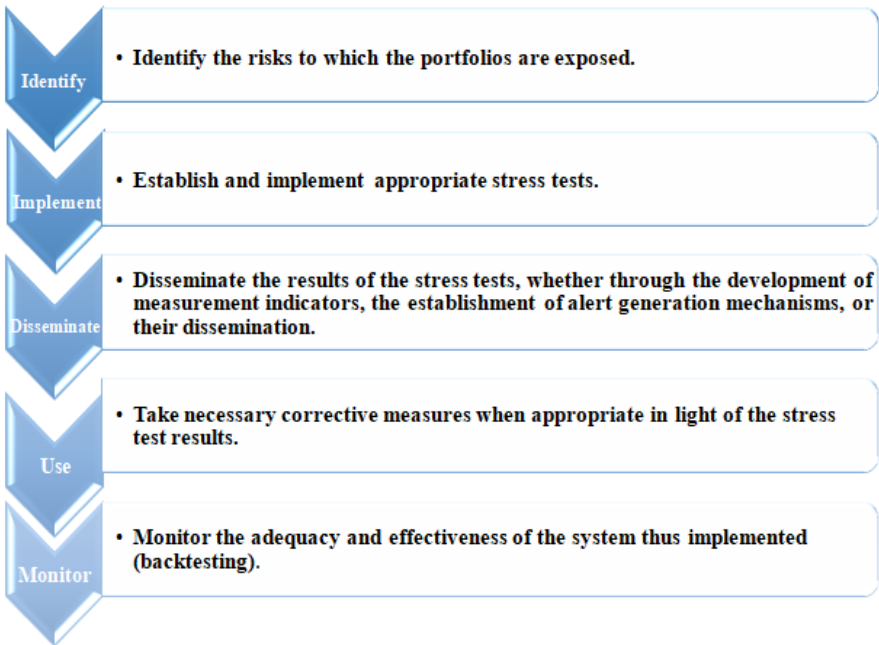
b.Hypothetical Approach

This subjective approach is based on a forward-looking and dynamic vision. It involves developing an unexpected, adverse, and plausible event whose shocks have not yet occurred. The impact of these

shocks is calibrated and quantified through variations of risk factors and their interdependence.

The objective behind stress testing exercises is to enrich risk analysis and highlight the limits of current risk management strategies. Among the objectives assigned to stress tests, we can mention:

Fig1: objectives of stress testing.



Source: Financial Markets Authority

The implementation of stress testing exercises can be defined by four stages, which can be found in any type of stress test. These stages are as follows (Tari, 2018):

✓ **Step1: Inputs (Data Loading**

Banks and financial institutions are required to regularly transmit data related to their activities to the central bank for control and supervision purposes. To load this data, it is necessary to import the files transmitted by the banks and insert them in the appropriate format into the corresponding Excel sheet of the FPM application. The data used by the application cover a time horizon equivalent to 12 periods, with frequencies being daily, weekly, monthly, quarterly, semi-annually, or annually.

✓ **Step 2: Mapping (Data Matching to the Application)**

The financial statements (Balance Sheet and Income Statement) and the prudential declaration as presented by the banks differ from the form in which they are presented on the FPM application. Therefore, a "Mapping" step is essential to align the data provided by the banks with the application to use them and make the necessary propositions for the next step, which is projection.

✓ **Step3: Calibration of the Projection**

In some cases, the projection provides implausible data that does not follow the historical trend or may not occur in the future. It is in such situations that the calibration of the projection intervenes to correct the resultant data to provide the maximum credibility for our base projection (without stress).

✓ **Step 4: Stress Test Scenario and Projection of Results**

Once the projection is completed, a projected balance sheet and income statement will be obtained, along with indicators in the form of CAMELS (Capital adequacy, Asset quality, Management quality, Earning Liquidity, Sensitivity to market risk) projected onto which tests are applied to assess the bank's resistance during the occurrence of the shock.

