

**Assessing the Performance of Banks in Algeria and Tunisia:
A Panel Data Analysis from 2000 to 2020****Bendima Nesrine ^{1♦}, Zeddoun Djamel ²**¹ MIFMA Laboratory, Faculty of Economic Sciences, Business and Management, Tlemcen University (Algeria), nesrine.bendima@univ-tlemcen.dz² LMELSPM Laboratory, Faculty of Economic Sciences, Business and Management, Ain Temouchent University (Algeria), djamel.zeddoun@univ-temouchent.edu.dz**Received:** 12/09/2024**Accepted:** 24/10/2024**Published:** 19/11/2024**Abstract:**

This research examines the relationship between performance indicators and both internal and external environmental factors, employing an unbalanced panel data analysis on a sample of 26 banks from Algeria and Tunisia over the period 2000-2020. The findings reveal that capital adequacy, asset quality, and liquidity are negatively associated with the performance of commercial banks, while management quality positively influences performance. Additionally, in terms of external factors, gross domestic product (GDP) and inflation were found to have no substantial impact on the performance of commercial banks in both Algeria and Tunisia.

Keywords: Commercial banks, Camels, Panel data analysis.**JEL Classification:** G21 ,C50

♦ Corresponding author

1. Introduction:

The banking sector is one of the most critical and sensitive economic sectors, with significant influence on a country's economic growth. It plays a crucial role in the economic and financial systems, contributing positively to economic development. Algeria and Tunisia being emerging economies, have faced numerous economic challenges. As a result, these countries implemented economic reforms across various sectors (Khales, 2004). In Tunisia, banking performance underwent significant changes due to adjustments to the new financial market systems, which fostered greater competition. This, in turn, improved bank performance and contributed to higher economic growth rates. In contrast, despite similar reforms in Algeria, banks continue to struggle with challenges that negatively impact economic growth, largely due to the economy's heavy dependence on oil and fragile infrastructure (Qureshi, 2004). However, according to (Douadi-Amiar, 2022) the Algerian banks is weakened by the level of non-performing claims on private groups with informal structures.

The modernization of the banking sector has become an essential need to keep pace with contemporary developments in the global banking environment. Consequently, the both Algeria and Tunisia are seriously considering ways to modernize their banking systems, which are increasingly linked to the global banking framework (Jaidi & Nasser, 2013).

Assessing the performance of banks in relation to internal and external environmental factors is crucial for understanding the current state of commercial banks. It also helps in determining the banks' standing within local, regional, and international financial structures. This is important not only for advancing economic development but also for improving the efficiency in resource utilization and achieving desired goals (Bendob, 2015). The central question addressed in this study is: What is the relationship between performance indicators and internal and external environmental variables in Algeria and Tunisia from 2000 to 2020?

The structure of this research paper is organized as follows: first, we review relevant previous studies; second, we describe the data and its sources. Then, we demonstrate the model estimation and analyze the empirical results, and ultimately, we highlight the key findings in the conclusion.

2. Literature review:

Extensive research has been conducted on the increasing importance of profitability in commercial banks. In his study, Naceur (2003) aimed to explore the effect of macroeconomic indicators on bank profitability in Tunisia from 1980 to 2000. He found that bank loan interest rates and size negatively impacted net interest margins, reflecting inefficiency, while macroeconomic indicators like inflation and growth had no effect on margins or profitability. Similarly, Athanasoglou et al. (2005) examined the macroeconomic determinants of commercial bank profitability from 1985 to 2001 using a dynamic panel model. They concluded that increased credit risk lowered profits, while growth in labor productivity positively influenced profitability. However, neither concentration nor size had a direct link to profitability.

Fadzlan and Muzafar Shah (2009) investigated the factors influencing profitability in

financial institutions in the Philippines from 1990 to 2005 using a linear model. Their findings showed that bank size and inflation had a negative relationship with profitability, whereas capital, economic growth, and money supply growth had positive effects.

Meanwhile, Ramadan et al. (2011), in their study of Jordanian banks from 2001 to 2010, identified that some banks were better positioned to exploit investment opportunities and reduce costs. However, market concentration and credit risk negatively impacted profitability. Another study of Troudi and Liouane (2013) try to analyze Tunisian banks from 1999 to 2020 using dynamic panel data. They found that bank size and capital markets positively affected profitability, while credit risk and sector concentration had negative effects.

