

Profitability of Public and Private Commercial Banks in Algeria: Panel data analysis during 1997-2012

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Abstract

The Algerian banking system has experienced since the early 90s a series of metamorphoses, characterizing different stages of reform and compliance with international standards. The question remains about the performance of commercial banks in Algeria. In this study we examine the relationship between profitability of commercial banks and two types of factors internal and external, for a sample of 10 public and private Algerian banks over 1997-2012. We use the regression model with unbalanced panel data analysis and CAMEL approach, but this study used four internal indicators: capital adequacy, assets quality, management efficiency and liquidity at used proxies for performance of banks and only two external indicators GDP and inflation rate.

After regression analysis of unbalanced panel with three methods POLS, fixed effects and random effects we conclude that the capital adequacy, management efficiency and liquidity indicators are significant effect profitability of commercial banks in Algeria in the period of study. The management efficiency and liquidity indicators are positively related with profitability, and the capital indicator is negatively related with profitability. The assets quality, GDP and inflation have not any significant effect on profitability of commercial banks in Algeria in the period of study. The Acceptance of fixed effects model shows that the relationship varies from one bank to another, due to the different characteristics of each bank.

Keywords: Commercial banks, CAMEL approach, macroeconomic indicators, Panel data, Algeria.

JEL Classification: C33, G20, G21, E44.

1. Introduction

Banks are financial firms and depend on economies of size and gains arising from internalising certain activities rather than relying on market transactions (Machiraju 2008 : P47). The banking industry has experienced during the recent period developments and changes rapid influenced on the features of the international banking system, this through the current financial and banking changes such as the banking Panic, crisis contagion and the Basel Convention 3, where the problem of development and improving the quality of the performance had become the most important issues that receive more attention and privacy in the worldwide especially in developing countries, Imad Z. Ramadan an al. (2011) in Jordan, Mabwe Kumbirai and Robert Web (2010) in South Africa, Mamatzakis, E.C. and P.C Remoundos, (2003) in Greek, NOUAILI, Makram Ahmed (2015) in Tunisia, Naceur, Samy Ben, and Magda Kandil. (2009) in Egypt, Olweny, T., Shipho, T.M. (2011) in Kenya.

The Algerian economy is characterized by the transition from a socialist economy to a liberal economy based on foundations and principles of the market economy in the end of years 80s, after the crisis in 1986, which clearly showed the fragility of the economic structure in Algeria, which required initially to effect a self reforms without resorting to IMF, but that self-adoption had resulted an aggravation monetary, economic conditions, even social, and this had manifested in high rates of inflation and unemployment levels, rising of foreign debt and the weight of debt service, high state budget deficit, reduce of the National monetary value, reduce of economic growth rates. Algeria paid all her external debts to the IMF in 2006 by about 10 billion dollars, and achieves considerable economic growth rates because of high oil prices in world markets, as well as does some economic reforms.

Algeria had proceeded to make many reforms to ameliorate the Algerian public commercial banks performance, and especially in 1990 it was 65% of the assets of these banks not generating for return. Accordingly, it had been dressed the law of monetary and debt 10/90 delivered on April 14th, 1990, whose the purpose was to create commercial banks to act according to market economy mechanisms. Then followed by other reforms were the most important were on 1994, and of course even these reforms to be effective, It was necessary to improve the quality of these banks commissar, where the governor does not represent only 10% of the bank and the Governor of the deposited resources and of the market share, which the competent authority had began in the cleared through financial cleansing which was the first steps in 1991, and most recently at the end of 2001.

The Algerian banking system has experienced several problems, the most important issue is the Khalifa Bank in 2003, one of the most important crises experienced known by the banking system in Algeria, regarding to his impact, because of this troubles that known the privates banks, the authorities had proceeded to reforms, notably 03/11 issued on August 26th, 2003 which had confirmed the authority of the central bank of the

monetary and the power of state intervention in the banking system because of the foggy and ambiguity in the relationship between the supervisory bodies on the banking sector, particularly between the bank of Algeria and the Committee of Monetary and loan or Banking Committee and private banks, which these bodies did not play their role in the control and adjust of the banking and financial operation an the market regulation. The problematic remains about the performance of commercial banks in Algeria, and Transformations and reforms had touched the performance of Algerian commercial banks? Because the modernization has become necessary must be happened on all social and economic variables including with the deposit of the methods which may follow to keep.

This research paper aims to show the developments in the sector of Algerian Bank to keep up with this international progress, because it had an important role in moving the wheels economy and contribute to economic development and this is what had resulted from strong banks and other weak performance and it is necessary to clarify the bank level, and methods used to achieve their goals and that with an analytical manner using a regression model with panel data for such Algerian commercial Banks to value the performance, financial indicators are considered as an effective technique used in banks to determine their level and performance with the CAMEL approach.