2.2. The Algerian Regulatory Framework for Stress Testing.

The implementation of stress tests has been a regulatory obligation since 2014, with two articles related to crisis simulations published by the Bank of Algeria:

- ✓ Article 16 of Regulation No. 14-02 of February 16, 2014, concerning large risks and participations: "Banks and financial institutions periodically develop crisis scenarios concerning the degradation of the credit risk of major counterparties. These scenarios must take into account credit risk concentrations and the realization value of the associated guarantees."
- ✓ Article 34 of Regulation No. 14-01 of February 16, 2014, on solvency ratios applicable to banks and financial institutions: "Banks and financial institutions must perform crisis simulations to assess the vulnerability of their credit portfolio in the event of an economic downturn or deterioration in the quality of counterparties."

3. Literature Review on Stress Testing.

Ben Youcef, (2018) proposed an econometric model to perform a macro stress test of credit risk on a sample of Tunisian banks. The author first attempted to explain the credit risk for each bank using a fixed-effect statistical model, generating credit risk loss distributions for each scenario and determining the unexpected losses for each bank using Monte Carlo simulation. The results obtained with the model indicate a negative relationship between credit risk and the GDP growth rate and the loans-to-total assets ratio. Moreover, the asset yield ratio and the size of the bank have a negative impact on credit risk.

The analysis of the stress test results indicates that in the event of an economic slowdown in Tunisia, this would lead to an increase in the frequency of credit losses for all banks in the sample, and the estimated unexpected losses that would occur in the event of a crisis could be covered by the available capital of these banks.

Babou Amadou BA, (2021) addressed the resilience of the banking system in the WAEMU zone to macroeconomic shocks caused by the COVID-19 pandemic. To address the issue, the author implemented a macro-prudential bank stress test (TOP-DOWN approach) for credit risk using a VAR (Vector Autoregressive) model.

Initially, the VAR model was used to estimate the relationship between macro variables (real GDP, real exchange rate, inflation rate) and from this, macroeconomic scenarios were set up to reproduce the health crisis scenario. The analysis of the results obtained with the VAR model shows that the WAEMU banks are well-capitalized and solvent in the face of the various simulated shocks, partly due to the implementation in 2018 of regulation requiring banks to comply with the McDonough solvency ratio (Basel II).

An article by Bouchetera Mehdi (B. Mehdi, 2018) titled "Financial Stability and Solvency of Algerian Banks, Application of Stress Tests from 2012 to 2016" utilized the Cihak (2007) model for solvency risk stress tests, which is limited to sensitivity analyses. The approach followed was a top-down approach to test a sample of twelve (12) public and private banks.

The author simulated stress test scenarios on several banking risks: deposit flight for liquidity risk, exchange rate for currency risk, non-performing loans for credit risk, and interest rate for interest rate risk. The objective was to identify vulnerabilities in the Algerian banking sector to a number of exceptional but plausible risk factors.

The study found that Algerian banks are resilient and solvent to the shocks applied over the entire period, even after the fall in oil prices in 2014. The author concludes that financial stability is not a source of concern in the Algerian context, given the state's continuous support for banks (cleaning up public enterprise debts and farmers).

An article by (Selma & Hizia, 2021) titled "Analytical Study of a Liquidity Stress Test During the COVID-19 Pandemic - Case of Algerian Public Banks" conducted a liquidity stress test on the six public banks using the Financial Projection Model "FPM." The applied scenario involved simulating a deposit flight and observing its impact on the liquidity ratio and balance sheet of each bank. The results revealed a serious liquidity problem for the banks. Indeed, varying degrees of liquidity needs were recorded in the banks' balance sheets, noting that these liquidity needs were compensated by asset sales. Moreover, the recorded regulatory liquidity ratios were below the exceptional threshold of 60%, explained by the banks' recourse to liquid assets to meet customer demand.

