

# Towards Early Critical Warnings of Lebanese Banks: An Analytical CAMELS Study

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## Abstract

The stability of the Lebanese banking sector has been jeopardized following the financial crisis that unfolded in 2019. This instability manifested through a loss of customer confidence, widespread doubts about the banks' ability to repay deposits, indirect control over capital, and restrictions on withdrawals, particularly in foreign currencies. As a result, the Lebanese banking sector, once regarded as the backbone of the economy, now faces an existential challenge. The financial health of the country has deteriorated significantly, especially after the Lebanese government declared bankruptcy on euro bonds held by local commercial banks, coupled with the depreciation of the Lebanese pound against foreign currencies. To evaluate the potential for recovery and the challenges ahead, a study of ten Lebanese commercial banks was conducted using the CAMELS model, which examines capital adequacy, asset quality, management quality, profitability, liquidity, and sensitivity to market risk. The findings reveal that by 2022, all assessed banks received a CAMELS score of 4, reflecting the profound financial and economic crisis in Lebanon.

**Keywords:** CAMELS framework, Lebanese banking sector, financial crisis, capital adequacy, asset quality, management quality, profitability, liquidity, and sensitivity to market risk

## 1. Introduction

It is widely recognized that a nation's financial system and economy are built on the backs of a robust, stable, and prosperous banking industry. In addition to offering security to depositors and lenders, a healthy banking industry is essential to borrowers and the overall economy. The banking industry plays a major role in supporting sustainable economic growth, especially in emerging economies, by collecting money and wealth from individuals and corporations with excess capital and reinvesting it into the economy through loans to investors (Allen, Carletti, & Gu, 2008; Liang & Reichert, 2006; Jokipii & Monnin, 2013).

The last two decades have brought radical changes to the financial markets given the rapidly evolving globalization, fierce technological progress, demographic changes, interactions between banking and non-banking financial institutions, the global competitive climate, financial integration and the decline in knowledge prices. These changes create new challenges and of course new opportunities for banks and other financial institutions which makes the requirements of this stage completely different from the requirements of the past stage. This stage requires distinguished powers and capacities in terms of flexibility, innovation, elimination of possible weaknesses, and financial stability, particularly in terms of liquidity and solvency (Rahman, Ming, Baigh, & Sarker, 2023; Naimi-Sadigh, Asgari, & Rabiei, 2022; Saviano, Russo, Farina Briamonte, & Di Nallo, 2024).

The Lebanese banking system has faced significant challenges in the past two years, including inadequate risk management, insufficient liquidity, and insolvency. This is seen by the stringent policies that banks have put in place for depositors, such as more stringent withdrawal guidelines, which have resulted in a major decline in depositor confidence. Nowadays, a lot of depositors consider the banks as practically bankrupt, and they try to take all of their money out of fear, even if it's not needed right then. As a result, there is now less faith in the financial system, and people are reluctant to deposit valuable funds in Lebanese banks.

By assigning each bank a credit rating, external rating agencies evaluate the solvency and credit risks of banks

and their financial instruments. These ratings are essential for giving stakeholders, regulators, and investors information about the soundness of banks' finances and their capacity to repay debt. When a bank is considered "too big to fail," governments may intervene and use public cash to save specific financial organizations that are in danger of failing or going bankrupt. Since these institutions are frequently seen as systemically important, their failure could lead to widespread financial instability and cause disruptions to the economy as a whole.

## 2. Literature Review

### 2.1 CAMELS Framework

In this approach, the CAMELS framework represents one of the most popular used techniques for the investigation and assessment of banking soundness. This framework, originally known as CAMEL, was developed by the bank regulatory agencies in the United States in 1979. Since then, its use has been expanded, and it is now regarded as a useful tool by regulatory authorities from other nations to evaluate the soundness of financial institutions (Roman & Argu, 2013). CAMEL consists of 5 components: Capital Adequacy, Asset Quality, Management, Earnings, and Liquidity. In practice, U.S. regulators realized that CAMEL had not effectively accounted for the contemporary, highly competitive global markets and thus introduced a sixth element to capture systemic risk in 1997. This systemic component, S, aims to account for the sensitivity of banks to market variables. Examining financial ratios and comparing them to benchmarks is the most popular method of evaluating the financial performance and quality of management of banks. Each element of this rating is assigned a score between 1 and 5, which are then added together to create a composite evaluation that is similarly determined by the 1 to 5 scale.

To assess the capital adequacy of banks, it is important to examine their financial ratios and compare them with benchmarks. Among these indices, emphasis should be placed on the amount of capital these banks must hold to neutralize their operating losses, absorb unforeseen adverse market shocks, and maintain their financial security. It can be measured through the Capital to Risk-Weighted Assets ratio. A large share of equity and a higher loan-to-asset ratio can reduce banks' suffering during the early stages of the crisis (Beltratti et al., 2012). The solvency of financial institutions can be jeopardized following a depreciation of the quality of loans (bad debts, defaults) and a depreciation of the assets held by these institutions leading to a decrease in the profitability of borrowers and financial health (Farg et al, 2013).

The asset quality indicator measures the performance of an asset, which evaluates the suitability of a financial institution's loan portfolio and the effectiveness of its risk management procedures. According to Borio and Drehman (2009), the global financial crisis of 2007-2008 was linked to a vulnerability of bank assets, and banking instability generated financial instability. The Garcia report requires that banks operating in the European Union be subject to asset quality reviews to ensure European banking stability. The ratio of nonperforming loans (NPLs) to total loans is used in this study.

Furthermore, the management efficiency element focuses on strategic planning, risk management, governance, and leadership techniques are all components of effective management and have a substantial impact on operational performance and overall soundness. This means that assessing management under CAMELS requires a deep understanding of both operational effectiveness and managerial effectiveness. In order to assess managerial capacity in the banking industry, this study divides non-interest expenses by operating income minus loan loss provision. This ratio is known as the efficiency ratio. This formula was selected because it offers a comprehensive grasp of cost control, risk mitigation strategies, and income production—all essential elements of effective management. The selected formula is preferred above other formulas since it shows the operating expenses percentage as a proportion of operational income coming from interests and fees, which makes it a useful tool for evaluating management competency in the context of the CAMELS framework. In addition, the concepts of corporate governance, the importance of which is highlighted by the Basel Committee, and internal control play a crucial role in bank ratings and it has been proven that the global financial crisis of 2008 was initiated by poor risk management, poor internal control and deficiencies in the independence of board members or their skills and expertise in analyzing risk situations (Andres et al, 2008) and in financial transparency and disclosure of banking practices.