2. Literature Review

Some authors studied the banking performance starting from data on several countries or other studies, the analysis of the determinants was focused on a single country , such Abreu, M. and Mendes, V. (2002), Mamatzakis and Remoundos, 2003 [Greece], Garcia-Herrero et al. 2009 [China], Dietrich and Wanzenried, 2011 [Swiss]). In 2000 Bert Scholtenesa had confirmed the existence of a positive relationship between the profitability of banks and bank capital. Elena Loukoianova 2008 using DEA analysis had showed an improvement in the performance of Japanese banks but the profitability remained weak compared with banks in developed countries. In 2009 Ngoc Anh-Voyhi had used panel data bank of three (3) countries (the Czech Republic, Hungary, Poland) the results had proved the entry of foreign investment and the cancellation of restraint had different impact for national banks, Tobias Olweny 2011 had tested 38 Bank of Kenya using the Panel and had mentioned the existence of effects on internal factors on the performance bank in contrast of the market factors which have not an impact.

Sibel Yilmaz (2012) had taken 40 Bank of Turkish and had used the performance indicators ROA, ROA which had reached that it can interpret the variable return on assets and return on equity with a variable diversification of banks but Bassem Salhi and Boujelben 2012 had reached after testing 10 Tunisian banks that mediation Banking follow a traditional demarche in Tunisia, despite efforts to reform and expand the financial liberalization and in 2015 Makram Mouailil and Anis Ochi3 had confirmed that the bank size and performance indicator had a negative relation with the liquidity and that the variables of total economy had a good relation with the performance, but for the GDP there is a negative relation with inflation, and this is what I had concluded on the Tunisian banks.

Athanasoglou et al. (2008), Dietrich and Wanzenried (2014), were interested in the effect of inflation on banking performance, and has found a positive and significant impact. However, the studies of Afanasieff et al. (2002) and Ben Naceur and Kandil (2009) have yielded an opposed result revealing that inflation has a negative effect on interest margins. They offer the following explanation: the main activity of trade banks is the granting of credit. The market therefore relies on a supply of credit (provided by the banks), and a request (that of the individuals and firms). Inflation would reduce the demand for credit, because it increases uncertainty on the future. However, it was proven that individuals and companies are generally very light showers to the uncertainty (ambiguity-aversion). This fall in demand would involve a decrease of credits and therefore a go down of the performance.

The development of economic activity, as measured by the growth of gross domestic product (GDP), has a positive effect on banks performance: a period of strong growth resulted in an increase in investment and consumption, from where a rise in credits, and thus a rise of banks performance. This is actually the result reached by the majority of authors who have studied this relationship, namely, Arpa et al. (2001), Goddard et al. (2004) and Dietrich and Wanzenried (2014).

Fadzman S, and Royfaizal R, C.,(2008) study the determinants of Philippines banks profitability over the period 1990–2005 . The authors conclude all the bank-specific determinant variables have a statistically significantly impact on bank profitability, the size, credit risk, and expense preference behavior are negatively related to banks' profitability, while non-interest income and capitalization have a positive impact. The results suggest that inflation has a negative impact on bank profitability, while the impact of economic growth, money supply, and stock market capitalization have not significantly explained the variations in the profitability of the Philippines banks in the period under study.

The study of Fadzman S. & Muzafar S., H. (2009) seeks to examine the performance of 37 Bangladeshi commercial banks between 1997 and 2004. The empirical findings of this study suggest that bank specific

characteristics, in particular loans intensity, credit risk, and cost have positive and significant impacts on bank performance, while non-interest income exhibits negative relationship with bank profitability. During the period under study the results suggest that the impact of size is not uniform across the various measures employed. The empirical findings suggest that size has a negative impact on return on average equity (ROAE) while the opposite is true for return on average assets (ROAA) and net interest margins (NIM). As for the impact of macroeconomic indicators, we conclude that the variables have no significant impact on bank profitability, except for inflation.

Saira J. and all. (2011) analyzes the internal determinants of top 10 banks' profitability in Pakistan over the period 2004-2008, and uses the pooled Ordinary Least Square. The empirical results have found strong evidence that these variables have a strong influence on the profitability. However, the results show that higher total assets may not necessarily lead to higher profits due to diseconomies of scales. Also, higher loans contribute towards profitability but their impact is not significant. Equity and Deposits have significant impact on profitability.

In Jordan Imad Z. R. and all (2011) uses the data of 10 banks over the period 2001-2010 for testing the relationship between the profitability of banks and the characteristics of internal and external factors. They have concluded Jordanian bank's characteristics explain a significant part of the variation in bank profitability. High Jordanian bank profitability tends to be associated with well-capitalized banks, high lending activities, low credit risk, and the efficiency of cost management. Results also showed that the estimated effect of size did not support the significant scale economies for Jordanian banks and the individual effects are present in the model of this study.