Tari Mohamed Larbi (Tari, 2018) in his article addressed credit risk stress tests by applying various scenarios (moderate and severe) on the credit risk parameters (probability of default, concentration risk) of a commercial bank. In the moderate scenario, the bank withstands the applied shocks and does not express a need for capital. However, in the severe scenario, the bank shows a risk of bankruptcy, failing to meet the regulatory solvency ratio, and expresses a need for capital of around 9 billion. The bank would need to recapitalize. The author concludes that this bank must manage its exposure to credit risk and diversify its portfolio to avoid concentration risk.

4. Practical Framework.

To illustrate what we have shown the theoretical part, we will apply a stress test on a commercial bank using the Financial Projection Model FPM.

4.1. Presentation of the Financial Projection Model (FPM).

The Financial Projection Model "FPM" is an Excel-based system of equations that establishes links between various balance sheet variables, income statement, financial flows, and risk management indicators of a bank. The model's methodology involves using historical information combined with a forward-looking approach to perform different types of projections and calculations. It was designed for financial institutions primarily for simulating adverse events on an individual scale as well as at the level of a group of financial institutions (Murat, 2018).

4.2. Analysis of the Base Scenario.

First, we will project the data of our bank without shocks (a calibration called Baseline) based on basic assumptions determined according to historical trend. The data are projected on a quarterly frequency

a. Projection of Deposits:

From the table above, we observe a stable growth of deposits over

Table 1: Projection of deposits

In billion dinars.

Periods	Base	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
Deposits	1441	1468	1497	1526	1557	1588	1619	1652	1686	1721	1756	1793	1831

Source: Prepared by the researcher based on the outputs of FPM.

the study periods, assuming favorable economic conditions.

b.Projection of Loans:

The results of the projection indicate a quarterly increase in gross

Table 2: Projection of loans

In billion dinars.

Periods	Base	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
Gross Credits	1456.7	1455.8	1482	1507	1534	1561	1589	1617	1647	1677	1708	1740	1773
Classified Loans	423.69	426.70	429.6	432.7	435.9	439.3	442.7	446.4	450.1	454	458.1	462.32	466.68
NPL	-	3.01	2.95	3.09	3.22	3.35	3.48	3.62	3.76	3.90	4.05	4.20	4.36
Provisions	234.8	236.2	237.5	238.9	240.3	241.8	243.4	245	246.7	248.4	250.2	252.1	254.08

Source: Prepared by the researcher based on the outputs of FPM.

loans, attributed to the increase in deposits (by assumption) during

the projection period as deposits fund loans. Additionally, an increase in classified loans alongside an increase in gross loans indicates poor management in the selection of loan files by this bank. As for provisions, they register a slight increase compared to the first period, following the same trend as classified loans. Indeed, an increase in classified loans necessitates more provisions, and vice versa.

c.Solvency Ratio

Table 3: Solvency Ratio Projection

In billion dinars

Periods	Base	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
FPR	153.2	157.54	159.87	162.3	164.79	167.3	169.9	172.7	175.5	178.37	181.32	184.36	187.48
RWA	836.42	846.15	856.09	857.27	873.21	890.67	908.5	926.85	945.6	965.02	984.9	1005.3	1026.33
SolvencyRatio(%)	18.32	18.62	18.67	18.93	18.87	18.79	18.71	18.63	18.56	18.48	18.41	18.34	18.27

Source: Prepared by the researcher based on the outputs of FPM.

From the table above, we remark that equity and risk-weighted assets continue to evolve over all projection periods, noting that equity covers risk-weighted assets. For clarity, the obtained solvency ratio is represented in the graph in Annex 1.

The analysis of the solvency ratio evolution shows that throughout the *Baseline* projection, the bank's solvency ratio meets the regulatory standard of 9.5%. The bank's solvency is convincing.

d.Liquidity Ratio:

Table 4: Liquidity Ratio Projection.

d.Liquidity Ratio

In billion dinars

Periods	Base	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
Liquid Assets	555.9	559.6	570.4	581.4	592.7	604.3	616.3	628.53	641.1	654.1	667.5	681.22	695.36
Exigible Liabilities	407.9	415.2	422.9	431.4	440.09	449	458.3	467.71	477.4	487.5	497.8	508.45	519.41
Liquidity Ratio (%)	136.2	134.7	134.9	134.7	134.6	134.5	134.5	134.4	134.3	134.2	134.0	133.98	133.88

Source: Prepared by the researcher based on the outputs of FPM

The results of the table are presented in the graph in Annex 2: The bank's liquidity ratio experienced a slight decrease throughout the projection period, dropping from 136.28% to 133.88%, noting that it is well above the regulatory threshold of 100%, indicating that this bank does not have a liquidity problem.