In addition, many studies have shown a statistically significant positive correlation between the profitability (earnings) of a bank and its credit rating. According to several studies, the income of a bank derives its importance from the fact that the higher it is, the lower the risk of the bank paying its debts, which means that its credit rating will increase (Poon et al, 2009). Rajan (2005) states that risk in the banking system is linked to the volatility of profits and income generated and that the risk/return ratio must be evaluated: it must be acceptable and it must consider capital costs. The Return on Average Common Equity (ROACE) and Return on Average

Assets (ROAA) formulas were used in this study. By providing information on operational effectiveness and resource allocation tactics, ROAA enables a detailed evaluation of how well a financial institution uses its assets to generate earnings. In the meantime, ROACE offers an additional perspective of the returns received by investors in average common stock, revealing the institution's ability to generate profits in relation to shareholder capital. Through the use of these formulas, this study is able to acquire a thorough comprehension of earnings dynamics, which facilitates a thorough assessment of the performance and strategic positioning of financial institutions within dynamic market environments.

Moreover, liquidity is the ability of a bank to meet its payment deadlines, honor its contractual obligations, and finance the growth of its assets while avoiding intolerable losses. A bank's liquidity constitutes its resilience against shocks and crises, this is because the bank essentially assumes the role of intermediary between the parts of the economy that are in surplus and those that are in deficit. A good liquidity ratio is positively correlated with the credit rating (Poon et al., 2009). However excess liquidity can lead to a downgrade of the credit rating because this excess shows that the bank is unable to seize good investment opportunities. Both liquidity risk and credit risk influence the probability of a bank failing, this is why they require litigation review. The loans-to-deposits ratio is used in this study. This crucial ratio, which is obtained by dividing the entire amount of loans made by a bank by the total amount of deposits, is a crucial tool for evaluating the ability of the organization to meet short-term financial obligations and handle unstable economic conditions. It provides a clear and informative look into the bank's basic operations by analyzing the loan-to-deposit ratio, which clarifies how the lending activities of the bank are balanced with its core financing source.

Under the requirements of the Basel II agreement, credit rating agencies such as Fitch analyze the commercial risk or market risk of banks using the sensitivity ratios. This involves examining how regulators handle financial crises, the quality and effectiveness of regulatory bodies, the institutional structure of the country, the performance of banks and their competitive environment, and their range of financial services and products. For example, the commercial risk of a bank increases as it uses sophisticated financial products. In their examination of commercial risk, (Amato & Furfine, 2004) consider three essential factors, which are the market beta (a measure of systemic risk), the residual standard error of the model estimation, and the size of the institution. On the other hand, this study used the ratio of Total Securities to Total Assets. The choice of this formula stems from its ability to capture the extent to which banks allocate their assets towards securities. These securities can be a wide range of financial instruments, including certificates of deposit (BDL), Net Lebanese Treasury Bills & Eurobonds, Risk-ceded Lebanese Eurobonds, equity instruments, other non-Lebanese governmental securities, and other Lebanese securities. These securities are recognized mainly under financial statements line items related to financial assets given as collateral, financial assets at fair value through profit or loss, financial assets at amortized cost, and financial assets at fair value through other comprehensive income. The Total Securities to Total Assets ratio offers a comprehensive view of a bank's investment portfolio diversification and exposure to market risk. In order to improve understanding of how banks manage their investment portfolios and respond to external challenges, this study examines how sensitive this ratio is to changes in various market conditions, regulatory requirements, or macroeconomic factors. Ultimately, this will help to advance risk management practices within the banking industry.

## 2.2 Empirical Research

AL-Najjar & Assous (2021) used the CAMELS rating system to evaluate eleven Saudi banks (including seven conventional banks and four Islamic banks) and to examine the effect of these ratings on the evolution of deposits from 2014 to 2018 using the regression model. This study ranks Saudi banks according to financial ratios. The determinants of CAMELS used by this study are capital adequacy (CAR and CAR tier 1), liquidity (loans to deposits), asset quality (loan losses to total equity), management (net profit per employee), and earnings quality (return on equity, and return on assets). The findings show how different financial ratios affect banks' total deposits, showing positive impacts on capital, management efficiency, and certain liquidity ratios, and negative effects for other earnings and liquidity ratios. Furthermore, the total amount of deposits was shown to be unaffected (not significant) by asset quality ratios.

Petropoulos et al (2020) used forecasting techniques to predict bank insolvencies using the components of the CAMELS framework. The study concludes that Random Forests (RF) outperforms Neural Networks in forecasting bank insolvencies with Neural Networks performing equally well in out-of-time samples. Capital and profitability measures are crucial to the CAMELS rating framework's ability to forecast bank failures. The study recommends using macroeconomic factors and expanding the analysis to multiple jurisdictions.

Furthermore, Guan, Liu, Xie, and Chen (2019) employed the G-CAMELS, which includes a green indicator that

gauges the environmental impact of Chinese commercial banks in addition to the established CAMELS variables. Profitability and green credit are given the highest weights in this scheme. According to the study's findings, joint-stock banks should prioritize safety, profitability, and green credit while state-owned banks should concentrate on innovation and green credit promotion. The study demonstrated that the government should consider lowering green credit rules for municipal commercial banks.