The study of Tesfaye B., L. (2014) includes two long stayed government owned banks (CBE and CBB) and six private banks (Awash, Dashen, Abyssinia, Wegagen, NIB and United). This research investigates the determinants of Ethiopian banks performance considering bank specific and external variables on selected banks' profitability during the period 1990-2012. The author finds that bank specific variables by large explain the variation in profitability. High performance is related to the ability of banks to control their credit risk, diversify their income sources by incorporating non-traditional banking services and control their overhead expenses. The bank's capital and liquidity status are not significant to affect the performance of banks. On the other hand, the paper finds that bank size and macro-economic variables such real GDP growth rates have no significant impact on banks' profitability. However, the inflation rate is determined to be significant driver to the performance of the Ethiopian commercial Banks.

Stephen Oluwafemi Adeusi (2014) tested the determinants of bank profitability of commercial banks in Nigeria from 2000 to 2013 on a sample of fourteen banks. The author employed the panel data with cross-sectional data. The findings revealed that asset quality, management efficiency, and economic growth are the determinants of commercial banks' profitability. They were found to be statistically significant on profitability in both the fixed effect and random effect models. Asset quality was highly significant in all the models; thus concluding that credit risk is a major determinant of commercial banks' profitability.

On level of 31 commercial banks operating in Pakistan over the period 2009-2012, Haroon Jabbar (2014) using the panel data estimation techniques of fixed, common, and random effect model, conclude that banks profitability is significantly impacted by CAP and size while loan loss provision, deposit growth are found to have negative significant coefficients.

El Mehdi F. (2014) analyzes the performance of major Moroccan banks during the period 2001-2011 using CAMEL approach. This study aims to evaluate Moroccan banks capital adequacy, asset quality, management, earnings and liquidity and then determine financial performance, operating soundness and regulatory compliance of Moroccan banks. Without the use of standard techniques, the author applied CAMEL approach only.

Sarra T., and Naoufel L. (2014) analyzes the determinants of profitability if sample of 10 Tunisian banks' over the period 1999-2010, and use the generalized method of moments (GMM) was used to generate the results of the econometric estimation of the dynamic panel. The empirical results indicate that many institutional and structural factors significantly influence the Tunisian banks profitability.

3. Profitability determinants and hypothesis of study

There are many literatures have used the CAMEL approach, such as Mehdi F. (2014), Adeusi (2014) Imad Z. R. and all (2011). This approach or CAMEL rating is a system to classify the banks, and measured the performance of banks. This rating is based on ratios of the financial statement, and the rating is not published, only forwarded to higher managers of bank in order to prevent panic bankers. The CAMEL rating system is composed on the fifth indicators represented by factors, these indicators acronym "CAMEL" and examined are as follows:

- (C) : is capital Adequacy
- (A) : is asset Quality
- (M) : is management Efficiency

- (E) : is earning (Profitability in this study)
- (L) : is liquidity
- Has been added the sixth indicator (S) sensitivity to market risk, especially interest rate risk.

We chose one financial ratio for each indicator, except profitability which is the dependent variable was selected three financial ratios concerning the internal environment of the Bank. In the external environment has been a choice of two indicators GDP and inflation rate.

In this study we tested six hypotheses; four related to the internal environment of the Bank and two in the external environment of the bank, we formulate alternative hypotheses as follows:

- H^1_1 : The capital adequacy ratio measures the capital and financial strength of the Bank, every increase in capital adequacy increase the confidence of depositors. Thereby increasing the financing capacity of the bank which increases the profitability of the bank; we can assume the positive relationship between profitability and capital adequacy of commercial banks in Algeria.
- H^2_1 : The assets quality ratio is reflects the vulnerability of bank credit risk. If this ratio is high, the number depositors of the bank increased, thereby increasing the profitability, we assume the positive relationship between profitability and assets quality ratio of commercial banks in Algeria.
- H^3_1 : The management efficiency reflects the ability of managers of the bank on the use of available resources, the greater the efficiency increased profitability of the bank. We assume the positive relationship between profitability and management efficiency ratio of commercial banks in Algeria.
- H^4_1 : The liquidity ratio indicates of the bank's ability to repay creditors in the short term, all the increase in this rate increases the confidence of depositors at the bank, which increases the profitability of the bank, we assume the positive relationship between profitability and the liquidity ratio of commercial banks in Algeria.
- H^5_1 : Macroeconomic conditions may have an impact on the profitability of banks of several entrances; in the case of the economic boom, the credit demand is increases compared to periods of recession. The increase in growth rates reduces the risk of non-payment local borrowers. Poor economic conditions hurt banks by non-performing loans. We can assume the positive relationship between profitability and the liquidity ratio of commercial banks in Algeria.
- H^6_1 : In general, inflation rates have a positive impact because the bank integrates the premium of inflation rate in the desired interest rate, as the bank takes into account the inflation rate at the long-term outlook. Inflation may adversely affect the profitability of banks, in the case of the inability to predict the levels of inflation, and therefore the banks lose the opportunity to benefit from the inflationary environment. We are assuming the positive relationship between the inflation rate and profitability of commercial banks in Algeria.

