

The management of bank liquidity risk in the Basel III Era: The case of the Algerian Bank BADR

Mostefai Della Asma ¹

¹ Higher School of Business, Master in Financial Sciences, Algeria. Email: asma.most.d@gmail.com

Abstract---The paper explores the vital necessity of liquidity risk management inside financial organizations. Contextualizing the problem after the 2008 financial crisis, the paper explores the different **Asset-Liability Management (ALM)** strategies and their practical implementation. The work is based on a technique combining a literature review and a case study undertaken with the Bank of **Agriculture and Rural Development (BADR) in Algeria**. The measuring techniques employed include liquidity gap analysis, base surplus calculation (demonstrating a surplus of 5,700 MDA), and the transformation index (calculated at **1.52**, showing adequate risk coverage). The findings show that ALM is a crucial instrument for predicting finance requirements and managing the profitability-risk balance. The discussion highlights the need for Algerian banks to consolidate their management practices and comply with international regulatory developments, particularly the LCR and NSFR ratios introduced by Basel III. The study concludes with recommendations aimed at strengthening the institution's resilience against liquidity shocks.

Keywords---Cash management, Liquidity risk, ALM, Basel III, LCR, NSFR, Algerian banks, BADR.

1. Introduction

The management of liquidity risk constitutes a major concern for the stability and sustainability of financial organizations. Indeed, liquidity, which corresponds to a bank's capacity to make its immediate or short-term payment commitments, lies at the core of the correct functioning of the financial system (Goodhart, 2008).

Insufficient liquidity may swiftly provoke a loss of trust among depositors and investors, possibly leading to an insolvency crisis. The global financial crisis of 2007-2009 revealed the shortcomings of the

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current regulatory frameworks, notably those emanating from the Basel II accords, which did not effectively account for liquidity risk. In response, the Basel Committee introduced a set of stricter measures in the Basel III agreement, including the Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR), which aim to strengthen banks' resilience in the face of liquidity pressures (**Basel Committee on Banking Supervision, 2013**).

In this setting, asset and liability management (ALM) emerges as a critical instrument for predicting financing needs, balancing liquidity and profitability, and maintaining compliance with regulatory requirements. If banks in wealthy nations have substantially incorporated these methods, banks in developing countries, including those in Algeria, are still in the adaption phase.

This research focuses on the Bank of Agriculture and Rural Development (BADR) in Algeria, in order to analyze liquidity risk management in a local setting distinguished by economic and regulatory specificities. The purpose is to understand how BADR implements ALM techniques and reacts to the problems given by the gradual implementation of Basel III requirements, relying on an empirical study based on internal data and interviews with treasury management.

2. Methodology

2.1. General Approach

This research employs a hybrid strategy, combining a detailed literature review with an empirical analysis focusing on a case study. This dual approach allows for the confrontation of theoretical and regulatory principles with the actual reality of liquidity risk management inside an Algerian bank, the Bank of Agriculture and Rural Development (BADR).

2.2. Sources of data collecting

The data utilized mostly originates from internal papers supplied by BADR, especially the balance sheets and financial reports for the 2014-2015 fiscal years. These papers enable for the extraction of specific information on the composition of assets and liabilities, as well as on the structure of maturities.

Furthermore, semi-structured interviews were performed with the heads of treasury and the risk management department of BADR. These interviews attempt to better understand asset-liability management processes, the instruments employed, as well as the unique restrictions experienced in liquidity management.

2.3. Analysis tools and indicators utilized

To examine liquidity risk management, numerous techniques and indicators were used:

Prudential ratios: The present liquidity ratio in the bank was assessed, as well as the particular criteria of the Basel III ratios, namely the Liquidity Coverage Ratio (LCR) for short-term liquidity and the Net Stable Funding Ratio (NSFR) for long-term structural liquidity.

These ratios serve as benchmarks to assess BADR's conformity with international standards. The examination of liquidity gaps: This approach includes assessing the mismatches between the maturities of assets and obligations, both in stock (position at a particular date) and in flow (forecasted movements). It provides for the identification of times when the bank could be exposed to a financing demand or a liquidity excess (**Bessis, 1995**).

The transformation index: Calculated by weighting assets and liabilities by their average maturity length, this indicator indicates the degree to which long-term purposes are funded by short-term resources, an essential risk element in liquidity management (**Ouchene & Rabhi, 2011**).