Additionally, Antoun, Coskun, and Georgievski's (2018) study attempts to pinpoint the elements affecting the banks' financial performance in Central and Eastern European countries. A Financial Performance Index (FPI) based on CAMEL ratios is introduced, which considers elements unique to banks, the industry, and the macroeconomic environment. Sources of data include the Financial Structure and Development Dataset, World Development Indicators, and Bank Scope database. Panel data with fixed-effects regression is used for analysis. Utilizing unbalanced panel data, the study spans the years 2009–2014. Important conclusions include the following: bank performance is positively impacted by business mix and inflation, but negatively by bank size. Moreover, bank concentration and economic growth are positively correlated with capital sufficiency and liquidity. The research explains why fixed-effects models are preferable to random-effects models and considers a number of variables as performance indicators, including real GDP per capita growth, operational expenses, and bank-specific components.

Abdulazeez et al. (2017) conducted a study that contrasts the profitability of Saudi Arabian local and foreign banks between the years 2000 and 2014. The study tackles capital sufficiency, asset quality, management, earnings, and liquidity using the CAMEL framework. It uses panel data with fixed-effects models and pooled ordinary least square (OLS), using return on assets (ROA), return on equity (ROE), and Net interest income/average earning assets (NIM) as profitability metrics. The Hausman test is used in the study to address endogeneity, and it offers insights into the variables affecting Saudi Arabian banks' profitability. The results show that Saudi Arabian domestic banks are more profitable than foreign banks. Profitability is positively correlated with higher capitalization for both local and international banks.

Plus, Yuksel et al (2015) analyzed Turkish deposit banks using CAMELS components and the Multinomial logistic regression analysis. They concluded the major importance of asset quality (with a special emphasis on fixed assets), sensitivity to commercial risk, and management quality on the credit ratings. They additionally found that earnings ratio and capital adequacy do have not any significant impact on credit ratings. Yet, Turkish banks should focus on interest income and FX liquid assets to enhance their credit ratings.

In addition, Christopoulos et al (2011) studied the reasons behind the failure of Lehman Brothers by examining CAMELS components from 2003 to 2007. They concluded that bad risk management, bad debts, and high exposure to risks were the main reasons for this collapse. They also noted the negative role of credit rating agencies and the US Federal Reserve in the collapse and recommended the use of Basel III requirements to get enhanced equity.

### *2.3 Research Questions*

Lebanese banks lent a significant portion of their funds, primarily composed of deposits from Lebanese citizens, to the government via the central bank. When the government defaulted and the Lebanese pound depreciated against foreign currencies, depositors rushed to withdraw their money, particularly foreign currency deposits. Faced with a severe liquidity shortage and a loss of depositor confidence, Lebanese banks plunged into a monetary crisis, which swiftly escalated into a broader banking and financial crisis.

The pressing question now is whether Lebanese banks have the capacity to survive this existential crisis. To explore this, the researchers apply the CAMELS model to assess the financial health of 10 Lebanese banks and evaluate their ability to withstand the crisis thus answering the following questions: what are the Lebanese banks' scores according to the CAMELS framework? And are they able to overcome the crisis?

### **3. Research Methodology**

The researchers use a descriptive-analytical approach that combines theoretical fieldwork and research. The CAMELS variables are applied to 10 Lebanese banks over 11 years.

The banks examined are AUDI Bank, BLOM Bank, Byblos Bank, Bank of Beirut, BLC Bank, BEMO Bank, BML Bank, Credit Libanais, IBL Bank, and Fransabank. The study examines all six publicly listed Lebanese banks (AUDI Bank, BLOM Bank, Byblos Bank, Bank of Beirut, BLC Bank, and BEMO Bank) due to their significant market presence. Additionally, four other private banks (BML Bank, Credit Libanais, IBL Bank, and Fransabank) were included to provide a comprehensive analysis of the sector. This selection ensures a representative sample, capturing both publicly traded and prominent privately-held banks.

The data of these banks are taken from their audited annual reports. The researchers empirically calculate each CAMELS variable and analyzes the quantitative results in depth.

The CAMELS composite rating system is a comprehensive tool used to evaluate a bank's overall health and stability, employing a scale that ranges from 1 to 5. Each numerical grade reflects a different level of soundness and risk exposure for stakeholders. A rating of 1, labeled "Strong" indicates that a bank performs exceptionally well in all major assessment areas, demonstrating high profitability, robust capital reserves, excellent asset quality, efficient management, sufficient liquidity, and low sensitivity to market risks. In contrast, a rating of 2, classified as "Satisfactory" denotes that the bank is fundamentally sound, with overall good performance but some minor weaknesses that require attention. A "Fair" rating of 3 indicates that the bank has certain shortcomings in specific areas, suggesting the need for closer monitoring and possible remedial action to strengthen its overall stability. Banks rated 4, or "Marginal" exhibit serious flaws that may make them more vulnerable to risks and financial difficulties; they need corrective measures to mitigate risks and enhance their standing. Lastly, a rating of 5, or "Unsatisfactory" reflects significant deficiencies that

#### 4. Findings

To calculate the rating, each component is assigned a weight and a percentage related to its rating interval. Below is a representation of the evaluation of the rating components.

Table 1. CAMELS rating weights and rating calculation

		Weight	1(%)	2(%)	3(%)	4(%)	5(%)
C	CAR	20%	>11	8-11	4-7.99	1-3.99	<1
A	NPL/ Loans	20%	<1.5	1.5-3.49	3.5-6.9	7-9.5	>9.5
M	NIE/ (OI – LLP)	25%	≤25	25.1-30.9	31-38.9	39-45.9	≥46
E	ROAA	7.5%	>1.5	1.25-1.5	1.01-1.24	0.75-1	<0.75
E	ROACE	7.5%	≥22	1.7-21.99	10-16.99	7-9.99	≤6.99
L	Loans/ Deposits	10%	<60	60-64.9	65-69.9	70-80	>80
S	Securities / Assets	10%	>80	71-80	65-70.9	60-64.9	<60

*Note.* CAR = Capital Adequacy Ratio, NPL = Non-performing Loans, NIE = Non-interest Expenses, OI = Operating Income, LLP = Loan Loss Provision, ROAA = Return on Average Asset, ROACE = Return on Average Common Equity. *Source:* Masood, Ghauri, & Aktan (2016)

The CAMELS assessment system, as shown in Table 1, gives varying weights to key aspects, with management quality being given the maximum weight at 25%. This illustrates how crucial it is to preserving a bank's overall operational health. Subsequently, asset quality and capital adequacy are weighed at 20% each, indicating their importance in assessing a bank's risk exposure and resilience. Another important component, weighted at 15%, is earnings, which emphasizes the bank's sustainability and profitability. Lastly, 10% weightings are allocated to both liquidity and sensitivity to market risk, highlighting their moderate but significant effects on a bank's stability.