In India, Dash (2013) analyzed the impact of assets and liabilities on profitability using a sample of 35 public and private commercial banks. He concluded that many Indian banks, especially public ones, faced short-term risks, adversely affecting profitability. While, Rastogi and Saxena (2013) compared public and private banks, finding that private banks performed better over the study period.

Sushma and Mihir (2014) examined the technical efficiency of Indian banks from 2005 to 2010, finding that public banks were more efficient than private banks, despite a decline in overall efficiency. In Bendob's (2015) study on the relationship between profitability and internal as well as external factors in Algerian banks, He conclude that administrative efficiency and liquidity positively impacted profitability, while asset quality, GDP, and inflation had little effect.

Wang (2016) explored the influence of interest rates on Chinese banks between 2008 and 2015, finding that the liberalization of interest rates improved market segmentation and profitability but weakened pricing power and reduced profitability overall.

Moreover, Bose (2018) investigate employee performance in the UAE banking sector, concluding that a lack of motivation among employees adversely affected the performance of commercial banks.

In their study, Antoun et al. (2018) the financial performance of banks in Central and Eastern European countries from 2009 to 2014 was analyzed, revealing that liquidity and capital adequacy were negatively impacted by bank size, while positively influenced by bank concentration. Macroeconomic variables like inflation positively impacted asset quality and profits, while economic growth increased capital and liquidity adequacy.

Another study of (Nedjar, 2023), focusing on factors affecting the efficiency of private banks from Algeria covering the period 2012-2021 the results show that the majority of internal factors have an impact on banking efficiency while the external factors represented in GDP have a negative effect on return on equity, and inflation have a positive effect on return on equity.

3. Data and Methodology:

3.1 Data:

The data for this research is gathered from the Fitch Connect database, with a focus on annual balance sheets, income statements, and additional sources like the Arab Monetary Fund and the World Bank. The sample comprises 26 commercial banks from Algeria and Tunisia, spanning the period from 2000 to 2020 (see Appendix 01).

The variables selected for analysis are based on the CAMELS index, which has proven to be more effective in explaining bank performance than other indicators. These variables were selected to match the study's goal of evaluating the performance of commercial banks in Algeria and Tunisia, as supported by previous literature, including works by Olweny and Shipho (2011), Matthew and Laryea (2020), Roman and Şargu (2013), Shahzad et al. (2018), and Tanveer et al. (2018).

3.2 Econometric model:

The statistical approach used in this study involved employing multiple linear regression analysis to explore the internal and external factors affecting the performance of commercial banks. This evaluation was carried out using the EViews10 software, based on a static panel data model. The models for internal and external determinants of commercial bank performance in Algeria and Tunisia are as follows:

$$Performance_{it} = \beta_0 + \beta_1 CA_{it} + \beta_2 AQ_{it} + \beta_3 MG_{it} + \beta_4 LQ_{it} + \beta_5 GDP_{it} + \beta_6 INF_{it} + \varepsilon_{it}$$

Were:

Dependent variables:

- Performance: assessed using return on assets (ROA), return on equity (ROE), and net interest margin (NIM).

Independent variables:

- Factors related to the internal environment of the banks, such as:

CA: Capital adequacy

AQ: Asset quality;

MG: Management quality;

LQ: Liquidity;

External environment variables of the bank:

GDP: Gross Domestic Product

INF: Inflation Rate (refer to Appendix 02)

We aim to test the following hypotheses:

- The relationship between performance indicators and internal and external environmental variables have negative effects.
- The relationship between performance indicators and internal and external environmental variables exhibits fixed effects rather than random effects.
- Distinct variations are evident in the nature of the relationships between performance indicators and both internal and external environmental variables across different banks and countries during the study period.

3.3 Homogeneity test:

The process of customization and homogeneity testing has become essential for determining the structure of panel data. This approach was proposed by "Hsiao" in 1986, along with standard tests to facilitate the process (Bourbonnais, 2010, pp. 349-350). In this study, we will present various statistical tests based on Fisher statistics. The panel structure determination involves testing three key hypotheses, as illustrated in the following table:

Table 1. Homogeneity test results

Homogeneity Test	Fisher statistics	ROA		ROE		NIM	
		F stat	P value	F stat	P value	F stat	P value
First test	F1	13.580087	4.435e-73	11.440865	1.380e-65	36.928734	5.458e-06
Second test	F2	11.534622	3.406	7.9686416	5.702	27.799274	0.2572
Third test	F3	4.1705556	8.010e-14	7.2704888	2.520e-28	10.760268	0.01073274

Source: By the authors using STATA 16

The table above presents the results of the homogeneity test performed using the STATA. Initially, we analyze the structure of the first hypothesis of total homogeneity by calculating the Fisher statistic, which is given by: $F1 = ((SCRC1 - SCR) / (N - 1)(K + 1)) / (SCR / NT - N(K + 1))$. Given that the probability associated with the Fisher statistic is below 5% (P-value $F1 < 0.05$), we reject $H0$ and accept $H1$, indicating that total homogeneity does not exist for ROA, ROE, and NIM. Therefore, we proceed to test the second hypothesis.