An index higher than 1 shows a sensible risk coverage.

The fundamental surplus: Defined as the gap between liquid assets and current obligations, this surplus is a liquidity cushion available to deal with unanticipated financial withdrawals (**Ait Ikhlef, 2013**). The examination of stock and flow impasses: This in-depth investigation of the differences between outstanding amounts and deadlines shows possible liquidity tensions across various periods (**Darmon, 1997**).

2.4. Methodological constraints

This research has various constraints pertaining to the availability and accessibility of internal data, as well as the representativeness of a particular case study. The findings produced should thus be evaluated within this unique framework, even if they give valuable insights into the issues of liquidity risk management in the Algerian setting.

Furthermore, the examined period (2014-2015) corresponds to a time prior to the full implementation of Basel III criteria in Algeria, which may restrict the evaluation of current compliance with the standards. Nevertheless, this time offers a good base for understanding initial practices and obstacles.

3. Results

3.1. Analysis of the liquidity status of BADR (2014-2015)

Focuses on a full simulation of the balance sheet of the Bank of Agriculture and Rural Development (BADR) throughout the period **2014-2015** in order to assess its liquidity risk management using ALM methods.

3.2. Transformation Index

The transformation index assesses the appropriateness between the duration of assets and that of liabilities. It is computed by weighing the outstanding balances of assets and liabilities by their respective maturities. Table 1 displays the allocation of BADR's assets and liabilities according to various maturity classes, as well as the applicable weightings.

Table 1 gives an example of this data (in millions of Algerian Dinars MDA):

Table 1. Profile of weighted assets and liabilities

Maturity classes	Liabilities	Assets	Weightings	Weighted liabilities	Weighted assets
≤ 7 days	2600	2000	0.01	26	20
7 days $\leq d < 1$ month	3000	3200	0.05	150	160
1 month $\leq d < 3$ months	4300	2700	0.16	688	432
3 months $\leq d < 6$ months	2800	2400	0.37	1 036	888
6 months $\leq d < 1$ year	1200	1300	0.75	900	975
1 year $\leq d < 2$ years	500	1800	1.5	750	2700
≥ 2 years	1800	2800	3.5	6 300	9800
Total	16200	16200		9 850	14 975

The transformation index is then computed as the ratio of weighted liabilities to weighted assets:

$$[\text{Transformation Index}] = \frac{9,850}{14,975} \approx 1.52$$

An index higher than 1 implies that the bank appropriately funds its long-term assets with long-term resources, hence lowering the transformation risk. This score demonstrates that the BADR has excellent coverage of this risk.

3.3. Basic surplus

The basic surplus is an indicator that assesses the difference between liquid assets and payable obligations, reflecting an accessible liquidity cushion. Table 2 displays the composition of liquid assets and payable liabilities of BADR, with the associated amounts. For a specific example (in millions of Algerian Dinars):

Table 2. Calculation of the base surplus

Liquid assets (A)	Amount	Current obligations (B)	Amount
Cash and balances BC	400	Central Bank	500
BC balance net of reserves	1 000	Excess reserves purchased	10 000
Government securities	9 000	Repurchase agreements	5 000
Securities trading position	3 000	DAT	800
Advances to subsidiaries	600	Surpluses in long-term reserves	3 000
Short-term advances	7 000		
Loans to brokers	1 000		
Excess reserves sold	3000		
Total	25 000	Total	19 300

The fundamental excess is therefore: $[25,000 - 19,300 = 5,700, \text{MDA}]$ This positive surplus demonstrates that BADR has a strong liquidity buffer, enhancing its capacity to deal with unanticipated cash withdrawals.

3.4. Analysis of liquidity constraints in stock and flow

The examination of stock and flow impasses allows for the comprehension of predicted liquidity difficulties across multiple periods. Table 3 gives an example of the maturity profile of assets and liabilities, as well as the estimated gaps.

