

Ranking the Financial Resilience of Algerian Banks Using the CAMELS Model and TOPSIS Method: A Study on a Sample of Commercial Banks for the Period 2019-2023

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Abstract:

This study aims to assess the financial resilience of six commercial banks in Algeria (three public banks and three private banks) during the period 2019–2023. It relied on CAMELS model indicators as a basis for assessing financial resilience and on the TOPSIS technique as one of the most prominent multi-criteria decision-making techniques for ranking banks according to their levels of financial resilience.

The results indicate a significant disparity between public and private banks in terms of financial resilience. Public banks ranked at the top due to their emphasis on stability indicators such as capital adequacy and liquidity, while private banks gave greater priority to profitability indicators. The results also showed that capital adequacy, management, and liquidity criteria are the most influential determinants of banks' performance differences. The study provides a quantitative and objective framework that can help decision-makers in banks and regulators improve financial stability strategies.

Keywords: Financial resilience; CAMELS model; TOPSIS technique; Algerian commercial banks.

JEL Classification Codes: C53, G21, O16.

1. INTRODUCTION:

The concept of financial resilience has become central to contemporary financial literature, moving beyond the traditional view that

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links it solely to financial stability to express the banking system's ability to anticipate and adapt to shocks (Ruza, González, & Gazquez, 2019). After the 2008 global financial crisis, global regulatory efforts, led by the Basel Committee on Banking Supervision, shifted toward building proactive resilience. These efforts are embodied in the Basel III requirements, which emphasize the importance of high-quality capital such as Common Equity Tier 1 (CET1) capital and imposed stringent liquidity standards to ensure that banks could withstand market pressures (Bank for International Settlements, 2017). In this context, numerous studies have sought to measure the effectiveness of these regulatory efforts in enhancing the financial resilience of financial systems.

The study by Danisman, & All (2021) covering 66 countries during the COVID-19 pandemic showed that countries with more concentrated banking systems, stricter capital and liquidity regulatory requirements, and strong performance indicators (such as low non-performing loans) were more resilient and better able to absorb shocks. In the Algerian context, it is noted that the banking system showed a certain level of “preventive” resilience as a result of its weak integration into global financial markets. Douadi-amiar (2022) indicates that structural weaknesses, such as high credit risks represented by the volume of non-performing loans in public banks and heavy dependence on hydrocarbon revenues, make the resilience of the Algerian banking system closely linked to the state's ability to intervene and provide support. Although the Algerian economy has begun to undergo tangible shifts toward diversifying revenue sources, encouraging local production, reducing the import bill, and increasing the focus on exports, this new economic dynamic highlights the need for a flexible and comprehensive assessment framework that takes into account the complexities and variables of the local banking environment.

Assessing the financial performance and resilience of banks is inherently a multidimensional decision-making problem, as it requires taking into account overlapping and sometimes conflicting criteria, such as profitability, liquidity, asset quality, and capital adequacy. This overlap makes reliance on single indicators insufficient for reaching a comprehensive and objective judgment about bank performance. In this

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context, Multi-Criteria Decision-Making (MCDM) methods are gaining importance, given their ability to provide an integrated methodological framework for addressing such complex problems by transforming the assessment from a multi-dimensional space to a single decision space. MCDM methods are becoming increasingly important, given their ability to provide an integrated methodological framework for addressing such complex problems by transforming the evaluation from a multidimensional space to a unified dimension that allows alternatives to be ranked and compared in a logical and systematic manner (Stanujkic, Djordjevic, & Djordjevic, 2013, p. 214).

The CAMELS model is one of the most widely used tools for measuring the financial resilience of banks. This model provides an analysis of six key dimensions: capital adequacy (C), asset quality (A), management quality (M), earnings (E), liquidity (L), and sensitivity to market risk (S). The literature has proven its effectiveness in assessing banking safety in various contexts, including BRICS countries (Aderogba, Adekunle, & Atoyebi, 2025) and European markets (Ben Lahouel, Taleb, Ben Zaied, & Managi, 2022).

Within this framework, this study attempts to determine the financial resilience of a sample of commercial banks in Algeria during the period from 2019 to 2023, based on the CAMELS model indicators, one of the most prominent models used in assessing financial resilience. We will attempt to rank these banks according to their financial resilience and identify which ones have the highest degree of resilience, using one of the multi-criteria decision-making techniques, namely the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS). This study aims to answer the following questions:

Can the TOPSIS technique be used to distinguish the differences between the commercial banks under study in terms of their financial resilience levels? Which of these banks has a higher degree of financial resilience?