The second Fisher statistic is calculated as follows: $F2 = ((SCRC2 - SCR) / (N - 1)K) / (SCR / NT - N(K + 1))$. We observe that the probability associated with the Fisher statistic exceeds 5% (P-value $F2 > 0.05$), we accept $H0$ and reject $H1$, meaning that total homogeneity exists for ROA, ROE, and NIM with regard to the constant term.

In the last place, the third Fisher statistic is calculated as: $F3 = ((SCRC1 - SCRC2) / (N - 1)) / (SCRC2 / N(T - 1) - K)$. Here, the probability of the Fisher statistic is less than 5% (P-value $F3 < 0.05$), so we reject $H0$ and accept $H1$, indicating that the difference lies only in the fixed term, known as the individual effects model.

Where:

- SCRC1: Sum of squares of the full-frame model for individuals over the entire period, using the OLS method with $(N - K - 1)$ as the degrees of freedom.
- SCRC2: is defined as sum of squares of the residuals for the individual fixed effects model.
- SCR: is the total sum of residuals for each model estimated separately for each individual over the period using the OLS method.

The remaining question is whether the individual effects model is "Fixed" or "Random," which is the focus of our study.

3.4 Stationarity test:

Unit root tests are crucial for assessing the stability of time series data. Despite the availability of various tests for stationarity, we have chosen to apply the IPS (Im, Pesaran, and Shin) test and the LLC (Levin, Lin, and Chu) test.

Table 2. Results of Stationary tests

Variables	IPS test		LLC test	
	Value	P value	Value	P value
NIM	-7.549	0.000	-30.259	0.000
ROA	-3.606	0.002	-7.760	0.000
ROE	-3.074	0.001	-6.705	0.000
AQ	-3.426	0.000	-9.383	0.000
CA	-5.955	0.000	-31.01	0.000
MG	-3.124	0.000	-6.649	0.000
LQ	-1.187	0.007	-7.110	0.000
GDP	-22.991	0.000	-29.918	0.000
INF	-7.649	0.000	-12.095	0.000

Source: Compiled by the authors using Eviews 10.

The p-values of both the LLC and IPS tests for all variables are close to 0, suggesting that we reject the null hypothesis of a unit root at the 1% significance level for all variables. This confirms that the variables are stationary. Therefore, we can proceed with estimating our models using four different estimation methods:

- Pooled Least Squares method;
- Fixed Effects model;
- Two-way Fixed Effects model;
- Random Effects model.

4. Results analysis:

The estimated parameter for each dependent variable (ROA, ROE, NIM) from the previous equation are summarized in the table below. It is important to note that correlated variables were removed from the models to enhance accuracy in the regression estimates.

4.1 First model estimation results (NIM as the dependent variable):

Table 3. NIM estimation results with PLS, FEM, DFE and RE

Independent Variable	Method of estimation			
	PLS	FEM	DFE	REM
C	0.864 (1.935)**	2.391 (7.9794)*	2.420 (6.529)*	2.439 (5.988)*
CA	0.038 (3.047)*	-0.035 (-2.695)*	-0.037 (-2.642)*	-0.015 (-1.279)ns
AQ	-0.026 (-10.438)*	-0.020 (-13.038)*	-0.020 (-12.871)*	-0.021 (-13.679)*

MG	1.113 (24.351)*	0.8789 (29.189)*	0.871 (29.058)*	0.916 (31.388)*
LQ	-8.36E-05 (-0.042)ns	0.000 (0.632)ns	0.001 (0.875)ns	4.55E-05 (0.036)ns
GDP	-0.014 (-0.226)ns	-0.0297 (- 0.904 ns	-0.043 (-1.019)ns	-0.030 (-0.942)ns
INF	-0.158 (-1.902)**	-0.113 (-2.051)**	-0.095 (-1.152)ns	-0.092 (1.712)***
test (h)	$\chi^2 (6) = 48.112614 (0.000)**$			
test(C,S,E)ai	F = 93.44511 (0.000)**			
likelihood	-531.761	-342.300	-330.789	-
Adj, Re	0.714	0.927	0.930	0.770
F	106.366	93.445	72.416	142.11
D,W	0.679	2.111	2.127	1.602
S,E	2.007	1.0108	0.993	1.101
NO,Of obs	253	253	253	253

Source: Compiled by the authors using EViews 10.