For an example of a maturity profile:

Table 3. Profile of outstanding amounts, liquidity constraints in stock and flow

DATE	1	2	3	4	5	6
Assets	1000	900	700	650	500	300
Liabilities	1000	800	500	400	350	100
Stocked Deadlocks	0	-100	-200	-250	-150	-250
Asset drops		+100	+200	+50	+150	+250
Falls of Liabilities		-200	-300	-100	-50	-250
Deadlocks in Flow		-100	-100	-50	+100	-50
Cumulative flow impasses		-100	-200	-250	-150	-200

Demonstrates that over numerous years, liabilities amortize more rapidly than assets, hence producing periodic financing demands. This event underlines the significance of active liquidity risk management using ALM technologies to foresee these conflicts and modify the bank's financial plan.

4. Discussion

The findings acquired by the BADR analysis highlight the vital relevance of rigorous liquidity risk management in an emerging banking scenario. The transformation index more than **1 (≈ 1.52)** and the positive base surplus (**5,700 MDA**) reflect a cautious management approach aimed at reducing exposure to risks associated to maturity transition and keeping an appropriate liquidity reserve.

These indicators are congruent with the core concepts of asset-liability management (ALM), which allows for the forecasting of possible imbalances between inflows and outflows of funds. However, the examination of stock and flow imbalances reveals that rare conflicts might occur, especially when liabilities mature more rapidly than assets. This discovery emphasizes the necessity for constant monitoring and a flexible approach to satisfy short-term finance requirements.

Within the scope of international regulatory standards, BADR looks to have the required foundations to achieve Basel III ratios, especially the **Liquidity Coverage Ratio (LCR)**, which needs a sufficient amount of liquid assets to cover net withdrawals over 30 days. However, the complete implementation of the LCR and NSFR ratios creates a difficulty for the Algerian banking sector as a whole. Indeed, as various studies have demonstrated (Al-Tamimi & Al-Mazrooei, 2017; Kouki et al., 2020), banks in developing nations confront structural restrictions, such as weak financial markets, a heavy dependence on short-term deposits, and risk management systems that are still in need of development.

The BADR, with its capacity to maintain a balanced profile, indicates a certain preventative resilience. Nevertheless, to permanently develop this resilience, various areas for improvement need to be explored. First, the diversification of funding sources, for example via the development of securitization or access to long-term finance, may lessen risk associated to excessive dependence on short-term resources. Next, the digitization of treasury management operations and the integration of new technical tools will permit greater forecasting of demands and more refined risk management.

Moreover, Algerian banking legislation continue to change, with stronger monitoring and a gradual harmonization to international norms. It is crucial that banks, notably BADR, have technical assistance and continual training to completely understand ALM technologies and satisfy the criteria of the authorities.

Finally, this research underlines the significance of constant communication between regulators and banking stakeholders in order to adjust norms to local specificities, while guaranteeing financial stability. Compliance with Basel III should be considered not just as a legal restriction but as an opportunity for structural and strategic change.

Conclusion and Recommendations

The research demonstrated the important relevance of liquidity risk management in Algerian banks via an in-depth investigation of the case of the Bank of Agriculture and Rural Development (BADR). The findings suggest that rigorous asset-liability management, shown by a transformation index larger than 1 and a positive base surplus, is a crucial lever for guaranteeing financial stability and anticipating financing requirements.

However, despite these strong practices, the full application of Basel III international standards, notably the LCR and NSFR ratios, remains a problem for BADR and the Algerian banking system as a whole. The limits associated to the structure of the financial sector, the preponderance of short-term borrowing, and the still-perfectible technology capacity prevent complete compliance. Increase this resilience and provide a consistent financing profile, many proposals are proposed:

- ☑ Diversification of financing sources: Develop alternate channels such as securitization and long-term bond issuances to lessen dependence on short-term deposits.
- ☑ Improvement of ALM tools and processes: Integrate sophisticated cash management technology and increase analytical skills for better forecasting of demands.
- ☑ Strengthening training and awareness: Ensure constant assistance for risk management teams to learn regulatory standards and worldwide best practices.
- ☑ Enhanced conversation with regulators: Collaborate closely with the Bank of Algeria to adjust standards to the local context, while preserving international norms.

- ☒ Dynamic monitoring of liquidity indicators: Set up a persistent monitoring system for LCR, NSFR ratios, and liquidity gaps to swiftly anticipate any strain.

In conclusion, the progressive adaptation to Basel III criteria, along with proactive and creative management, is vital for Algerian banks to not only comply with laws but also increase their competitiveness and resilience in the face of economic risks.

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