4. Data and Methodology

In this study we use the main data source is BankScope database, we based from balance sheets, income statements and financial ratios of 10 Commercial banks in Algeria for during the period 1997-2012 (see table 1). The sources of macroeconomic variables are collected from International financial Statistics of IMF. The study sample included all public banks in Algeria, respectively:

- External Bank of Algeria
- National Bank of Algeria
- Agriculture and Rural Development Bank
- Algerian Popular Credit
- Local Development Bank

These banks dominate the banking sector in Algeria more than 70 per cent of the market share, where we note from Figure 1. The public banks in this study represent more than 90 per cent of total assets of banks under study for the year 2012. The private banks account for only 8 per cent and the banks which in Table1. in descending order by size of assets for the year 2012.

4.1 Econometric model

Panel data econometrics has evolved rapidly over the last decade. Dynamic panel data estimation, non-linear panel data methods and the phenomenal growth in non-stationary panel data econometrics (Baltagi 2005). There are many literature Studies in the banking to use the panel data econometrics; Ramlall, I, (2009), Stephen Oluwafemi Adeusi (2014), Imad Z. Et al. (2011), Goddard, John, et al. (2004). The panel data analysis is characterized by importance because the multi-dimensional analysis of the economic and financial phenomena. Whether traditional analysis of regression analysis or time series analysis examines individual change or time change. Panel data econometrics integrates individual effect and times effect, and is distinct from the previous analysis several characteristics:

- Detection and control of individual variation which may appear in the one-dimensional data (individually, a time), which leads to variable results analysis;
- The Panel data characterized by information content of greater than one-dimensional, and there is access to significant extensions of the largest information, and higher degrees of freedom;
- Allow the study of the behavior of the vocabulary of time to another point;
- Contribute to the reduction of the appearance of the problem of omitted variables.

The panel may be balanced in the case of equality of observations for each of the individuals, or is unbalanced in the absence of the observations of some individuals, as in this study.

For testing the relationship between the profitability indicators of Commercial banks and the internal and external banking indicators we used the unbalanced Panel for following linear regression model:

$$\psi_{it} = \pi_0 + \pi_1 \text{ETA}_{it} + \pi_2 \text{LLPNI}_{it} + \pi_3 \text{NIRAA}_{it} + \pi_4 \text{LATDB}_{it} + \pi_5 \text{GDP}_t + \pi_6 \text{INF}_t + \mu_i + \varepsilon_{it} \quad (01)$$

Where

ψ_{it} : is Profitability indicators of Bank i at time t, expressed by NIM, ROAA and ROAE, π_i : is Parameters of model, ETA_{it} : is Equity by Total Assets, represent capital Adequacy of Bank i at time t, LLPNI_{it} : is Loan loss provision by over net interest revenue of Bank i at time t; represent the Assets Quality, NIRAA_{it} : is Net Int Rev by Average Assets of Bank i at time t; measured the Management Efficiency, LATDB_{it} : is Net Loans by Total Deposits and borrowings of Bank i at time t; measured the Liquidity, GDP_t : is Gross Domestic Product at time t, INF_t : is Inflation rate at time t, μ_i : Unobserved Gross section Effects for individual i, ε_{it} : Random variable representing the model residuals or errors term is IID. For estimate the parameters of this model we are use the Eviews[®] software.

The Assumptions of this Model with OLS Regression is :

$E(\varepsilon_t) = 0$, $\forall t = 1, \dots, T$, $Var(\varepsilon_t) = E(\varepsilon_t^2) = \sigma^2 \quad \forall t = 1, \dots, T$ is independent and identically distributed (IID)

There linear relationship between variables studied

- $Cov(\varepsilon_t, \chi_t) = 0$: Explanatory variables is uncorrelated with the disturbance (error) term
- $E(\varepsilon_t^2) = \sigma^2$: Variance of the error is constant; i.e., Homoscédasticité.
- $Cov(\varepsilon_t, \varepsilon_{t'}) = E(\varepsilon_t \varepsilon_{t'}) = 0, \forall t \neq t', t, t' = 1, \dots, T$: There is no correlation between error terms; i.e., no serial- or auto-correlation
- Regression model is correctly specified.

4.2 Descriptive statistics of Profitability indicators

In the table 2 we presented the Descriptive statistics of Profitability indicators of commercial banks in Algeria during 1997-2012. We can observe that all profitability indicators are normal distributed except the ROAA for BDL Bank. The average NIM was 4.8 of the banking sector in Algeria during the period 1997-2012. The Public banks did not report this average except the BNA Bank, while private banks exceeded this average except the BAMIC Bank. The average of ROAA was 1.49 for commercial banks sector in Algeria. The public banks are below the average, while private banks are above this average. Also, a higher value of ROAA is in the TBA bank, and the lowest value in the BDL Bank. The ROAE characterized by negative average in the BADR Bank and the BNA Bank (Public banks). This is due to the failure of some of the projects especially those related to support young entrepreneurs. In addition to some cases of embezzlement and corruption that has touched the banking sector in Algeria (KHALIFA Crisis). The ROAA was 14.11 for commercial banks sector in Algeria; it is closed to the rate of return imposed 15%. In general, the average profitability indicators NIM, ROAA, ROAE of the banking sector in Algeria during the period 1997-2012, whole was 4.8, 1.49, 14.11 respectively, and the public banks are weakest performance and more risky (higher Std. Dev.). This performance is acceptable compared to some of the profitability of the banking sector indicators for other countries, for example, ROAA and ROAE for the year 2013 amounted to respectively: in Tunisia 0.7, 8.9, in Morocco 0.9, 10.6 (Arabic Monetary Fund "AMF" 2013).