Does the performance of public banks differ from that of private banks in terms of the financial resilience of the banks under study?

Based on the study's problem, we formulate the following hypotheses:

Hypothesis 1: The TOPSIS technique allows us to distinguish differences in the financial resilience of the banks under study and rank the banks according to their degree of financial resilience.

Hypothesis 2: Public banks perform better than private banks in terms of financial resilience.

2. Theoretical framework of the study:

2.1. Financial resilience of banks:

The concept of financial resilience refers to the ability of the banking system to anticipate and adapt to shocks without losing its basic functions in financing the economy (Ruza, González, & Gazquez, 2019, p. 1242).

There are many ways and indicators to assess the financial resilience of banks, with multiple approaches and perspectives. A study by Ruza, & All (2019) classifies three levels for determining financial soundness: (1) The first level is based on banks' balance sheet information, (2) the second level relates to the structure of the market in which banks operate, (3) the third level takes into account the institutional environment and policies that influence banking behavior, i.e., the regulatory framework and monetary and fiscal policies. The first level, which relies on financial information provided by the bank, is considered more measurable than the other two levels. In the same context, Jansson (2018) argues that financial resilience is the result of the interaction between three key elements: internal financial balance (such as profitability and liquidity), the company's business model, and, most importantly, the nature and structure of ownership.

2.2. CAMELS model for assessing the financial resilience of banks:

The CAMELS model is one of the most prominent internationally recognized tools for measuring the financial resilience of banks. The model was first adopted in the United States in 1979 as a standardized framework for evaluating banks to determine the overall rating of each bank, and as an effective supervisory tool to measure the safety of banks, their financial and operational performance, and their compliance with regulations.

Initially, the model was based on five composite factors (CAMEL), until a sixth factor related to market risk was added in the late 1990s, thus expanding the model to be known as CAMELS. These dimensions are: (1) Capital Adequacy, (2) Asset Quality, (3) Management, (4) Earnings, (5)

Liquidity, (6) Sensitivity to Market Risk (Bhatti, Sadiq, Albarq, & Juhari, 2022, pp. 115-117).

The literature has demonstrated its effectiveness in assessing banking safety in various contexts, including BRICS countries (Aderogba, Adekunle, & Atoyebi, 2025) and European markets. (Ben Lahouel, Taleb, Ben Zaied, & Managi, 2022).

2.3. Technique for Order Preference by Similarity to Ideal Solution (TOPSIS):

The TOPSIS method was first developed by Hwang & Yoon (1981) to solve multi-criteria decision problems. This method is based on the principle that the selected alternative should have the shortest distance from the positive ideal solution (PIS) and the longest distance from the negative ideal solution (NIS). The PIS represents the hypothetical situation that achieves the best possible values for all criteria (such as highest profitability, highest liquidity, and lowest non-performing loan ratio), while the NIS reflects the worst of these values.

TOPSIS provides us with a ranking of alternatives by evaluating the distance. This technique has gained popularity due to its simple calculation steps, solid mathematical foundations, and easy-to-understand method (Hezer, Gelmez, & Özceylan, 2021).

Given that **m** is the number of alternatives and **n** is the number of criteria, the TOPSIS calculation goes through the following stages: (Hezer, Gelmez, & Özceylan, 2021, p. 777)

- **Stage 1:** Normalization of the decision matrix

In the first stage, the decision matrix is converted into comparable values according to the following equation:

$$\bar{X}_{ij} = \frac{X_{ij}}{\sqrt{\sum_{i=1}^n X_{ij}^2}} \dots\dots\dots (1) \quad i=1,2,\dots,n ; j=1,2,\dots,m$$

- **Stage 2:** Calculating the Weighted Normalized Matrix

In stage two, the matrix values are multiplied by the criteria weights according to the following equation:

$i=1,2,\dots,n ; j=1,2,\dots,m$

$$V_{ij} = \bar{X}_{ij} \times W_j \dots\dots(2)$$

W_j = Weighted value of criterion j

- **Stage 3:** Calculating the Best Value and Worst Value for Each Criterion

The Best Value and Worst Value for each criterion are calculated using the following equation:

$$V_j^- = \text{Max}(X_{ij}) \quad V_j^+ = \text{Min}(X_{ij})$$

If the criterion is cost:

$$V_j^- = \text{Min}(X_{ij}) \quad V_j^+ = \text{Max}(X_{ij})$$

If the criterion is benefit

- **Stage 4:** Calculate the distance from the positive ideal solution and the distance from the negative ideal solution:

The distance from the positive ideal solution and the negative ideal solution is calculated using the following two equations, respectively:

$$S_i^+ = \left[\sum_{j=1}^m (V_{ij} - V_j^+)^2 \right]^{0.5} \dots\dots(3)$$

$i=1,2,\dots,n ; j=1,2,\dots,m$

v_j^+ = Best value for criterion j

$$S_i^- = \left[\sum_{j=1}^m (V_{ij} - V_j^-)^2 \right]^{0.5} \dots\dots(4)$$

$i=1,2,\dots,n ; j=1,2,\dots,m$

v_j^- = Best value for criterion j

- **Stage 5:** Calculate the proximity coefficient to the ideal solution

$$P_i = \frac{S_i^-}{S_i^+ + S_i^-} \dots\dots\dots(5)$$

$i=1,2,\dots,n$

Finally, the P_i is ranked in descending order, and the solution with the highest value represents the best solution.

3. Applied section of the study: We present it as follows:

3.1. Study methodology:

- **Study sample:**

The study population represents Algerian banks in general. Due to the inability to access the financial data of all banks operating in Algeria, a sample of six banks (three public and three private) was selected, for which

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annual financial reports were available. Secondary data was used, consisting of financial statements for a period of five years from 2019 to 2023. The following table lists these banks:

Table 1. List of banks under study

Bank	Code	Ownership Structure
National Bank of Algeria	BNA	Public
People's Credit Bank of Algeria	CPA	Public
Foreign Bank of Algeria	BEA	Public
Al Baraka Bank	ALBARAKA	Private (Islamic)
Société Générale Algérie	S. Generale	Private
BNP Paribas El Djazaïr	BNP.p	Private

Source: prepared by the researchers.

- Study variables:

The financial resilience of banks was measured using the CAMELS model indicators, with some adjustments to adapt them to the data disclosed by Algerian banks. The method of calculating each indicator is shown in Table 2.

Table 2. Method of calculating the model indicators.

Dimension	Key Indicator	Method of Calculation
C –Capital Adequacy	Capital Adequacy Ratio	Regulatory Capital / Risk-Weighted Assets*
A – Asset Quality	Non-Performing Loan Ratio	Loan Loss Provisions / Total Loans
M – Management	Operating Expenses to Income Ratio	Operating Expenses / Total Income
E – Earnings	Return on Assets (ROA)	Net Profit / Total Assets
L – Liquidity	Liquidity Ratio	Liquid Assets / Short-Term Liabilities
S – Sensitivity to Risk	Risk Sensitivity	Natural Logarithm of Asset Size

Source: Prepared by the researchers.

For risk-weighted assets, given the unavailability of the necessary data in the financial reports of the banks under review regarding credit ratings, asset valuations, and risk levels, they were calculated based on the weighted

values set by the Basel Committee, where accounts included in the RAW calculation were weighted as follows: cash, bank, government bonds, and postal instruments were considered risk-free; loans and receivables from financial institutions were given a risk weight of 20%; and the remaining asset accounts included in the RAW calculation were given a risk weight of 100%.

3.2. Assessment of the financial resilience of the banks under study:

The following table shows the average financial resilience indicators for the banks under study for the period from 2019 to 2023, which were measured using the CAMELS model indicators:

Table 3. Average financial resilience of the banks under study during the period from 2019 to 2023

Indicator	C	A	M	E	L	c
Nature Banks	Benefit	Cost	Cost	Benefit	Benefit	Benefit
BNA	0,0461	0,0261	0,2621	0,1222	0,3250	29,1361
CPA	0,1112	0,0170	0,3520	0,1089	0,1557	23,1979
BEA	0,8842	0,0303	0,1786	0,1592	0,1921	28,9964
ALBARAKA	0,2028	0,0121	0,4004	0,2064	0,0000	26,3595
S.Generale	0,1767	0,0614	0,4450	0,1796	0,1932	26,7681
BNP.p	0,1498	0,0515	0,5474	0,1665	0,1033	26,3807

Source: prepared by the researchers.

The table shows that the highest capital adequacy ratio (C) was achieved by BEA Bank, which reached 0.88, a very high ratio. We also note that this ratio is similar among private banks (Albaraka, S.Generale, BNP.p), ranging between 0.14 and 0.2. We also note from the table that the asset quality index (A) values are similar among the banks under study. As for the management index (M), public banks outperform private banks.

