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The impact of banking strategies on the net interest margin: Empirical evidence from Tunisia

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ABSTRACT: In the banking sector, the conditions for creating a sustainable competitive advantage are specific. Moreover, innovation is not protected, new products or new sales methods are easily imitated. Building on traditional thesis factoring May Provide an advantage, aim the durability thereof cannot be ensured partner after the adoption of some strategies. Realized Banks -have for years, the need to define a strategy, as well as for internal Reasons of clearer presentation of the objective and tasks Reasons for external communication towards customers and Shareholders exposed to a controlled development. This article is devoted to the analysis of different approaches developed in the financial literature for measuring the impact of banking strategies on the performance of banks. Our analysis is based on the presentation of a literature review on the measurement of bank performance. Thus, the study of the impact of banking strategies on the performance of banks is based on the use of variables that indicate the type of strategy adopted by a bank. Our empirical validation is carried out on a sample of 11 banks for a period of 13 years (2000-2012). We will use the software to get STATA12 different econometric results and empirically validate our research problem. This validation will be based on the use of econometric techniques such as regression on panel data.

KEYWORDS: banking strategies, banking performance, performance measurement, net interest margin, panel data.

1 INTRODUCTION

The creation of the Tunisian banking system dates back to 1958 when the central bank was created more than two public institutions. The existence of a prudent economic policy and a gradual liberalization of the economy have a very favorable macro-economic environment in Tunisia. In fact, the Tunisian banking system is characterized by a process of reforms since 1986.

However, the Tunisian banking sector is characterized by a significant change: the protected area and closed to an open area, developed and dynamic in the Tunisian economy. Thus, reforms in the Tunisian banking sector have positively impacted the profitability of banks in terms of assets, liabilities and profitability ratios.

In our research, we will answer a key question brings us to determine the impact of banking strategies on net interest margin. Thus, this issue is as follows: to what extent the banking strategies can affect the net interest margin of banks Tunisian?

This paper aims to answer this question. In addition, we will try to present a review of empirical literature on the determinants of net interest margin and then show a brief overview of the banking sector in Tunisia.

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Then, we present the research methodology and to analyze the results. In research methodology, we will show the sample used as models to estimate. The last section is reserved to conclusion.

2 LITERATURE REVIEW

The literature on the determinants of net interest margin is broad. Its relevance stems from the need to monitor the trends in bank efficiency over time and assess its impact on the efficiency of the allocation of company funds. Some authors have suggested that the most important interest margins can provide banks with a base that helps to absorb losses from shocks and financial crises and thereby promote the financial stability of the bank activity [1]. Other authors have pointed out that high interest margins may reflect an inadequate regulatory environment and underdeveloped banking system [2], [3].

Empirical evidence on the impact of competition on the net interest margin is heterogeneous and sometimes contradictory. In general, the concentration of high market or strong market power, often measured by the Herfindahl index or the Lerner index is expected to increase interest margins.

However, we showed that this positive relationship fails when applying control over institutions. The authors examined the impact of bank regulations, concentration, and inflation net of bank interest margins using data from 1400 banks in 72 countries. The data indicate that more stringent regulations on the entry of banks and banking activities increased net interest margins. Inflation also has a positive impact on net interest margin. Then, concentration is positively associated with net interest margins. Furthermore, bank regulations become insignificant when controlling for national indicators of economic freedom and the protection of property rights [4].

Other authors considered that the positive relationship between concentration and bank margins may be influenced by other variables [5]. These authors showed that the market concentration of a bank can even negatively affect net interest margins. Two authors have validated their theory on a sample of 19,322 banks for the period 1994-2001. The results found by the authors have verified the existence of a relationship between risk and net interest mare.

Then, in other studies we stated that there is a lack of robustness using market concentration as a factor explaining the conditions of competition between banks [2], [6], [7].

Thus, we found that banks belong to countries where there is a competitive banking sector have smaller net interest margins [3].

In contrast, the fall in margins in the banking sectors of the European Union is justified by a relaxation of competition [8]. Two authors studied the net interest margin in the banking sectors leading Europeans during the period 1993-2000. They found that the decline in net interest margins comes from the relaxation of competition. The increase in net margin comes from the reduction of the effect of interest rate risk, credit risk and costs of operations.

The mixed nature of the results obtained in different empirical research calls into question the exact nature of the relationship between competition and the net interest margin.

Other factors were mentioned that may have an impact on the net interest margin. These factors include the returns on equity and asset growth. The maximization of returns on equity and asset growth may lead to lower interest margins. So we can assume the existence of a negative relationship between equity returns and asset growth on the one hand and the net interest margin on the other.