5. Results and Comment

We present in this section the estimated results of model of study (Equation 1). Three methods are used: pooled basis (Table 3), fixed effects (Table 4) and random effects (Table 5) with three types of models. In the first model on uses the NIM as a measure of profitability. In the second and the third models on uses the ROAA and ROAE respectively as a measure of profitability. We can reject the null hypothesis that there is not significant effect of internal and external determinants of profitability of commercial banks in Algeria during 1997-2012, because the F statistic is significant at 1% level for all models. The higher R^2 value of regression reflects 93.74%

for first model. In the second and third models the value of R^2 was 61.39%, 25.46% respectively. The liquidity and assets quality indicators are positively related with profitability, this effect is not significant on profitability of commercial banks in Algeria. The capital adequacy and management efficiency indicators are positively related with profitability, here significant effect on profitability of commercial banks in Algeria. For the external indicators GDP and inflation have significant effect on profitability of commercial banks in Algeria. The GDP is positively related with profitability, and inflation is negatively related with profitability. We confirmed the inflation rate decrease the profitability; conversely, the GDP increases the profitability of commercial banks in Algeria. These results relate to pooled basis, but, Is the inclusion of the individual effects change the results? In the next analysis we present the results of estimate the study models, with the Method of individual fixed effect in the table 4.

The F statistic has indicated for acceptance of hypothesis that there is significant effect of gross section at 1% level. The first model is better, because the R^2 value is higher. The capital adequacy, management efficiency and liquidity indicators have significant effect profitability of commercial banks in Algeria in the period under study. The management efficiency and liquidity indicators are positively related with profitability, and the capital adequacy indicator is negatively related with profitability. Other internal and external indicators have no significant effect on profitability. The GDP is insignificant positive effect; this result is supported by researches of (Alper & Anbar, 2011; Athanasoglou & Staikouras, 2006; Demircuc-Kunt & Huizinga, 1999, Flamini, McDonald & Schumacher, 2009; Naceur, 2003; Sufian & Chong, 2008; Vong & Chan, 2009). The insignificance of inflation is in accordance with studies of (Alper & Anbar, 2011; Demircuc- Kunt & Huizinga, 1999; Havrylchuk & Jurzyk, 2006; Mamatzakis & Remoundos, 2003; Naceur, 2003; Sharma & Mani, 2012). We observed in the Bottom of table 4 that all public banks are characterized by negative fixed effects, we can explain this result by the weak of performance of this bank compared to private banks in Algeria in the period under study (see table 2). But the question we ask: Is these results may differ when we use the method of random effects (Cross)?

The table 5 presents the panel data regression estimate with individual random effects and the Hausman test for choose between fixed and random effect models. Except the management efficiency indicator all independent Variable has no significant effect on profitability of commercial banks in Algeria in period under study. The R^2 value is decreased in this method a level of the three models, and the null hypotheses that the difference in coefficient of the fixed and random effect models is systematic can be rejected at a 5% level, hence the model with fixed effects is chosen. The Acceptance of fixed effects model shows that the relationship varies from one bank to another, due to the different characteristics of each bank.

It can be explained by the existence of significant positive correlation between the ratio of capital adequacy and the profitability of banks as follows: The capital adequacy ratio measures the capital and financial strength of the Bank, every increase in capital adequacy increase the confidence of depositors. There by increasing the financing capacity of the bank which increases the profitability. This has been proved by the literature, but in Algeria the contrary there is an inverse relationship in the best model (1), this relationship can be traced back to the nature of the banks where mostly public banks. The latter has a great confidence of depositors, where the depositor is not afraid of bankruptcy, because the public treasury of the state to compensate potential losses. Conversely private banks have a high proportion of the capital because of the rules imposed precautionary and a customer because of fear to deal notified bankruptcy, particularly the effects of the panic banking caused by the Khalifa crisis. These results are completely contradictory to many of Literature in Jordan by Imad Z. R. and all (2011), in Nigeria by Oluwafemi Adeusi (2014) and in Pakistan by Haroon Jabbar (2014).

The assets quality ratio is reflects the vulnerability of bank credit risk. If this ratio is high, the depositors of the bank increased, thereby increasing the profitability, on the contrary, and low asset quality alienate depositors for the bank, which reduces the profitability. The efficient management reflects the ability of managers of the bank on the use of available resources, the greater the efficiency increased profitability of the bank, and this result is approved by several literatures (see Haroon Jabbar (2014)), a result consistent with the case of Algeria. This determinant in the model 1 is the most flexible, each increase one unit of efficiency leads to increase in profitability more than one unit. The liquidity ratio indicates of the bank's ability to repay creditors in the short term, all the increase in this rate increases the confidence of depositors at the bank, which increases the profitability of the bank in Algeria.