*, **, and *** denote significance levels at 1%, 5%, and 10%, respectively; () indicates t statistics; ns: not significant.

The tables above suggest that the most suitable methods for estimating the model are the fixed effects and DFE models. This is supported by the model's statistical significance at the 5% level and its high explanatory power, as reflected in an adjusted R-squared value of 93%.

Table 4. Comparison of the fixed effects and random effects estimates for NIM

Variable	Coefficient		Coefficient Difference	S.E of the Coefficient
	Fixed effects	Random effects		
CA	-0.035216	-0.015180	-0.035216	0.013065
AQ	-0.020608	-0.021156	-0.020608	0.001581
MG	0.878925	0.916590	0.878925	0.030111
LQ	0.000812	0.000045	0.000812	0.001283
GDP	-0.029788	-0.030943	-0.029788	0.032921
INF	-0.113695	-0.092220	-0.113695	0.055418

Source: By the authors using Eviews 10.

Table (4) demonstrates the absence of correlation between the independent variables. The Hausman test, detailed in Table (3), compares the fixed effects model with the random effects model and produces a Chi-square statistic of 48.1126., indicating that the fixed effects model is more suitable.

4.2 Second model estimation results (ROA as the dependent variable):

Table 5. ROA estimation results with PLS, FEM, DFE and REM

Independent Variable	Method of estimation			
	PLS	FEM	DFE	REM
C	0.202 (0.632)ns	1.281 (4.453)*	1.186 (3.269) *	1.010 (2.945)*
CA	0.0461 (5.131)*	-0.011 (-0.891)ns	-0.006 (-0.459)ns	0.013 (1.215)ns
AQ	-0.024 (-13.578)*	-0.024 (-16.004)*	-0.024 (-15.632)*	-0.023 (-16.361)*
MG	0.352 (10.780)*	0.280 (9.692)*	0.279 (9.532)*	0.295 (10.718)*
LQ	-0.001 (-0.949)ns	0.000 (0.708)ns	0.000 (0.697)ns	-0.000 (-0.198)ns
GDP	-0.011 (-0.261)ns	-0.005 (-0.160)ns	-0.002 (-0.062)ns	-0.010 (-0.320)ns
INF	0.059 (0.989)ns	-0.018 (-0.349)ns	-0.0102 (-0.127)ns	0.0152 (0.299)ns
test (h)	$\chi^2 (6) = 18.535852 (0.0050)**$			
test(C,S,E)ai	F = 25.27564 (0.000)**			
Likelihood	-447.097	-332.058	-325.471	-
Adj, Re	0.499	0.771	0.770	0.520
F	42.833	25.275	18.964	46.573
D,W	0.781	1.865	1.907	1.500
S,E	1.436	0.970	0.973	1.019
No ,of obs	253	253	253	253

Source: Compiled by the authors using EViews 10.

*, **, and *** denote significance levels at 1%, 5%, and 10%, respectively; () indicates t statistics; ns: not significant.

The results in the preceding table show that the model is statistically significant, as indicated by the Fisher statistic at the 5% significance level, with a moderate explanatory power, as reflected by an adjusted R-squared value of 77%.

Table 6. Comparison of fixed effects and random effects estimates for ROA

Variable	Coefficient		Coefficient Difference	S.E of the Coefficient
	Fixed effects	Random effects		
CA	-0.011186	0.013123	-0.011186	0.012547
AQ	-0.024292	-0.023992	-0.024292	0.001518
MG	0.280285	0.295149	0.280285	0.028917
LQ	0.000873	-0.000234	0.000873	0.001232
GDP	-0.005061	-0.010075	-0.005061	0.031615
INF	-0.018610	0.015220	-0.018610	0.053219

Source: By the authors using Eviews 10.

Using the Hausman test to compare fixed effects and random effects, the Chi-square statistic of

18.5358 indicates that the variables have fixed effects rather than random effects, with the results being significant at the 5% level.