4.3.Stress Test Results Analysis:

We will examine a credit and liquidity stress test (combined shock situation) applied to our bank and try to deduce the impact.

We generated a severe (adverse) scenario, in which we stressed two parameters: the deposit growth rate and the probability of default. The data are projected on a quarterly frequency.

Through this severe scenario, we will try to assess the bank's capabilities to withstand a severe combined shock with a default probability of 8.19% and a deposit flight rate of 15.33% over all projection periods.

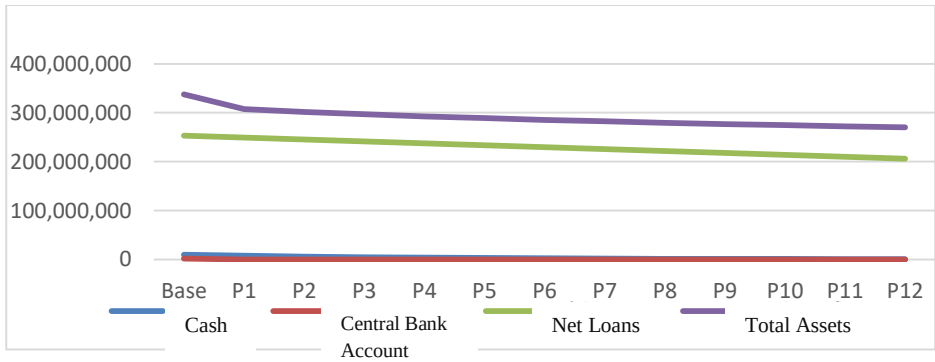
a. Deposit Projection:

Table 5:Deposit Projection Unit.

In billion dinars														
Periods	Base	S	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
Deposits	1441	B	1468	1497	1526	1557	1588	1619	1652	1686	1721	1756	1793	1831
		S	1220	1033	874.7	740.6	627.07	530.9	449.5	380.6	322.8	272.8	231	195.63

Source: Prepared by the researcher based on the outputs of FPM.

Fig1: Evolution of Asset Items During the Severe Test.



Source:Prepared by the author.

From the graph above, we observe that a deposit flight of approximately (-15.33%) leads to a rapid decrease in the various balance sheet asset items, revealing a need for liquidity as early as the fourth projection period. This test highlights the essential nature of the "deposit collection" function as a main activity within a commercial bank and its volatile character during a crisis period

b. Credit Projection:

Table 6: Credit Projection

In billion dinars.

Periods	Base	S	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
Gross Loans	1456.7	B	1455.8	1482	1507	1534	1561	1589	1617	1647	1677	1708	1740	1773
		S	1450.9	1445	1437	1430	1424	1415	1404.8	1393.6	1382	1368.7	1352	1333.4
Classified Loans	423.7	B	426.7	429.6	432.7	435.9	439.3	442.7	446.4	450.1	454	458.1	462.3	466.6
		S	446.6	468.7	490.7	512.6	534.5	556.3	578.0	599.7	621.4	643.1	664.9	686.7
NPL			22.92	22.09	22.01	21.93	21.85	21.8	21.75	21.72	21.71	21.71	21.74	21.78
Provisions	234.87	B	236.2	237.53	238.9	240.3	241.9	243.4	245.	246.7	248.5	250.1	252.1	254.08
		S	245.11	254.98	264.8	274.4	284.4	294.1	303.8	313.6	323.3	332.9	342.7	352.42

Source: Prepared by the researcher based on the outputs of FPM.