The period before the financial crisis of 2007 was characterized by low risk-free rate and the growth of assets prices and the availability of financial innovations.

This has led to higher securitization activity and weak banking supervision. A growing chain of literature draws attention to monetary policy as a cause that encourages banks to increase their risk-taking. Several authors have postulated that by information asymmetries and mitigation banks lower the risk. In addition, a low interest rate environment may cause expansion of the level of credit and increase risk-taking.

By analyzing many studies, we can conclude that the net interest margin can be defined or expressed by several variables. These variables are defined in terms of strategies applied by banks. Mention may be made, for example, strategies to clients, financial development strategies, strategies for mergers and acquisitions, competition strategies, strategies for density and concentration, strategies for bank risk management.

3 METHODOLOGY

The purpose of this article is to verify the research hypotheses that revolve around determining the impact of banking strategies on net interest margin in Tunisian banks. We selected a sample of Tunisian banks listed on the stock exchange.

Thus, our sample includes the major commercial banks in Tunisia (11 banks) during the period 2000-2012. Our study will mainly banks listed on the stock exchange:

- Amen Bank (AB).
- Arab Tunisian Bank (ATB).
- Attijari Bank of Tunisia (BAT).
- The Housing Bank (BH).
- The Arab International Bank of Tunisia (BIAT).
- The Tunisian Bank (BT).
- The Agricultural National Bank (BNA).
- The Tunisian Society of Banks (STB).
- Union Bank of Trade and Industry (UBCI).
- International Union of Banks (UIB).
- Bank of Tunisia and Emirates (BTE).

In addition, the data used in the empirical validation were extracted from the database of the Central Bank of Tunisia (CBT), the Tunisian Professional Association of Banks and Financial Institutions (TPABFI), the National Institute of Statistics (NIS), the Stock Exchange of Tunisia (SET) and the World Bank (WB).

In fact, our empirical test is to measure the impact of banking strategies on net interest margin Tunisian banks. Therefore, we use several variables to measure this impact.

4 THE MODEL

In this paper, we will refer to the model**,** in which we studied the impact of banks' strategies on the net interest margin [9]. Their study focuses on a group of banks in the euro zone for a period of 13 years (1995-2007). They used two models. In the first, they considered a variable that measures the ratio between deposits and liabilities in terms of the explanatory variables that explain the existence of a causal relationship that leads to the maximization of net interest margins. The second model measures the net interest margin is expressed as a function of variables that reflect the strategies adopted by European banks.

Their results showed the existence of a positive relationship between net interest margin and deposits / liabilities ratio. This relationship is consistent with previous work. Therefore, we adopt the estimation of the two models we try to present them in the following:

4.1 MODEL 1

The first model is as follows:

$$\boldsymbol{ddepliab_{it} = \beta_0 + \beta_{1t} inf_t + \beta_{2t} gdp_t + \beta_{3t} size_{it} + \beta_{4t} oppcost_{it} + \beta_{5t} scale_{it} + \beta_{6t} growthasset_{it} + \epsilon_{it}}$$

Where,

- $\boldsymbol{ddepliab_{it}}$ **:** is the ratio between the total deposits and total liabilities of bank i at time t.
- $\boldsymbol{inf_t}$ **:** is the inflation rate at time t in Tunisia.
- $\boldsymbol{gdp_t}$ **:** is the growth rate of GDP at time t in Tunisia.
- $\boldsymbol{size_{it}}$ **:** is the logarithms of total assets of bank i at time t.
- $\boldsymbol{oppcost_{it}}$ **:** is the ratio of reserves held at the central bank and the total assets of bank i at time t.
- $\boldsymbol{scale_{it}}$ **:** is the relationship between the logarithm of the bank credits and i the number of banks studied at time t.
- $\boldsymbol{growthasset_{it}}$ **:** is the growth rate of assets of bank i at time t.
- $\boldsymbol{\beta_{it}}$ **:** the coefficients of the explanatory variables (i = 1, ..., 6) and (t = 1, ..., 13).
- $\boldsymbol{\beta_0}$**:** the constant.
- **i**: the index relative to each bank (i = 1, ..., 11).
- $\boldsymbol{\epsilon_{it}}$**:** the error term.