Overall, the results overlap between public and private banks, highlighting the need for the TOPSIS technique to obtain a better assessment.

3.3. Applying TOPSIS to the banks under study:

- Stage 1: Normalization of the decision matrix

The decision matrix consists of criteria and alternatives (Table 3), including six criteria, which are the CAMELS model indicators, and six alternatives representing the banks in the study sample. We rely on the

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vector normalization method on which the TOPSIS calculation methodology is based, according to the following equation:

$$\overline{X}_{ij} = \frac{X_{ij}}{\sqrt{\sum_{i=1}^n X_{ij}^2}} \dots\dots\dots(1)$$

After applying equation (1) to the initial matrix, we obtain the following results:

Table 4. Normalized decision matrix

Bank	C	A	M	E	L	S
BNA	0,0494	0,3425	0,3433	0,3428	0,7194	0,4829
CPA	0,1192	0,2231	0,4610	0,3056	0,3446	0,3845
BEA	0,9486	0,3979	0,2338	0,4467	0,4252	0,4806
ALBARAKA	0,2176	0,1592	0,5244	0,5792	0	0,4369
S.Generale	0,1896	0,8056	0,5828	0,5039	0,4275	0,4437
BNP.p	0,1589	0,5840	0,6068	0,4451	0,3127	0,4467

Source: prepared by the researchers.

- Stage 2: Calculating the weighted normalized matrix

Given the absence of weighting criteria, we will calculate them using the Criteria Importance Through Intercriteria (CRITIC) method, one of the most prominent objective methods for determining the relative importance and weights of criteria, where a criterion is considered more important if it carries a greater amount of information that contributes to distinguishing between alternatives, by calculating the intensity of variation and the degree of conflict. (Diakoulaki, Mavrotas, & Papayannakis, 1995, pp. 764-765).

• Preparing the decision matrix

The decision matrix is shown in **Table 3**, which includes the six criteria and six alternatives mentioned above.

• Normalizing the decision matrix

At this stage, we rely on the equation for maximum/minimum linear normalization, which is formulated as follows:

$$x_{aj} = \frac{f_{j(a)} - f_{j*}}{f_{j+} - f_{j*}} \dots\dots\dots(1)$$

The results are summarized in the following table:

Table 5. Decision matrix for calculating weights

Bank	C_n	A_n	M_n	E_n	L_n	S_n
BNA	1	0,7164	0,7734	0,8640	0	0
CPA	0,9223	0,9011	0,5298	1	0,5209	1
BEA	0	0,6307	1	0,4844	0,4089	0,0235
ALBARAKA	0,8129	1	0,3986	0	1	0,4675
S.Generale	0,8441	0	0,2777	0,2752	0,4056	0,3987
BNP.p	0,8762	0,2006	0	0,4100	0,6821	0,4640

Source: prepared by the researchers.

- **Calculating the standard deviation of the decision matrix**

We calculate the standard deviation of the values of each indicator as follows:

Table 6. Standard deviation of values

	C	A	M	E	L	S
SDV	0,3696	0,3952	0,3564	0,3718	0,3319	0,3661

Source: prepared by the researcher.

- **Calculating the correlation between the criteria and the degree of conflict between them**

We use Pearson's equation to calculate the correlation between the values, and the results are summarized in the following table:

Table 7. Correlation matrix

	C_n	A_n	M_n	E_n	L_n	S_n
C_n	1	-0,03401	-0,5951	0,18208	-0,01205	0,43994
A_n	-0,03401	1	0,49433	0,22336	0,19767	0,1709
M_n	-0,5951	0,49433	1	0,38091	-0,51112	-0,48806
E_n	0,18208	0,22336	0,38091	1	-0,67329	0,17815
L_n	-0,01205	0,19767	-0,51112	-0,67329	1	0,48157
S_n	0,43994	0,1709	-0,48806	0,17815	0,48157	1

Source: prepared by the researchers.

We calculate the conflict measure for each criterion j using the following formula:

$$\sum_{k=1}^m (1 - r_{jk}) \dots \dots \dots (2)$$

The conflict results are summarized in the following table:

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Table 8. Conflict matrix for values

	C_n	A_n	M_n	E_n	L_n	S_n
C_n	0	1,03401	1,5951	0,81792	1,01205	0,56006
A_n	1,03401	0	0,50567	0,77664	0,80233	0,8291
M_n	1,5951	0,50567	0	0,61909	1,51112	1,48806
E_n	0,81792	0,77664	0,61909	0	1,67329	0,82185
L_n	1,01205	0,80233	1,51112	1,67329	0	0,51843
S_n	0,56006	0,8291	1,48806	0,82185	0,51843	0

Source: prepared by the researchers.