When it comes to capital adequacy, the best results are shown by a capital adequacy ratio higher than 11%, which denotes a well-capitalized bank that can withstand losses. On the other hand, if the ratio falls below 1%, there are significant capital deficits that could jeopardize the bank's viability.

In terms of asset quality, the top-performing banks keep their non-performing loan (NPL) ratio of total loans under 1.5%, indicating sound risk management practices and robust asset health. Conversely, if NPLs ratio is above 9.5%, it signifies a significant decline in asset quality and a strong probability of loan defaults and unstable finances.

The ratio of Non-Interest Expenses (NIE) to Operating Income - Loan Loss Provision indicates management efficiency. It functions best when the ratio is less than 25%, which denotes cost-effective operations and excellent management control. But a percentage higher than 46% indicates inefficiency, meaning that operating costs severely reduce profitability.

Regarding earnings, two key ratios are used: Return on Average Assets (ROAA) and Return on Average Common Equity (ROACE). The best earnings are indicated by an ROAA above 1.5% and an ROACE exceeding 22%, reflecting robust profitability and effective use of assets. Conversely, an ROAA below 0.75% and an ROACE under 6.99% suggest weak earnings and poor returns on equity.

Furthermore, the optimal loan-to-deposit ratio, which guarantees high liquidity, is less than 60%. This means that the bank has enough deposits to fund its loans. Ratios above 80% indicate a tight liquidity and raise the

possibility that the bank is overly dependent on deposits to sustain its lending, which could be risky financially.

Lastly, the ratio of total securities to total assets determines sensitivity to market risk. Banks that have ratios over 80% are thought to be extremely vulnerable to changes in the market, whilst those that have ratios under 60% are thought to be less vulnerable and more stable.

Now that the weights and the percentage intervals are assigned for each of the CAMELS component, below is a representation of all ratings calculations across all CAMELS components:

Table 2. Banks' CAR ((Tier 1 Capital +Tier 2 Capital) / Risk-Weighted Assets) Calculations

Bank name	2012 (%)	2013 (%)	2014 (%)	2015 (%)	2016 (%)	2017 (%)	2018 (%)	2019 (%)	2020 (%)	2021 (%)	2022 (%)
AUDI	13.67	12.09	13.03	13.36	14.78	16.93	18.91	11.37	13.12	14.52	9.81
BLOM	16.22	16.83	17.03	17.54	19.85	18.14	20.07	11.05	11.59	12.54	15.39
Byblos	17.29	16.5	17.23	17.78	18.81	17.8	18.19	9.73	11	12.91	13.1
Bank of Beirut	14.21	13.37	14.45	13.61	14.94	15.21	16.91	12.01	12.44	14.73	14.83
BLC	11.8	14.47	14.68	14.73	16.4	18.85	19.25	10.14	16.27	16.25	15.59
BEMO	12.26	14.5	14.3	14.44	15.59	17.85	15	10.5	13.07	13.09	13.15
BML	13.45	13.29	12.63	12.16	14.19	15.54	15.6	7.48	8.88	9.71	9.05
Credit Libanais	13.65	14.17	15.77	14.73	14.75	13.44	16.59	8.86	13.83	14.37	10.82
IBL	13.5	12	11.66	14.86	19.11	30.15	30.09	9.55	9.22	9.3	9.8
Fransa bank	12.44	14.72	15.07	14.74	15.37	15.4	15	10.5	11.93	11.77	10.29

The ten banks showed a generally strong to satisfactory capital adequacy rating across the ten-year period from 2012 to 2022, as shown in Table 2, with their CAR (capital adequacy ratios) percentages continuously hit above the 11% level until 2019, showing a stable ability to absorb financial risks. But things started to change in 2019 when the Lebanese financial crisis struck, with a decrease in the capital adequacy levels of all of these banks. On the other hand, the capital adequacy ratios of BLOM Bank, BLC and Bank of Beirut remained the highest over the course of the period, indicating their better capital management and resilience over other banks. Furthermore, a few banks, like Bank Audi and Credit Libanais, had notable declines; by 2022, where Audi's CAR had dropped significantly, indicating that it could be difficult to maintain adequate capital reserves in the face of changing market conditions.

Table 3. Banks' Asset Quality (Non-performing loans/ Total Loans) Calculations

Bank name	2012 (%)	2013 (%)	2014 (%)	2015 (%)	2016 (%)	2017 (%)	2018 (%)	2019 (%)	2020 (%)	2021 (%)	2022 (%)
AUDI	2.64	2.31	3.08	3.14	2.69	3.88	5.52	13.12	15.31	13.33	14.78
BLOM	5.44	4.89	4.44	4.4	4.19	3.13	4.48	7.08	21.26	20.39	25.87
Byblos	5.28	4.85	5.05	4.56	3.68	4.02	3.93	5.43	14.16	21.3	27.43
Bank of Beirut	1.89	1.98	2.52	2.83	5.04	4.24	4.42	4.5	6.73	9.15	15.54
BLC	7.47	5.59	7.1	7.05	7.84	3.44	5.92	8.67	12.16	15.72	25.34
BEMO	0.54	0.7	1.01	0.7	0.72	0.65	3.4	6.69	12.07	13.48	18.24
BML	7.42	8.66	6.84	5.76	5.08	6.98	10.98	8.06	18.97	25.45	30.4
Credit Libanais	1.75	1.96	1.71	1.85	1.87	2.43	3.14	3.76	8.85	17.31	33.19
IBL	1.49	1.06	1.27	1.31	2.28	2.41	4.78	6.25	16.67	23.42	23.89
Fransa bank	4.25	4.82	4.95	4.6	4.05	3.93	4.95	7.12	12.23	16.44	18.26