The results from this test demonstrate the magnitude of the impact of the applied shock on our bank. Indeed, a deposit flight of (-15.33%) combined with a default probability of 8.19% leads to a decrease of 8.1% in gross credits granted by this bank throughout the projection period. Moreover, this combined shock has a direct impact on the stock of classified loans, hence we observe an increase in classified loans; they rise from 446.5 billion to 686.7 billion, a 53% increase compared to the first projection period.

Regarding the provisions made by this bank, it is worth noting that these are provision flows related to new non-performing loans created during a period, which are added to the already established provision stock, increasing it over the projection periods. These flows follow the same increase rate as the flows of new non-performing loans, recording a decrease throughout the projection period

C. Solvency Ratio

Table 7: Solvency Ratio Projection

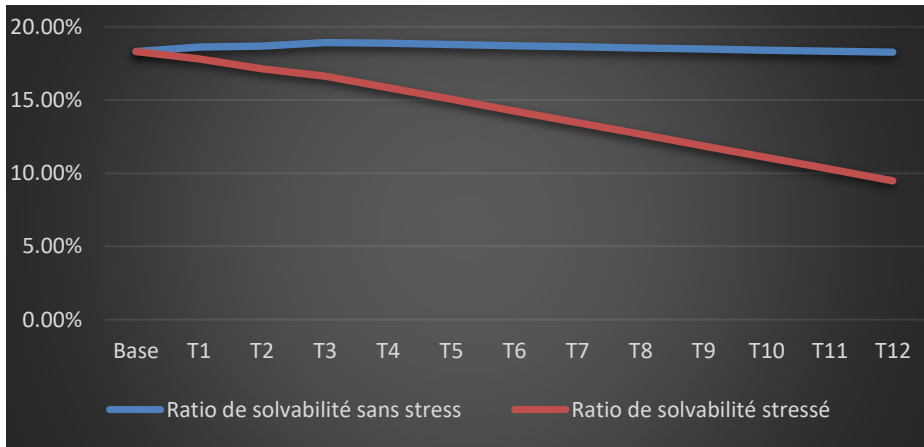
Periods	Base	S	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
FPR	153.2	B	157.54	159.87	162.3	164.79	167.3	169.9	172.7	175.5	178.37	181.32	182.32	187.48
		S	153.10	145.36	140.51	135.55	130.47	125.27	119.9	114.5	108.90	103.16	97.29	90.99
ARW	836.42	B	846.15	856.09	857.27	873.21	890.67	908.5	926.8	945.6	965.02	984.9	1005.3	1026.3
		S	842.71	848.44	844.97	855.19	866.91	878.96	891.4	904.2	917.52	931.39	945.77	959.76
Solvency Ratio	18.32	B	18.62	18.67	18.93	18.87	18.79	18.71	18.63	18.56	18.48	18.41	18.34	18.27
		S	17.81	17.13	16.63	15.85	15.05	14.25	13.46	12.66	11.98	11.08	10.29	9.48

Source: Prepared by the researcher based on the outputs of FPM.

Upon applying the shock, there's a noticeable decrease in equity by approximately 62 billion over the entire period, explained by a significant increase in provisions. Regarding risk-weighted assets, there's a significant trend where equity no longer covers risk-weighted assets, indicating an increased risk of insolvency.

The solvency ratio results are depicted in the following graph:

Fig 2: Evolution of the Solvency Ratio.



Source: Prepared by the author.

From the graph, it's observed that in the adverse scenario, the solvency ratio decreases throughout the projection period while being above the current regulatory standard of 9.5%, except for the last quarter where it falls below 9.5%. This indicates the bank's solvency difficulties in the face of a potential extreme shock.

d.Liquidity Ratio :