4.2 MODEL 2

The second model is as follows:

$$nim_{it} = \alpha_0 + \alpha_{1t} capstruc_{it} + \alpha_{2t} inf_t + \alpha_{3t} gdp_t + \alpha_{4t} credrisk_{it} + \alpha_{5t} size_{it} + \alpha_{6t} oppcost_{it} + \alpha_{7t} scale_{it} + \alpha_{8t} ddepliab_{it} + \alpha_{9t} conc_{it} + \alpha_{10t} growthasset_{it} + \alpha_{11t} marketcap_{it} + \varepsilon_{it}$$

Where,

- nim_{it} **:** is the relationship between interest margin and total assets of banks i at time t. it is the net interest margin is the ratio of net interest income and total assets.
- $capstruc_{it}$ **:** is the relationships between social capital and total assets of bank i at time t.
- inf_t **:** is the inflation rate at time t.
- gdp_t **:** is the growth rate of GDP of Tunisia at time t.
- $credrisk_{it}$ **:** it is the ratio between total loans and total assets of bank i at time t.
- $size_{it}$ **:** is the logarithms of total assets of bank i at time t.
- $oppcost_{it}$ **:** is the ratio of reserves held at the central bank and the total assets of bank i at time t.
- $scale_{it}$ **:** is the relationship between the logarithm of the bank credits and i the number of banks studied at time t.
- $ddepliab_{it}$ **:** is the ratio between the total deposits and total liabilities of bank i at time t.
- $conc_{it}$ **:** is the ratio between the total assets of bank i and the total assets of the three largest banks at time t.
- $growthasset_{it}$ **:** is the growth rate of the assets of bank i at time t.
- $marketcap_{it}$ **:** is the ratio of market capitalization of the bank i and GDP Tunisia at time t.
- α_{it} **:** The coefficients of the explanatory variables (i = 1... 11) and (t = 1... 13).
- α_0**:** the constant.
- **i**: the relative index to each bank (i = 1, ..., 11).
- ε_{it}**:** The error term.

The impact of different variables on the net interest margin, or the impact of banks' strategies on the net interest margin can be represented in Table 2.

Table 1. Analysis of the impact of banking strategies on the net interest margin in the literature

Variables	Impact on the net interest margin				Strategy of the bank
	+	Authors	-	Authors	
capstruc	*	*[2], [3], [10], [5]*			Capital management strategy. The higher ratio capstruc signified the higher the risk of insolvency is low.
inf	*	*[2]*	*	*[3], [4]*	Control strategy of the macro-economic environment.
gdp	*	*[2]*	*	*[3], [4]*	Control strategy of the macro-economic environment.
credrisk	*	*[2] , [8]*			Strategy management of credit risk. More risk involved, the higher the net interest margin is high.
size			*	*[5]*	Strategy to manage the level of credit granted to customers.
oppcost	*	*[8], [5]*			Strategy for compliance with regulations imposed by the BCT.
scale	*	*[1]*	*	*[8]*	Strategies in the context of relations with other banks.
ddepliab	*	*[3], [4]*			Selection strategy clients. That is to say how we can assign a balance between collecting deposits and granting loans.
conc	*	*[9]*	*	*[4]*	Strategy of concentration and competition.
growthasset			*	*[9]*	Strategy to manage the assets. That is to say, the strategy to manage the evolution of the level of appropriations or the strategy of the customer.
marketcap	*	*[11]*			Strategy in the financial market.

This paper aims to study the impact of banking strategies on the net interest margin Tunisian banks. This impact may be reflected in the measurement of the net interest margin as a function of several variables such as variables related to the characteristics specific banks (capstruc, size, ddepliab, growthasset, credrisk) The variables of financial regulation (oppcost), Variables that represent macro-economic measures (inf, gdp) Variables on concentration and competition from banks (scale, conc) And indicators of financial development (marketcap).

In this context, the hypotheses to be tested are those that verify the existence or not of an impact on the strategies of banking net interest margin Tunisian banks during the study period (2000-2012). Indeed, the assumptions of our research are:

- ***H1: Banking strategies may affect net interest margins.***
  - ***H1a: Banking strategies for specific characteristics of banks may affect the net interest margin.***
  - ***H1b: Banking strategies for the macro-economic environment may affect the net interest margin.***
  - ***H1c: Banking strategies for financial regulation may affect the net interest margin.***
  - ***H1d: Banking strategies for financial development can affect the net interest margin.***
  - ***H1e: Banking strategies for concentration and competition may affect the net interest margin.***
- ***H2 : Banking strategies may not affect net interest margins.***
  - ***H2a: Banking strategies for specific characteristics of banks can not affect the net interest margin.***
  - ***H2b: Banking strategies for the macro-economic environment can not affect the net interest margin.***
  - ***H2c: Banking strategies for financial regulation can not affect the net interest margin.***
  - ***H2d: Banking strategies for financial development can not affect the net interest margin.***
  - ***H2e: Banking strategies for concentration and competition can not affect the net interest margin.***

5 EMPIRICAL RESULTS

In this section, we will specify the type of estimate for both models is a regression on panel data. The choice of this type of regression is justified by the presence of the two dimensions in the data used, the first dimension is time (a period of 13 years) and the second is individual (the sample used is composed of 11 Tunisian banks listed on the Securities Tunis).