From 2012 to 2022, the asset quality of the ten banks declined, as shown in Table 3. Non-performing loan (NPL) ratios increased dramatically, particularly after 2019. For example, Bank Audi's non-performing loan (NPL) ratios were comparatively low from 2012 to 2016 (2.31% to 3.88%). However, in 2019, the percentage sharply increased, reaching a peak of 15.31% in 2020 and staying high until 2022. Similarly, BML Bank's NPL ratio increased sharply to 30.4% by 2022 while having a marginal asset quality up until 2017. NPLs at BLC Bank also increased significantly, rising from a steady 3.44% in 2017 to 25.34% in 2022. From 2012 to 2017, banks like Bemo, Credit Libanais, and IBL showed good asset quality; but, in the years that followed, particularly in 2020, 2021, and 2022, their ratios significantly deteriorated. This pattern demonstrates the serious risks to risk management and the difficulties these banks have in keeping their portfolios profitable and robust in the face of challenging economic times.

Table 4. Banks' Management Efficiency (NIE/ (OI – LLP)) Calculations

Bank name	2012 (%)	2013 (%)	2014 (%)	2015 (%)	2016 (%)	2017 (%)	2018 (%)	2019 (%)	2020 (%)	2021 (%)	2022 (%)
AUDI	52.7	61.2	61.6	60.8	53.1	56.6	52.5	427.3	143.1	181.7	181.4
BLOM	41.3	40.6	41.9	40	30.1	40.3	37.9	66.3	69.6	82.2	97.7
Byblos	52.3	53.1	49.5	53.7	38.4	54	55.3	168.6	155.2	92.1	73.5
Bank of Beirut	49.1	49.3	46.1	46.2	45.7	46.2	47.3	207.7	687.8	90.6	371.3
BLC	70.1	100.5	71.4	81.4	56.1	55.6	59.4	175.9	138.5	116.9	304.5
BEMO	79.2	73.1	65.1	60.5	59.2	56.3	54.8	131.4	87.1	100.1	1143
BML	88.8	88.3	83.6	84.5	105.3	79.5	63.3	56.46	98.2	108.5	245.7
Credit Libanais	61.2	59.2	61.9	60.9	61.4	58.2	58.7	94.4	106.3	173.9	1602
IBL	18.8	19.6	37.1	34.5	33	29.5	28.9	109.2	79	332.4	97.7
Fransa bank	53.9	62.6	58.1	55.3	50.7	52.9	56.3	159.8	95.2	167.3	1926

Table 4 displays the management efficiency trends of several banks from 2012 to 2022, based on the ratio of non-interest expenses (NIE) to operating income less loan loss provisions (OI - LLP). The data shows significant variation in the banks' managerial efficiency, especially after 2018. An extreme rise in non-interest expenses in comparison to operational revenue was shown by Bank Audi's efficiency ratio, which shot to 427.3% in 2019 and stayed high in the years that followed. Another bank that had a sharp increase was Bank of Beirut, which peaked at 687.8% in 2020 before declining to 371.3% in 2022 due to significant operational difficulties. Similar swings were seen in the management efficiency of BLOM and Byblos, with BLOM reaching a high of 97.7% in 2022 and Byblos reaching a top of 168.6% in 2019. Both BEMO and BLC showed significant fluctuations; in 2022, BEMO's ratio shot up to a startling 1143%, a sign of serious inefficiency. In 2022, Credit Libanais also achieved a shocking 1602%, underscoring serious management issues. On the other hand, the efficiency ratios of IBL and Fransa Bank showed notable rises. Fransa Bank's efficiency ratio ended at an astounding 1926% in 2022, indicating a severe need for operational reforms. All things considered, these patterns show the increasing difficulties commercial banks encounter in efficiently controlling their operating expenses, especially in a worsening economic climate.

Table 5. Banks' Earnings ROAA Calculations

Bank name	2012 (%)	2013 (%)	2014 (%)	2015 (%)	2016 (%)	2017 (%)	2018 (%)	2019 (%)	2020 (%)	2021 (%)	2022 (%)
AUDI	1.32	0.91	0.9	0.96	1.1	1.06	1.12	-1.39	-0.39	-0.59	-1.62
BLOM	1.39	1.38	1.35	1.42	1.58	1.56	1.48	0.33	0.01	0.02	0.02
Byblos	1	0.88	0.94	0.83	0.81	0.78	0.69	-0.52	-0.46	-0.09	-5.84
Bank of Beirut	1.24	1.16	1.23	1.2	1.21	1.15	1.13	-0.71	-1.68	0.03	-3.35
BLC	0.7	0.84	1.73	0.91	0.87	0.89	0.8	-0.65	-0.43	-3.2	-1.86
BEMO	0.5	0.43	0.76	0.84	0.93	1.05	0.99	-0.44	0.05	0.02	-2.51
BML	0.56	0.44	0.42	0.49	2.08	0.76	0.99	0.01	-5.63	-0.19	-2.18
Credit Libanais	0.81	0.84	0.73	0.7	0.68	0.73	0.69	0.04	-0.23	-2.73	-3.2
IBL	1.15	1.18	1.19	1.25	1.29	1.46	1.62	-1.77	-1.21	0.22	0.08
Fransa bank	1.06	0.98	0.93	0.92	0.98	0.84	0.83	-0.53	-0.33	-1.16	-2.85

The Return on Average Assets (ROAA) for a number of banks from 2012 to 2022 is shown in Table 5, which also shows a worrying trend in profits performance. The majority of banks saw a notable drop in their ROAA throughout this time, especially in the years that followed 2019, which was indicative of the unfavorable economic climate. Bank Audi had a sharp decline that resulted in a negative ROAA of minus 1.62% in 2022 from a starting ROAA of 1.32% in 2012. Byblos and Bank of Beirut displayed comparable trends, with Byblos falling to minus 5.84% in 2022 and both displaying negative returns in the later years. Even though it was declining, BLOM Bank and IBL were able to keep the highest ROAA between the ten banks, reaching a low of 0.02% and 0.08% in 2022. In the meantime, BLC and BEMO saw sharp drops; in 2021 and 2022, respectively, reaching -3.2% and -1.86%. The data, taken as a whole, shows a concerning trend in the banking industry's earnings performance, emphasizing the necessity of strategic changes to restore profitability in the face of difficult economic circumstances.