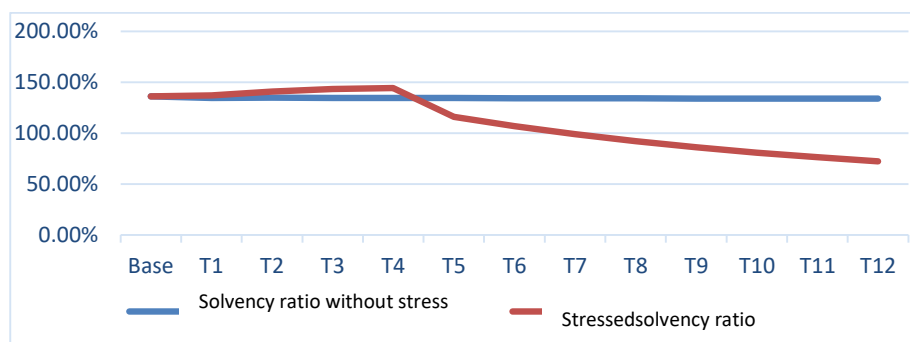
Table 8: Stressed Liquidity Ratio Projection with Liquidity Needs

Periods	Base	S	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
Liquid Assets	555.89	B	559.6	570.4	581.4	592.7	604.3	616.2	628.5	641.1	654.1	667.5	681.2	695.4
		S	522.7	496.4	473.6	453.6	444.20	435.1	426.5	418.2	410.3	402.7	395.3	388.3
Exigible Liabilities	407.90	B	415.2	422.9	431.4	440.09	449	458.2	467.7	477.4	487.5	497.8	508.4	519.4
		S	381.4	352.2	329.8	312.3	236.1	226.	216.4	207.2	198.4	190.	182.1	174.6
Liquidity Need			0	0	0	1.88	146.2	181.4	514.6	247.2	278.2	307.7	335.6	362.
Liquidity Ratio (%)	136.2	B	134.7	134.9	134.7	134.6	134.5	134.5	134.4	134.3	134.1	134.08	134	133.9
		S	137.07	140.9	143.6	144.4	116.1	106.8	98.9	92.05	86.	80.90	76.4	72.4

Source: Prepared by the researcher based on the outputs of FPM.

Results are summarized in the graph above:

Fig3: Evolution of the Liquidity Ratio.



Source: Prepared by the author.

From the graph above, it's evident that the bank's liquidity ratio decreases, falling below the regulatory threshold of 100% from the 7th period onwards, reaching 72.4% by the end of the projection, indicating a serious liquidity problem.

It's noteworthy that the bank expresses a liquidity need from the 4th projection period, increasing from 1 billion to 362 billion, marking an alarming situation. The absence of liquidity needs from period 1 to period 3 is due to absorption by:

- ✓ **Gross Interbank Assets:** the bank retrieves its interbank loans to cover the liquidity need, however, it only absorbed a part.
- ✓ **Securities Portfolio:** finally, the commercial bank proceeds to sell all of its securities.

The bank has a concerning liquidity problem that needs to be addressed by improving its ASSET-LIABILITY management.

4.4.Main Recommendations.

The applied Stress Test has highlighted the vulnerability of this bank to the deterioration of certain elements of its balance sheet. The results of this test have shown that if the bank faces a high-intensity shock, it would have difficulties maintaining its liquidity according to the current regulatory standards and requirements.

At the end of this stress test simulation, it is appropriate to make some comments on the bank's situation:

The bank's solvency ratio has withstood throughout the projection period, even during the extreme scenario, indicating that the bank enjoys good solvency.

- ❖ The liquidity ratio falls below the regulatory limit set by the Bank of Algeria from the seventh stress period, revealing a structural liquidity problem.
- ❖ Our bank finds itself in a position of permanent liquidity need.

In light of the results obtained from this exercise, we have formulated the following recommendations and corrective actions:

- Improve its Asset-Liability Management.
- Enhance its credit risk management policy by ensuring a selective sorting of solvent companies in its client portfolio.
- Strengthen the free part deposited with the Central Bank.
- Improve its investment policy in the securities market with the aim of constituting a solid source of liquidity.
- Regularly monitor its liquidity situation.

5. Conclusion:

Throughout our article, we have attempted to highlight the importance of banking stress tests in risk management, particularly for liquidity and credit risk, as well as assessing a bank's resilience to an extreme shock.