Table 2 summarizes the descriptive statistics for each variable used in the estimation of both models. The nim variable, which expresses the net interest margin of banks Tunisian throughout the study period, can reach a maximum value 0.0670315, as its minimum value is 0.0076826. The level of risk of the net interest margin which is measured by the standard deviation is 0.00864.

In fact, Tunisian banks tend to ensure a positive interest margin is the difference between interests received (interest received on loans granted) and interest income (interest earned on deposits collected). For this, the strategy to manage the deposits is explained by the variable ddepliab which has a maximum value 0.9376426 and a minimum value of 0.0212091. Thus, the level of risk is 0.1877409. The ddepliab variable is riskier than the nim variable.

Table 2. Descriptive statistics

Variables	Obs	Mean	Max	Min	Sd	Skewness	Kurtosis
nim	143	0.0252712	0.0670315	0.0076826	0.00864	0.6829567	5.81052
capstruc	143	0.0564564	0.4292398	0.015467	0.0799893	3.486925	14.54558
inf	143	0.0324615	0046	0021	0.0074226	0.509426	2.230108
gdp	143	0.0396923	0063	-0008	0.0216464	-1.069673	2.893775
credrisk	143	0.725902	0.9155814	0.4319	0.0867406	-1.18072	4.469312
size	143	21.57717	22.79138	19.16106	0.802446	-1.130005	4.325964
oppcost	143	0.0527069	0.1558974	0.004224	0.0289286	1.282925	5.015567
scale	143	1.931707	2.052858	1.694555	0.0740285	-1.061256	4.187841
ddepliab	143	0.7484049	0.9376426	0.0212091	0.1877409	-2.459022	9.254685
vonc	143	0.2022536	0.4078546	0.0211756	0.1005056	0.0943297	2.114884
growthasset	143	0.0959237	0.2846661	-0.064902	0.0710038	0.4625839	2.772735
marketcap	143	23.05976	101.6935	0.0862381	20.57838	1.667371	5.937398

In continuation of the analysis of the results, we conducted a test of correlation between the variables used. Table 3 summarizes the results. Furthermore, the results show that the majority of Pearson correlation coefficients do not exceed the tolerance limit (0.7) except for a few variables, which does not cause problems in estimating the two models of the two models nim and ddepliab.

Table 3. The correlation matrix

	nim	capstruc	Inf	gdp	credrisk	size	oppcost	scale	ddepliab	conc	growthasset	marketcap
nim	1.0000											
capstruc	0.2998 (0.0003) *	1.0000										
inf	-0.0803 (0.3403)	-0.0767 (0.3623)	1.0000									
gdp	0.0426 (0.6135)	0.0783 (0.3528)	-0.0878 (0.2970)	1.0000								
credrisk	0.3459 (0.0000) *	0.0294 (0.7272)	-0.0494 (0.5578)	-0.2038 (0.0146) **	1.0000							
size	-0.3605 (0.0000) *	-0.7882 (0.0000) *	0.2149 (0.0100) **	-0.2396 (0.0040) *	0.0227 (0.7878)	1.0000						
oppcost	0.3774 (0.0000) *	0.6733 (0.0000) *	-0.0388 (0.6455)	0.0175 (0.8359)	-0.0161 (0.8484)	-0.6065 (0.0000) *	1.0000					
scale	-0.2970 (0.0003) *	-0.7708 (0.0000) *	0.2020 (0.0155) **	-0.2668 (0.0013) *	0.1835 omparing	0.9868 (0.0000) *	-0.5990 (0.0000) *	1.0000				
ddepliab	-0.2209 (0.0080) *	-0.8612 (0.0000) *	0.0955 (0.2564)	-0.0233 (0.7825)	-0.1699 (0.0425) **	0.6516 (0.0000) *	-0.7144 (0.0000) *	0.6136 (0.0000) *	1.0000			
conc	-0.3104 (0.0002) *	-0.5662 (0.0000) *	0.0300 (0.7222)	-0.0527 (0.5321)	0.0243 (0.7731)	0.8435 (0.0000) *	-0.4632 (0.0000) *	0.8346 (0.0000) *	0.3588 (0.0000) *	1.0000		
growthasset	-0.1384 (0.0993) ***	-0.0661 (0.4328)	0.1844 (0.0274) **	0.1262 (0.1331)	-0.2369 (0.0044) *	0.0645 (0.4440)	-0.1411 (0.0928) ***	0.0235 (0.7810)	0.0742 (0.3783)	-0.0212 (0.8011)	1.0000	
marketcap	-0.0114 (0.8923)	-0.3097 (0.0002) *	0.1176 (0.1618)	-0.4177 (0.0000) *	-0.0424 (0.6151)	0.4651 (0.0000) *	-0.0291 (0.7301)	0.4501 (0.0000) *	0.3443 (0.0000) *	0.2149 (0.0099) *	0.0535 (0.5254)	1.0000
significant at a threshold value (*) 1% (**) and 5% (***) 10%												