Concerning macroeconomic factors, the positive relationship between economic growth and the profitability of banks in Algeria, means the banks are benefited from economic growth and employment extra, especially when the Algerian government to adopt an expansionary economic policy, in light of achieving significant rates of economic growth due to high oil prices. Non-significant relationship can be traced back to the lack of the ability of banks to predict in the absence of making sure the economy is based on variable dependent to the international market volatility. There is a negative relationship between inflation rate and bank profitability in Algeria evidence that banks lose the opportunity to benefit from the inflationary environment to increase their profits, in addition to that the Algerian government usually sets interest rates, and therefore banks

bear considerable risks, particularly in the long term. Results encouraged by many of the previous studies, such as : Imad Z. R. and all (2011) Tesfaye B., L. (2014) Oluwafemi Adeusi (2014) Sarra T., and Naoufel L. (2014).

6. Conclusion

The numerous applied studies tested the internal and external determinants of profitability of commercial banks in the emerging countries. In this study we examine the relationship between profitability of commercial banks and two types of factors internal and external, for a sample of 10 public and private Algerian banks over 1997-2012. The advantages of this research are the use of unbalanced panel data analysis and CAMEL approach, but this study employs four internal indicators ETA, LLPNI, NIRAA and LATDB at used a proxies for performance and only two external indicators GDP and inflation rate.

After analysis the 96 observations for unbalanced panel with three methods POLS, fixed effects and random effects, we checked the capital adequacy, management efficiency and liquidity indicators are significant effect profitability of commercial banks in Algeria in the period under study. The management efficiency and liquidity indicators are positively related with profitability, and the capital indicator is negatively related with profitability. The assets quality, GDP and inflation have no significant effect on profitability of commercial banks in Algeria in period under study, and we can:

- Reject the H^1_1 hypothesis that recognizes the positive relationship between profitability and capital adequacy of commercial banks in Algeria.
- Accept the H^2_1 hypothesis that recognizes the assets quality ratio is increasing the profitability of commercial banks in Algeria.
- Accept the H^3_1 hypothesis that recognizes the efficient management reflects the ability of managers of the bank on the use of available resources, the greater the efficiency increased profitability of commercial banks in Algeria.
- Accept the H^4_1 hypothesis that recognizes the positive relationship between profitability and the liquidity ratio of commercial banks in Algeria. The liquidity ratio indicates of the bank's ability to repay creditors in the short term, all the increase in this rate increases the confidence of depositors at the bank, which increases the profitability of commercial banks in Algeria,
- Accept H^5_1 hypothesis that recognizes the positive relationship between profitability and the liquidity ratio of commercial banks in Algeria. The macroeconomic conditions may have an impact on the profitability of commercial banks in Algeria; the increase in growth rates reduces the risk of non-payment local borrowers.
- Reject H^6_1 hypothesis that recognizes the positive relationship between the inflation rate and profitability of commercial banks in Algeria. The inflation rates may adversely affect the profitability of commercial banks in Algeria, in the case of the inability to predict the levels of inflation, and therefore the banks lose the opportunity to benefit from the inflationary environment.

For future research of this problematic we can propose to include the regional dimension MENA for example, and can be applied other econometric techniques in order to test the relationship between profitability and their determinants.

List of Figures and Tables

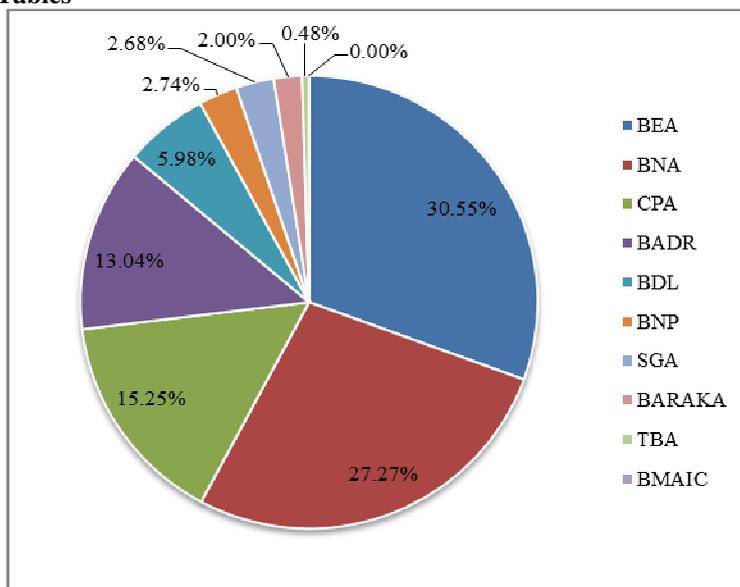


Figure 1. The importance of total assets for the banks under study.