• **Estimating criteria and calculating weighted weights:**

We estimate the criteria using the equation c_j , which is written as:

$$\dots\dots\dots(3) \quad C_j = \sigma_j \cdot \sum_{k=1}^m (1 - r_{jk})$$

After determining the values of c_j , we calculate the weighted weights W_j using the equation

$$W_j = \frac{c_j}{\sum_{k=1}^m c_k} \dots\dots\dots(4)$$

to obtain the results shown in the following table:

Table 09. Estimation of criteria and weights

Criteria	Cj	Wj
C	1,8550	0,1753
A	1,5601	0,1474
M	2,0382	0,1926
E	1,7507	0,1654
L	1,8311	0,1730
S	1,5440	0,1459

Source: prepared by the researchers.

After determining the weight of each criterion, we calculate the weighted matrix using the following equation:

$V_{ij} = \bar{X}_{ij} \times W_j$

 $i=1,2,\dots,n ; j=1,2,\dots,m$

Table 10. Weighted matrix

Bank	C	A	M	E	L	S
BNA	0,0086	0,0505	0,06615	0,0567	0,1245	0,0705

CPA	0,0209	0,0329	0,08883	0,0506	0,0597	0,0561
BEA	0,1663	0,0586	0,04506	0,0739	0,0736	0,0702
ALBARAKA	0,0381	0,0234	0,10104	0,0959	0	0,0638
S.Generale	0,0332	0,1188	0,1123	0,0834	0,074	0,0648
BNP.p	0,0278	0,0861	0,11692	0,0737	0,0541	0,0652

Source: prepared by the researchers.

- Stage 3: Calculating the best and worst values for each criterion

The following table summarizes the best and worst values for the criteria:

Table 11. Best and worst values for the criteria

Criteria	C	A	M	E	L	S
V+	0,1663	0,0234	0,0450	0,0959	0,1245	0,0705
V-	0,0086	0,1188	0,1169	0,0506	0	0,0561

Source: prepared by the researchers.

- Stage 4: Calculating the distance from the positive ideal solution and the distance from the negative ideal solution:

The distance from the positive ideal solution and the negative ideal solution is calculated using the following two equations, respectively:

$$S_i^- = \left[\sum_{j=1}^m (V_{ij} - V_j^-)^2 \right]^{0.5}$$

$$S_i^+ = \left[\sum_{j=1}^m (V_{ij} - V_j^+)^2 \right]^{0.5}$$

The results are summarized in Table 12.

- Stage 5: Calculating the proximity coefficient to the ideal solution

$$P_i = \frac{S_i^-}{S_i^+ + S_i^-}$$

i=1,2,...,n

After the calculation, we obtain the following results:

Table 12: Ranking of banks according to the TOPSIS method

	Si+	Si-	Pi	RANK
BNA	0,166	0,1516	0,4773	2
CPA	0,1721	0,109	0,3877	3
BEA	0,0657	0,1995	0,7523	1
ALBARAKA	0,1874	0,111	0,3719	4
S.Generale	0,1846	0,0852	0,3158	5
BNP.p	0,1837	0,0706	0,2776	6

Source: prepared by the researcher.

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4. Discussion of results:

The results of the study are summarized in the following table:

Table 13: Financial resilience of the banks under study

Bank	C	A	M	E	L	S	RANK
BNA	0,0461	0,0261	0,2621	0,1222	0,3250	29,1361	2
CPA	0,1112	0,0170	0,3520	0,1089	0,1557	23,1979	3
BEA	0,8842	0,0303	0,1786	0,1592	0,1921	28,9964	1
ALBARAKA	0,2028	0,0121	0,4004	0,2064	0,0000	26,3595	4
S.Generale	0,1767	0,0614	0,4450	0,1796	0,1932	26,7681	5
BNP.p	0,1498	0,0515	0,5474	0,1665	0,1033	26,3807	6

Source: prepared by the researchers.

With regard to the capital adequacy ratio, the best score was achieved by BEA Bank, while the worst score was achieved by BNA Bank. The rest of the banks achieved average scores that were similar to each other.

As for the asset quality ratio, the ratios are generally good, similar to each other and ranging between the highest value of 0.017 achieved by CPA Bank and the worst value of 0.061 achieved by S.Generale Bank.

For the management ratio, the results show that the banks under study achieved ratios between 0.17 and 0.54, which shows a significant disparity between the banks under study for this index.