4.3 Third model estimation results (ROE as the dependent variable):

Table 7. ROE estimation the results with PLS, FEM, DFE and REM

Independent Variable	Method of estimation			
	PLS	FEM	DFE	REM
C	12.022 (3.263)*	17.060 (4.1349)*	21.780 (4.232)*	13.575 (3.466)**
CA	-0.117 (-1.134)ns	-0.556 (-3.094)*	-0.396 (-2.018)**	-0.235 (-1.838)*
AQ	-0.325 (-15.583)*	-0.397 (-18.252)*	-0.403 (-18.152)*	-0.360 (-18.025)*
MG	2.372 (6.294)*	3.703 (8.934)*	3.702 (8.895)*	3.0187 (8.197)*
LQ	0.035 (2.236)**	0.039 (2.233)**	0.029 (1.593)ns	0.027 (1.742)**
GDP	-0.3943 (-0.750)ns	-0.105 (-0.233)ns	-0.561 (-0.947)ns	-0.283 (-0.632)ns
INF	0.623 (0.906)ns	-0.251 (-0.329)ns	-1.582 (-1.379)ns	0.337 (0.493)ns
test (h)	$\chi^2 (6) = 22.441491 (0.0010)^*$			
test(C,S,E)	$F = 13.91981 (0.000)**$			
log likelihood	-1065.446	-1005.733	-996.324	-
Adj, Re	0.493	0.6421	0.648	0.550
F	41.987	13.919	10.885	52.527
D,W	1.780	2.531	2.507	2.179
S,E	16.549	13.915	13.794	14.373
No,of obs	253	253	352	352

Source: Compiled by the authors using EViews 10.

*, **, and *** denote significance levels at 1%, 5%, and 10%, respectively; () indicates t statistics; ns: not significant.

Table 07 shows that the model is statistically significant at the 5% level, with a moderate explanatory power, as evidenced by an adjusted R-squared value of 64%.

Table 8. Comparison of fixed effects and random effects estimates for ROE

Variable	Coefficient		Coefficient Difference	S.E of the Coefficient
	Fixed effects	Random effects		
CA	-0.556561	-0.235257	-0.556561	0.179867
AQ	-0.397151	-0.360688	-0.397151	0.021759
MG	3.703728	3.018758	3.703728	0.414538
LQ	0.039450	0.027758	0.039450	0.017666
GDP	-0.105738	-0.283452	-0.105738	0.453218
INF	-0.251303	0.337533	-0.251303	0.762928

Source: By the authors using Eviews 10.

As it is shown, the Hausman test, which compares the fixed effects and random

effects models, yields a Chi-square statistic of 22.4414. This result suggests that the variables display fixed effects rather than random effects.

5. Summaries and discussions:

Testing the relationship between performance indicators and internal and external variables reveals that internal variables, represented by capital adequacy (CA), have a negative impact on ROE and NIM at the 5% significance level. This suggests that commercial banks face capital risk. However, ROA has a positive relationship with capital adequacy, significant at the 10% level, indicating that commercial banks can effectively meet their payment obligations on time.

The asset quality index (AQ) shows an inverse relationship with ROE, NIM, and ROA at the 1% significance level, indicating that commercial banks suffer from credit risk due to clients' inability to meet obligations on time. The liquidity (LQ) has a negative impact on ROE and ROA, significant at the 1% level, suggests that commercial banks are exposed to liquidity risk and struggle to meet their obligations in a timely manner.

The management quality index (MG) is positively associated with performance indicators and is significant at the 1%, 5%, and 10% levels, suggesting that enhancements in management quality lead to better bank performance. The study also concludes that external variables such as GDP negatively impact performance, though the probability values are not statistically significant. This implies that as GDP decreases, the performance of commercial banks improves.

Lastly, the inflation index (INF) is negatively correlated with ROE and NIM, while showing a positive correlation with ROA. Although the probability values are not statistically significant, if commercial banks' inflation expectations are accurate, inflation may affect them positively or negatively depending on the situation.

6. Conclusion:

The goal of this paper is to investigate the relationship between performance indicators and internal and external environment variables for a sample of 26 commercial banks across Algeria and Tunisia from 2000 to 2020. The study concludes that the performance indicators ROA and ROE are negatively correlated with the internal variable of liquidity (LQ). This suggests that commercial banks in these countries face liquidity risks, preventing them from meeting their obligations on time. These findings are consistent with those of Rasidah and Tumin (2014).