Table 1. List of commercial banks in this study and ownership type

Bank Name	Abbreviations	Total assets in 12.31,2012 mil DZD	Ownership	Number of years study
1. Banque Extérieure d Algérie	BEA	2 307 759,50	State	14
2. Banque Nationale d Algérie	BNA	2 060 079,70	State	16
3. Crédit Populaire d Algérie	CPA	1 152 000	State	15
4. Banque de L Agriculture et du Développement Rural	BADR	984 562,60	State	14
5. Banque de Développement local	BDL	451529	State	16
6. BNP Paribas El Djazair	BNP	207 164,70	Private	14
7. Société Générale Algérie	SGA	202 485,50	Private	09
8. Al Baraka of Algérie Bank	BARAKA	150788	Private	10
9. Trust Bank Algérie	TBA	36434	Private	10
10. Banque du Maghreb Arabe pour l'Investissement et le Commerce	BMAIC	277,9	Private	08

Source: Author.

Table 2. Descriptive statistics of profitability indicators of commercial banks in Algeria during 1997-2012

Banks	Mean	Median	Max	Min	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Obs.
NIM_BADR	2,63	2,43	4,62	0,37	1,67	-0,15	1,45	1,46	14
NIM_BDL	2,25	2,52	3,86	-0,22	0,91	-1,15	4,90	5,95	16
NIM_BEA	2,17	2,13	4,22	0,67	1,07	0,29	2,04	0,78	15
NIM_BNA	4,20	4,04	5,56	3,11	0,67	0,54	2,65	0,75	14
NIM_CPA	2,55	2,92	3,92	0,07	1,20	-0,67	2,16	1,68	16
NIM_BARAKA	5,88	6,45	9,30	2,11	2,13	-0,36	2,08	0,80	14
NIM_BMAIC	1,12	0,77	2,23	0,47	0,68	0,59	1,79	1,07	9
NIM_BNP	5,05	4,90	6,63	3,89	0,82	0,71	2,70	0,89	10
NIM_SGA	7,04	6,76	9,23	2,81	1,92	-0,86	3,35	1,30	10
NIM_TBA	7,94	7,84	11,84	5,10	1,98	0,65	3,22	0,57	8
AVERAGE NIM	4,08	4,07	6,14	1,84	1,31	-0,04	2,63	1,52	13
ROAA_BADR	0,20	0,05	1,32	-1,29	0,62	-0,31	4,20	1,06	14
ROAA_BDL	0,47	0,36	2,06	0,02	0,48	2,35	8,45	34,53**	16
ROAA_BEA	0,54	0,13	1,49	0,07	0,55	0,59	1,74	1,86	15
ROAA_CPA	0,79	0,57	1,72	0,00	0,64	0,32	1,40	1,97	16
ROAA_BNA	0,91	0,75	2,43	-0,47	0,88	0,33	2,07	0,75	14
ROAA_BMAIC	1,64	1,65	2,02	1,08	0,31	-0,57	2,36	0,65	9
ROAA_SGA	1,66	1,58	2,80	0,22	0,78	-0,14	2,46	0,16	10
ROAA_BARAKA	1,94	1,85	4,16	0,74	1,00	0,65	2,73	1,02	14
ROAA_BNP	2,70	2,51	4,92	1,50	0,91	1,43	4,88	4,89	10
ROAA_TBA	4,02	3,80	6,90	0,28	2,08	-0,35	2,51	0,24	8
AVERAGE ROAE	1,49	1,32	2,98	0,21	0,82	0,43	3,28	4,71	13
ROAE_BADR	4,57	0,92	29,50	-22,09	12,17	0,12	3,76	0,37	14
ROAE_BMAIC	4,66	5,14	5,53	2,96	0,95	-1,13	2,59	1,99	9
ROAE_CPA	8,54	7,53	19,87	0,00	6,03	0,31	1,82	1,18	16
ROAE_BEA	11,11	4,13	30,16	1,33	10,09	0,60	1,88	1,68	15
ROAE_TBA	12,65	11,71	26,45	1,15	8,29	0,31	2,09	0,40	8
ROAE_BNA	17,18	19,11	51,33	-15,30	14,89	0,05	4,32	1,02	14
ROAE_SGA	18,53	19,47	23,12	8,10	4,14	-1,66	5,23	6,65	10
ROAE_BARAKA	18,70	19,05	35,80	7,47	7,48	0,46	3,16	0,51	14
ROAE_BDL	19,05	6,63	75,63	0,26	21,57	1,26	3,77	4,66	16
ROAE_BNP	26,14	25,00	45,01	14,01	8,06	1,09	4,40	2,78	10
AVERAGE ROAE	14,11	11,87	34,24	-0,21	9,37	0,14	3,30	2,12	13

Source: Author. ** Significant at 5% level.

Table 3. Panel data regression estimate: The models of study with Pooled basis.