The financial situation of our commercial bank appears solid and sustainable, presenting good financial indicators during the *Baseline* projection.

However, the results of the shocks we applied to deposits and the probability of default have allowed us to observe the degradation of the bank's situation if a crisis were to occur. This bank must ensure that several parameters of its balance sheet do not deteriorate simultaneously, especially in terms of liquidity.

Therefore, it is necessary for this bank to take appropriate preventive measures in terms of liquidity management.

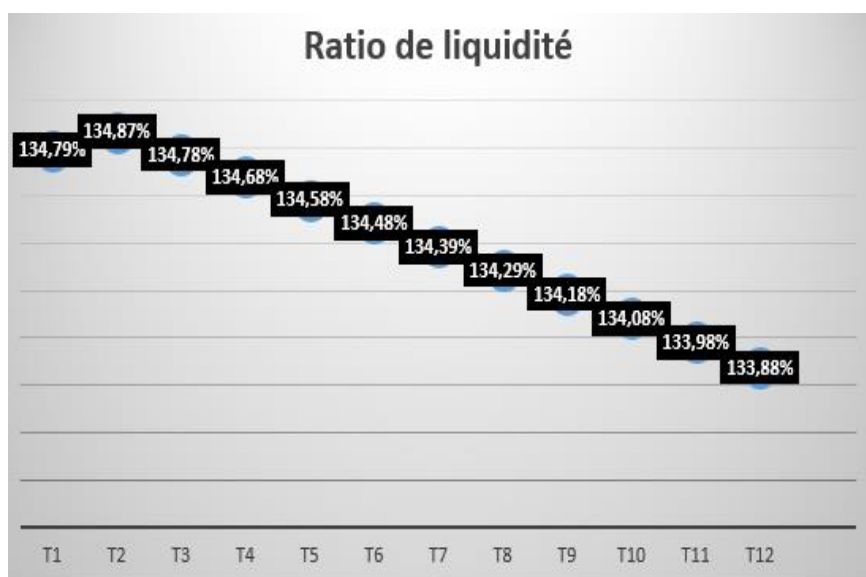
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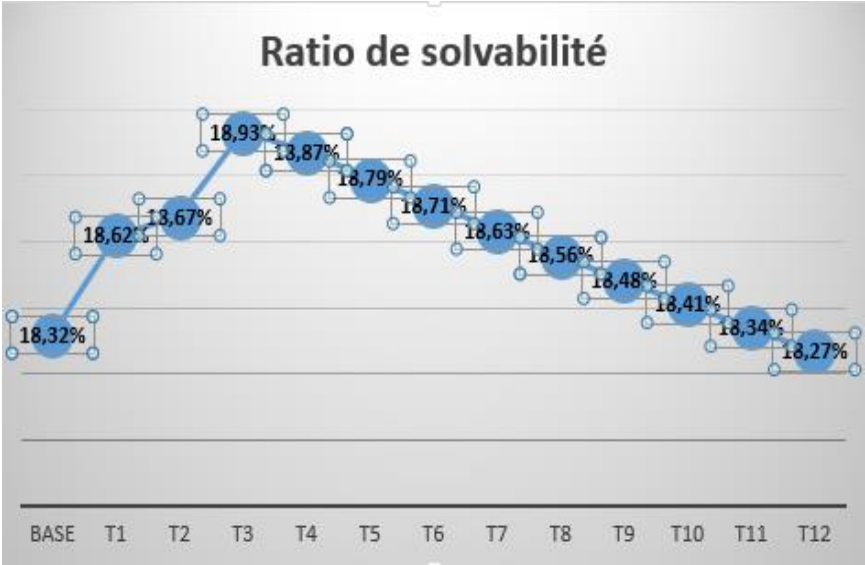
5. Appendices :

Annex 1: Evolution of the Liquidity Ratio During the Baseline Scenario



Source: Prepared by the author.

Annex 2: Evolution of the Solvency Ratio During the Baseline Scenario



Source: Prepared by the author.