Table 6. Banks' Earnings ROACE Calculations

Bank name	2012 (%)	2013 (%)	2014 (%)	2015 (%)	2016 (%)	2017 (%)	2018 (%)	2019 (%)	2020 (%)	2021 (%)	2022 (%)
AUDI	16.51	12.59	13.63	13.69	14.76	13.41	14	-21.3	-6.13	-8.8	-16.8
BLOM	16.13	15.56	14.98	15.42	16.37	16.35	16.31	3.59	0.08	0.14	0.15
Byblos	11.28	9.8	11.07	9.48	9.21	9.35	8.55	-8.71	-7.65	-1.24	-50.3
Bank of Beirut	15.68	15.31	16.24	13.61	12.27	11.54	11.54	-8.72	-27.3	0.4	-67.2
BLC	9.06	10.33	9.68	9.68	8.36	8.16	7.27	-7.31	-4.57	-34.7	-22.1
BEMO	4.26	6.22	10.58	13.47	13.97	13.89	12.81	-5.77	0.76	0.24	-40.2
BML	6.04	5.15	5.17	6.67	24.24	9.34	13.82	0.08	-71.4	-2.91	-31
Credit Libanais	11.88	12.17	10.7	10.49	10.45	11.35	10.88	0.65	-3.14	-35.3	-50.5
IBL	20.16	20.12	19.47	19.46	19.94	21.77	21.31	-24.3	-19.2	3.12	0.99
Fransa bank	13.2	11.39	10.65	10.96	11.21	9.47	8.53	-6.68	-4.08	-13.4	-36.9

The Return on Average Common Equity (ROACE) figures for the sample of banks from 2012 to 2022 are shown in Table 6, which shows an unsettling trend in earnings in relation to shareholders' equity. The majority of banks first revealed respectable ROACE levels; in 2012, where IBL led the pack at 20.16%. But the following years saw a sharp downturn, which demonstrated in a ROACE of 0.99% in 2022, showing large losses in relation to equity. Similar drops were seen at Byblos Bank and Bank of Beirut, with Byblos falling to -50.3% in 2022 and Bank of Beirut to -67.2%. Over time, BLOM Bank demonstrated better stability, managing to sustain a positive ROACE, although at a much lower level—finalizing at 0.15% in 2022. AUDI Bank, on the other hand, demonstrated some resiliency in 2018 with a high ROACE of 14% before incurring significant losses and closing at -16.8% in 2022. Negative ROACE numbers also affected BLC and BEMO; in 2022, BLC's ROACE dropped to -22.1%. Overall, the data highlights the impact of unfavorable economic conditions on financial performance by highlighting a concerning trend in the profitability and returns to equity investors of the banking sector.

Table 7. Banks' Liquidity (Loans to deposits) Calculations

Bank name	2012 (%)	2013 (%)	2014 (%)	2015 (%)	2016 (%)	2017 (%)	2018 (%)	2019 (%)	2020 (%)	2021 (%)	2022 (%)
AUDI	38.91	47.32	47.94	50.35	47.88	48.71	41.52	34.97	28.5	23.59	20.32
BLOM	27.66	28.11	28.78	28.68	28.88	28.3	26.32	21.97	14.8	11	8.4
Byblos	30.78	30.59	30.08	29.64	30.29	30.27	29.47	25.72	17.56	14.21	11.11
Bank of Beirut	42.15	36.81	37.44	34.88	38.01	42.64	39.45	38.08	34.41	30.82	25.5
BLC	41.25	44.13	44.23	42.34	39.21	41.23	41.1	37.81	28.98	22.9	12.96
BEMO	49	50.42	55.04	51.76	47.99	55.14	49.83	37.33	23.34	20.85	14.3
BML	27.87	24.07	22.13	23.16	32.38	29.77	29.81	24.22	16.16	9.96	6.46
Credit Libanais	32.1	36.31	36.91	35.31	36.02	37.19	35.95	34.65	27.26	20.31	12.16
IBL	22.86	22.47	23.78	23.32	19.67	19.13	15.94	13.78	12.71	12.03	9.15
Fransa bank	37.34	37.27	37.83	38.25	38.49	38.74	39.34	37.04	31.53	24.86	20.02

Table 7 shows the Liquidity (Loans to Deposits) ratio for the sample banks from 2012 to 2022. This ratio shows how well the banks are able to use client deposits to fund loans to meet short-term obligations. Bank Audi's liquidity was high; it began at 38.91% in 2012, peaked at 50.35% in 2015, and then dropped precipitously to 20.32% by 2022. With a reduced liquidity ratio over time, BLOM bank started at 27.66% in 2012 and dropped to just 8.4% by 2022. Byblos Bank had a more consistent trend but was nevertheless declining, with a peak of 30.78% in 2012 and a low of 11.11% in 2022. In 2012, Bank of Beirut's liquidity ratio was 42.15%, which was higher than its 2022 ratio of 25.5%. BLC also experienced a decline, finishing at 12.96% as opposed to 41.25% in 2012. In comparison, BEMO's liquidity ratio started out quite high in 2012 at 49% and peaked at 55.04% in 2014 before falling to 14.3% in 2022. Similar patterns were seen in BML and Credit Libanais, which saw declines from 27.87% to 6.46% and from 32.1% to 12.16%, respectively. With a final 8.4% in 2022, BLOM Bank continued to retain the lowest liquidity ratios, while Fransa Bank saw a decline from 37.34% to 20.02%.