Dependent Variable	Model 1 (NIM)	Model 2 (ROAA)	Model 3 (ROAE)
Variable	Coefficient	Coefficient	Coefficient
C	-0.588* (-2.003)	-1.146* (-2.763)	1.060 ^{ns} (0.229)
ETA	0.021* (2.595)	0.057* (5.036)	-0.389* (-3.078)
LLPNI	0.000 ^{ns} (-0.074)	-0.001 ^{ns} (-1.160)	0.010 ^{ns} (1.088)
NIRAA	1.527* (30.223)	0.487* (6.819)	3.978* (4.994)
LATDB	0.003 ^{ns} (0.895)	0.009* (2.347)	0.135* (3.044)
GDP	0.088* (2.025)	0.048 ^{ns} (0.785)	0.440 ^{ns} (0.640)
INF	-0.080* (-2.172)	0.006 ^{ns} (-0.114)	-0.271 ^{ns} (-0.466)
R-squared	93.74%	61.39%	25.46%
F-statistic	222.0041*	23.5863*	5.0676*

Source: Author.

() t-Statistic, ns: Not Significant. *, ** and *** Significant at 1% , 5% , 10% level respectively.

Table 4. Panel data regression estimate: The models of study with Fixed Effects (Cross)

Dependent Variable	Model 1 (NIM)	Model 2 (ROAA)	Model 3 (ROAE)
C	0,321 ^{ns} (-0,91)	-0,561 ^{ns} (-1,029)	3,859 ^{ns} (-0,616)
ETA	-0,031*** (-1,939)	0,049** (-1,994)	-0,089 ^{ns} (-0,316)
LLPNI	0,000 ^{ns} (-0,312)	-0,001 ^{ns} (-1,144)	0,011 ^{ns} (-1,176)
NIRAA	1,358* (-20,157)	0,283** (-2,713)	1,837 ^{ns} (-1,535)
LATDB	0,005*** (-1,618)	0,011** (-2,108)	0,177* (-2,944)
GDP	0,032 ^{ns} (-0,801)	0,004 ^{ns} (-0,068)	-0,023 ^{ns} (-0,032)
INF	-0,045 ^{ns} (-1,286)	0,036 ^{ns} (-0,668)	-0,408 ^{ns} (-0,662)
Fixed Effects (Cross)			
_BEA--C	-0,653	-0,23	-1,461
_BNA--C	-0,514	-0,02	7,351
_CPA--C	-0,45	-0,298	-4,626
_BADR--C	-0,283	-0,497	-4,097
_BDL--C	-0,314	-0,305	0,084
_BNP--C	0,362	1,036	7,827
_SGA--C	0,208	-0,087	0,614
_BMAIC--C	-0,134	-1,276	-20,226
_TBA--C	2,041	0,849	-3,725
_BARAKA--C	0,577	0,447	4,561
R-squared	0,959	0,698	0,381
F-statistic	124,874*	12,309*	3,286*

Source: Author.

() t-Statistic, ns: Not Significant.. *, ** and *** Significant at 1% , 5% , 10% level respectively.

Table 5. Panel data regression estimate: The models of study with Random Effects (Cross)

Dependent Variable	Model 1 (NIM)	Model 2 (ROAA)	Model 3 (ROAE)			
C	-0,217 ^{ns} (-0,682)	-0,990 ^{**} (-2,222)	1,782 ^{ns} (0,378)			
ETA	0,001 ^{ns} (0,078)	0,056 ^{**} (4,238)	-0,366 [*] (-2,748)			
LLPNI	0,000 ^{ns} (-0,170)	-0,001 ^{***} (-1,271)	0,009 ^{ns} (1,042)			
NIRAA	1,456 [*] (21,272)	0,434 [*] (5,494)	3,694 [*] (4,466)			
LATDB	0,004 ^{ns} (1,530)	0,008 ^{***} (1,986)	0,132 [*] (2,931)			
GDP	0,063 ^{ns} (1,571)	0,039 ^{ns} (0,662)	0,368 ^{ns} (0,552)			
INF	-0,067 ^{**} (-1,999)	0,023 ^{ns} (0,460)	-0,238 ^{ns} (-0,422)			
Random Effects (Cross)						
_BEA--C	-0,329	-0,006	-0,311			
_BNA--C	-0,403	-0,081	1,503			
_CPA--C	-0,240	-0,072	-1,035			
_BADR--C	0,004	-0,156	-1,075			
_BDL--C	-0,077	-0,089	-0,001			
_BNP--C	0,241	0,565	2,189			
_SGA--C	0,024	-0,167	-0,659			
_BMAIC--C	-0,310	-0,287	-0,853			
_TBA--C	0,796	0,197	-0,091			
_BARAKA--C	0,295	0,095	0,333			
S.D.	0,381	0,552	0,324	0,854	2,082	9,813
Rho	0,323	0,677	0,126	0,874	0,043	0,957
R-squared	0,880		0,464		0,213	
F-statistic	108,432		12,829		4,020	
Hausman Test						
Chi-Sq. Statistic	14,073		9,245		10,031	
Prob.	0,029		0,160		0,123	

Source: Author.

() t-Statistic, ns: Not Significant.. *, ** and *** Significant at 1% , 5% , 10% level respectively.

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