The Capital Adequacy (CA) index shows a negative impact on NIM and ROE performance indicators, indicating that commercial banks suffer from capital risk, contributing to lower performance levels in Maghreb countries. In contrast, ROA has a positive relationship with capital adequacy, similar to the findings of Adeusi et al. (2014) and Jabbar (2014).

Furthermore, the asset quality index (AQ) negatively affects bank performance, suggesting that commercial banks face credit risk due to high levels of non-performing loans and inadequate customer assessment and oversight reveal that increased credit risk leads to a decline in both profitability and performance.

For management quality index (MG) is positively correlated with all performance indicators, indicating that effective management, aligned with board policies and strategies,

enhances the profitability and performance of commercial banks in both Algeria and Tunisia. This finding aligns with the research of Aremu et al. (2013), Obamuyi (2013), Lelissa (2014), and Fadzlan and Muzafar Shah (2009).

The study also finds that external variables such as GDP negatively impact bank performance. This implies that higher growth rates in these countries tend to correspond with lower levels of efficiency and performance in the banking sector. Inflation (INF) has a negative effect on performance indicators (ROA, ROE, NIM), as economies with high inflation rates tend to have less active and efficient banks. This conclusion aligns with McKinnon's (1991) emphasis on the importance of price stability for financial intermediation and Huybens and Smith's (1998) argument that high inflation causes informational inconsistencies, which adversely affect the credit market. Although the probability values were not statistically significant, these findings are supported by several studies.

Based on these results, we answered the first hypothesis which stipulates that the relationship between performance indicators and internal and external environmental have negative effects is accepted. Moreover, the relationship between performance indicators and internal and external environment variables of commercial banks in Algeria and Tunisia shows stable effects that vary from bank to bank rather than random effects, as indicated by the results of the PLS, FEC, DEF, REM, and Hausman tests. Thus, the second hypothesis that claims that the relationship between performance indicators and internal and external environmental variables exhibits fixed effects rather than random effects is also accepted.

Additionally, there are clear differences in the relationship between performance indicators and internal and external factors among Algerian and Tunisian banks. For example, liquidity (LQ) negatively affects the performance of Algerian commercial banks, while it has a positive relationship with banks from Tunisia. Still within the same country, the relationship can vary: the National Bank of Algeria shows a positive relationship with liquidity, while the External Bank of Algeria shows an inverse relationship. These findings answer the third research question, leading us to accept the third hypothesis which asserts that there are clear differences in the relationship between performance indicators and internal and external environmental factors across different banks during the chosen period in our study.

Our study concludes that Tunisian commercial banks exhibit the best performance and profitability, largely due to improvements in financial liberalization policies and active financial markets and an efficient banking system, which have positively impacted their efficiency. In contrast, Algerian commercial banks exhibit low performance and profitability, primarily due to the instability of the banking sector, weak financial intermediation, and limited financial products and services, despite financial reforms. Additionally, the Algerian banking sector is heavily controlled by the government, which further constrains its development.

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7. Appendices:

Appendice 1. The list of banks and their countries

Algeria	Tunisia
1. Algerian outer bank	1. Tunisian Central Bank
2. Algerian National Bank	2. Arab International Bank of Tunisia
3. Algerian people's loan	3. National Bank of cropland management
4. Bank of Agriculture and Rural Development	4. e Society Tunisian Bank
5. national fund for savings and reserve	5. Security Bank
6. Local Development Bank	6. Bank HABITAT
7. BNP Paribas - Algeria	7. Commercial Bank
8. Society General - Algeria	8. Arab Tunisian Bank
9. Maghreb Bank for Investment and Trade	9. International Union of banks
10. Natexis Bank	10. Banking Union traders
11. Algerian Arab Banking Corporation	11. international bank of North Africa
12. Trust Bank	12. Fund for the support of local communities

13.salam-BANK ALGERIA

13. Libyan Tunisian Bank

Appendice 2. Description of dependent variables

Variable	Description	Definition
Profitability	Return on Assets	Net income/ Assets
	(ROA)	Net income / Equity
	Return on the Equity	(total income - the total
	(ROE)	expense) / Total Assets
	Net Interest Margin	
	(NIM)	

Appendice 3. Description of Independent variables

Variables	Labels	Description
Capital Adequacy	CA	Equity / Total Assets
Assets Quality	AQ	Loans Loss Provision / Net Int Revenue
Management	MG	of non- Interest expense /Ave Assets
Assets Liquidity	LQ	Net Loans / Interest deposit and ST funding
Gross Domestic product	GDP	Gross Domestic product (%)
Inflation	INF	Inflation (%)