Table 8. Banks' Sensitivity (Securities to Assets) Calculations

Bank name	2012 (%)	2013 (%)	2014 (%)	2015 (%)	2016 (%)	2017 (%)	2018 (%)	2019 (%)	2020 (%)	2021 (%)	2022 (%)
AUDI	32.43	30.62	24.07	24.03	22.29	24.98	30.21	23.25	18.16	21.27	20.56
BLOM	40.15	36.95	30.44	30.61	25.59	16.76	14.06	13.99	12.48	14.92	11.78
Byblos	37.17	37.5	36.67	36.44	33.57	24.98	21.47	23.45	21.35	19.97	13.29
Bank of Beirut	36.32	37.01	39.51	41.54	40.87	35.5	32.6	23.72	20.9	19.04	16.79
BLC	41.18	43.97	42.93	45.03	43.11	36.91	31.79	34.99	33.36	30.37	27.25
BEMO	22.34	27.2	24.15	27.18	25.49	24.45	20.81	20.78	12.67	11.56	9.01
BML	61.88	62.05	56.17	52.72	46.5	35.12	35.12	36.8	32.47	29.92	21.5
Credit Libanais	41.72	39.15	34.83	36.65	34.86	29.58	27.1	25.87	23.4	19.98	17.94
IBL	40.48	44.39	44.99	50.61	39	37.48	43.97	30.4	26.61	22.63	19.75
Fransa bank	37.27	35.81	35.91	37.95	35.62	31.59	28.02	25.43	21.83	19.52	17.36

The Sensitivity (Securities to Assets) ratios for the sample of banks from 2012 to 2022 are shown in Table 8, which shows the degree to which these banks are susceptible to changes in the value of their securities in relation to their total assets. Bank Audi's sensitivity ratio started out at 32.43% in 2012 and gradually decreased with time, reaching 20.56% in 2022. Additionally, BLOM Bank showed a declining trend, with its percentage falling from 40.15% in 2012 to 11.78% by 2022, indicating a notable decrease in the bank's sensitivity to changes in the market. Byblos Bank saw a steady fall from its 2012 starting point of 37.17% to 13.29% by 2022. Bank of Beirut's ratio was more consistent over time, ranging from 36.32% to 16.79%, with a notable decline in 2022. By 2022, BLC's sensitivity ratio of 41.18% had dropped to 27.25%. BEMO's sensitivity ratios were the lowest of all the banks; they began at 22.34% in 2012 and decreased to 9.01% in 2022, suggesting a diminished dependence on securities as assets. The asset allocation of BML had a dramatic shift over time, as seen by the large fall in its sensitivity ratio from 61.88% in 2012 to 21.5% in 2022. Although IBL Bank first stayed around 40% before falling to 19.75% in 2022, Credit Libanais began at 41.72% and ended at 17.94%. Between that same era, Fransabank showed a consistent downward trend, going from 37.27% to 17.36%. The general trend suggests that these banks are becoming less sensitive to securities, which may imply a strategy change in asset management as they adjust to shifting economic conditions.

Now that all CAMELS ratios are calculated for the ten banks, below is a representation of the total CAMELS composite ratings across all studied banks:

Table 9. Total CAMELS Composite Ratings

Bank name	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
AUDI	2.83	2.98	2.98	2.98	2.90	3.10	3.10	3.80	3.80	3.80	4.00
	≈3	≈3	≈3	≈3	≈3	≈3	≈3	≈4	≈4	≈4	≈4
BLOM	2.78	2.78	2.78	2.78	2.95	2.50	2.53	3.60	3.80	3.80	3.80
	≈3	≈3	≈3	≈3	≈3	≈3	≈3	≈4	≈4	≈4	≈4
Byblos	3.18	3.25	3.18	3.25	3.25	3.25	3.33	3.60	4.00	3.80	3.80
	≈3	≈3	≈3	≈3	≈3	≈3	≈3	≈4	≈4	≈4	≈4
Bank of Beirut	3.05	2.90	2.90	2.90	3.10	3.10	3.10	3.40	3.40	3.60	3.80
	≈3	≈3	≈3	≈3	≈3	≈3	≈3	≈3	≈3	≈4	≈4
BLC	3.53	3.18	3.23	3.45	3.45	3.05	3.25	3.80	3.80	3.80	3.80
	≈4	≈3	≈3	≈3	≈3	≈3	≈3	≈4	≈4	≈4	≈4
BEMO	3.00	3.00	2.78	2.78	2.78	2.70	2.98	3.60	3.80	3.80	3.80
	≈3	≈3	≈3	≈3	≈3	≈3	≈3	≈4	≈4	≈4	≈4
BML	3.50	3.50	3.18	3.18	3.18	3.10	3.58	4.00	4.00	4.00	4.00
	≈4	≈4	≈3	≈3	≈3	≈3	≈4	≈4	≈4	≈4	≈4
Credit Libanais	2.98	2.98	3.05	3.05	3.05	3.05	3.05	3.60	3.60	3.80	4.00
	≈3	≈3	≈3	≈3	≈3	≈3	≈3	≈4	≈4	≈4	≈4
IBL	1.63	1.63	2.13	2.05	2.25	2.00	2.13	3.60	4.00	4.00	4.00
	≈2	≈2	≈2	≈2	≈2	≈2	≈2	≈4	≈4	≈4	≈4
Fransa bank	3.10	3.18	3.18	3.18	3.18	3.25	3.25	3.80	3.80	3.80	4.00
	≈3	≈3	≈3	≈3	≈3	≈3	≈3	≈4	≈4	≈4	≈4

The CAMELS composite ratings for different banks have been listed in the table for the years 2012 through 2022. These ratings, which range from 1 to 5, evaluate the financial well-being of banks based on important criteria such as Capital adequacy, Asset quality, Management, Earnings, Liquidity, and Sensitivity to market risk, where lower scores indicate stronger performance. A thorough examination of the ratings shows a significant pattern of decline for most banks, especially post-2019.

In 2012, Audi Bank's first score was 3, indicating a comparatively fair standing. Up to 2018, its rating stayed

steady at 3. But starting in 2019, the score decreased, and by 2022, it had dropped to 4, indicating a significant drop in performance. Comparably, from 2012 to 2018, BLOM Bank consistently maintained a score of 3, indicating fair performance. The bank's financial standing took a severe turn for the worst in 2019, with the rating dropping to 4 by 2022.