For the profitability ratio, the banks achieved average levels between 0.1 and 0.2. As for the liquidity index, the scores were good and similar among the banks under study, except for BNA, which achieved a high score of 0.32.

The results of the study showed that the TOPSIS method enabled us to rank banks according to their financial resilience, which allowed us to clearly distinguish between the performance of these banks, thus **confirming the first hypothesis that the TOPSIS technique allows us to distinguish the differences in the financial resilience of the banks under study and to rank banks according to their financial resilience.**

We note from the results summarized in the table that public banks (BEA, BNA, CPA) ranked in the top three compared to private banks (ALBARAKA, S.Generale, BNP.p) in terms of financial resilience. **This**

confirms the hypothesis that public banks perform better than private banks in terms of financial resilience.

The table shows that BEA ranked first as the most financially sound bank among the banks under study. Looking at the CAMELS indicators, we see that this bank focuses more on capital adequacy (C), achieving the highest score in this indicator, which is considered one of the most important criteria for financial resilience stipulated in the Basel Accords. In addition, it achieved the best performance in the management indicator (M), which indicates its good control of costs and efficiency in management.

On the other hand, the results show that the private banks under study focus more on the profitability indicator (E), achieving higher scores than public banks. This may be due to the strategy of private banks, which mostly focus on maximizing value for shareholders, while achieving relatively low scores on the liquidity indicator. This is in contrast to public banks, which adopt more social objectives and tend to focus on stability and risk reduction, as reflected in their focus on the capital adequacy and liquidity indicators, where they achieved higher levels compared to private banks.

The TOPSIS method showed that capital adequacy, liquidity, and management efficiency are the most important factors for assessing the financial resilience of banks. The banks under study that focused on these factors were the most sound. These results are consistent with the Basel III decisions on the importance of capital adequacy and liquidity. These results are also consistent with the findings study of (Aderogba, Adekunle, & Atoyebi, 2025), which found that banks that focus on capital adequacy and liquidity are more robust and stable but less profitable. This is the same conclusion reached by our study, where profitability indicators were associated with private banks, which were less robust than public banks. The results of (Ben Lahouel, Taleb, Ben Zaied, & Managi , 2022) also indicate that higher income or profit may help banks cope with liquidity risks, but it may lead to higher bankruptcy risks. This finding applies to the private banks under study, which focus on profitability and ranked highest in this indicator, while at the same time achieving lower scores in the liquidity indicator.

5. Conclusion

Through this study, we attempted to assess the financial resilience of a sample of commercial banks in Algeria during the period from 2019 to 2023 and rank these banks according to their degree of financial resilience using the Technique of Preference Ordering Similarity to the Ideal Solution (TOPSIS) and to identify which of these banks has the highest financial resilience, helping it to cope with and adapt to financial crises and fluctuations. To achieve this, we relied on the data and financial statements published on the official websites of a sample of six commercial banks (three private banks and three public banks), where we assessed the financial resilience of these banks based on the CAMELES model indicators. Based on this assessment, we used the TOPSIS technique to rank these banks according to their degree of resilience, and we arrived at several conclusions, the most important of which can be summarized in the following points:

- The results of the study demonstrated the effectiveness of the TOPSIS method in distinguishing differences in the financial resilience of the banks under study and ranking the banks according to their degree of financial resilience.
- The results of the study showed that the variables of capital adequacy, liquidity, and management efficiency are among the most important determinants of the financial resilience of the banks under study.
- The results of the study showed that the public banks under study have higher financial resilience compared to private banks.
- The results of the study showed that BEA Bank is the best bank in terms of financial resilience compared to the other banks under study.
- The results of the study showed that banks that focus more on capital adequacy and liquidity are more sound and stable compared to banks that focus on profitability.

This study provides a practical and methodological framework that commercial banks in Algeria can use to periodically assess their financial resilience. By applying the TOPSIS technique, banks can go beyond individual metrics and arrive at a comprehensive diagnosis of their

performance, helping them to accurately identify their strengths and weaknesses. The study also recommends that banks focus their efforts to strengthen their resilience on the dimensions that have proven to be the most influential, primarily capital adequacy, management efficiency, and liquidity, which ensure the bank's stability.

Finally, despite the important findings of this study, it has its limitations, as it was limited to a sample of six commercial banks whose financial data was available. The sample could be expanded further to obtain more comprehensive results, and other multi-criteria decision-making (MCDM) techniques could be applied to compare the results.

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