From 2012 to 2018, Byblos Bank had a comparatively fair rating of approximately 3, signifying a moderate state of financial health. But starting in 2019 and continuing through 2022, the score declined significantly to 4. Similarly, Bank of Beirut demonstrated consistent performance between 2012 and 2020, earning ratings of approximately 3. Its score, however, steadily declined starting in 2021 and reached 4 by 2022, indicating a deterioration in its financial health.

BLC Bank's initial score in 2012 was 3.53, but it improved in the years that followed and stayed around 3 until 2018. The score declined to 4 in 2019 and stayed that way until 2022, indicating a marginal performance. BEMO Bank's rating, which began at 3 in 2012, witnessed some minor variations but ultimately declined to 4 by 2019 and remained there until 2022.

From 2014 to 2017, BML Bank continuously kept its score near 3. But starting in 2018 and continuing through 2022, its score dropped to 4, signifying a deterioration in financial health. Between 2012 and 2018, Credit Libanais's performance was comparatively fair, averaging about a 3. But by 2019, the bank's financial soundness had declined, as indicated by the score worsening to 4.

Starting with a score of 1.63 in 2012, which denotes satisfactory financial health, IBL Bank demonstrated one of the strongest performances early in the era. Up until 2018, this score was 2, but by 2019, the bank's score has drastically declined to 4. Fransabank also performed fairly, sustaining scores of about 3, from 2012 to 2018. However, the bank's score declined to 4 in 2019, signifying a deterioration in its financial standing.

In conclusion, most banks performed fairly in the early part of the time, with scores averaging around 3. However, the overall trend since 2019 shows that most of these banks' financial health declined to marginal, with all of them scoring a 4 by 2022. This drop indicates that the banking industry's overall performance during this time frame was impacted and banks are exhibiting serious flaws that may make them more vulnerable to risks and financial difficulties, and they need corrective measures to mitigate risks and enhance their standing. The implications of this study suggest that immediate reforms in financial management, regulatory frameworks, and government support are necessary to restore confidence in Lebanese banks. Effective governance and strategic financial decisions will play a crucial role in the stabilization process. The outcome of this recovery effort will not only impact the banking sector but also have far-reaching implications for Lebanon's overall economic resilience and its integration into the global financial system. However, failure to address these issues could leave the banks in a state of uncertainty, posing a significant risk of liquidation and further exacerbating the country's financial crisis.

## 5. Conclusion and Discussions

According to the study's findings, Lebanese banks often receive high ratings under the CAMELS framework, with all of them received a score of 4 by 2022. A score of 4 in the CAMELS assessment system denotes serious financial difficulties and shows that these banks are in a risky position. Lebanese banks appear to be having problems with all of these areas, according to this study. High CAMELS ratings, especially in the midst of an extended financial crisis, are a reliable indicator of systemic issues. The substantial rise in ratings in subsequent years, particularly after 2018, indicates the severity of these issues and the pressing need for changes.

The decline in CAMELS ratings is indicative of a wider financial and economic catastrophe that has recently struck Lebanon. A number of issues have hit the nation, including economic mismanagement, political unpredictability, and a financial industry that has proven vulnerable to outside shocks. The high CAMELS ratings indicate that these factors have contributed to a decline in trust in the financial sector. The ability of Lebanese banks to sustain financial stability has been seriously jeopardized by inadequate profitability, falling asset quality, and withdrawals limitations.

It is critical to address these problems if Lebanese banks are to perform better and survive this financial crisis. In order to ensure that they can support lending and absorb any losses, banks must first enhance their capital basis. Improving risk management procedures and lowering exposure to non-performing loans are two ways to improve asset quality, which is just as important. Navigating this crisis will also require competent management, since leadership must make calculated choices that prioritize stability above immediate rewards.

Furthermore, the need for improving earnings performance and liquidity management is emphasized in this study, contributing to the existing body of literature on banking crisis recovery. The study specifically highlights how

Lebanese banks' ratings have dropped drastically since the onset of the crisis, underscoring the urgent need for reforms in earnings performance and liquidity. Liquidity management, in particular, requires a more thorough analysis, especially regarding how anticipated credit losses are handled. Despite the significant financial struggles of the Central Bank of Lebanon, which holds a substantial portion of bank funds, the banks' liquidity ratios did not fall to alarmingly low levels. This is largely due to insufficient provisioning for credit losses, as reflected in the annual audited reports. To better align with the risks associated with these jeopardized funds, provisions for expected credit losses should be increased.

In conclusion, the severity of the current financial crisis is highlighted by the high CAMELS scores obtained by Lebanese banks in 2022. Systemic issues that need for extensive improvements are the cause of their performance's gradual degradation over time. To revive Lebanese banks, a concerted effort involving the government, regulatory bodies, and the banking industry itself is required. Lebanese banks will only be able to reduce their CAMELS scores and achieve stability and eventually position themselves for a more sustainable future in the global financial system by taking firm, immediate action. This will help Lebanon's economy as a whole recover while also raising their ratings.

## **6. Suggestions**

Future research could build on this study by adapting the CAMELS framework to more accurately represent the particular demands of crisis situations, especially for banks operating in nations like Lebanon. Incorporating social or environmental measures into CAMELS could provide information on how banks handle sustainability issues in unpredictable times. New financial ratios that account for stress factors like inflationary pressures, political risk sensitivity, and foreign exchange exposure, all of which are becoming more and more important for Lebanese banks, may also be tested in future research. Studies comparing banks in other financial crisis-affected nations, such as Greece or Argentina, may provide insightful insights by pointing out both general risk markers and particular safeguards that Lebanese banks should implement. The results also imply that a more thorough analysis of Lebanese banks' liquidity management procedures is necessary, particularly with regard to how anticipated credit losses are handled. Given that the Central Bank of Lebanon, which is struggling financially, holds a sizable amount of bank funds, the banks' liquidity ratios didn't drop to alarmingly low levels. This is due to the fact that expected credit losses in annual audited reports showed insufficient provisioning for credit losses, which should be increased to account for the risks tied to these jeopardized funds. Increasing provisions for expected credit losses and taking other pertinent financial ratios into account could improve liquidity calculation and bring risk management procedures into line with the difficult circumstances of Lebanon's financial crisis.

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No additional data are available.

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