In addition, by observing the Figure 1 we can see that all Tunisian banks have a net positive interest margin. This profit comes from good management applied by these banks in their activities. In fact, the resources collected from agents in lending are adequate to meet the demands of credit agents to financing needs.

For example, at the end of 2012, we can see that UBCI has the highest net interest margin. While the ATB has the lowest net interest margin in all Tunisian banks belonging to our sample.

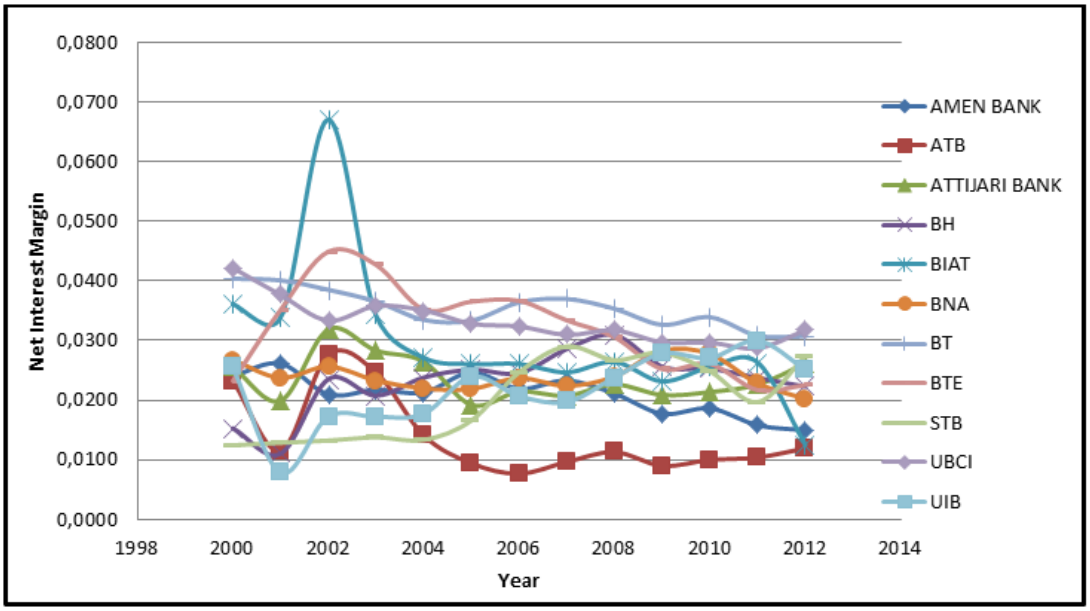

Fig. 1. The evolution of the net interest margin of banks Tunisian

The results of the estimation of the ddeplib variable and the nim variable are presented respectively in both Tables 5 and 6. The tables include several specifications; with the basic the two tables include several estimates specification including a

set of bank characteristic variables. Know an estimate of the dependent variables using the explanatory variables on strategies adopted by Tunisian banks. On the variable nim, we based our study on explanatory variables that are grouped by categories, namely category on the specific characteristics of banks, a category on financial regulation, a class on macro-economic indicators, a category on the concentration and competition and a final category for indicators of financial development.

So we added another model in which we estimate the ddepliab variable based on six variables inf, gdp, size, oppcost, scale and growthasset. This is justified in the literature by the significant impact of this variable on the net interest margin [9].

Note here that, the panel structure is homogeneous. In this case, we will apply the method of ordinary least squares that allows a better fit by minimizing the sum of squared residuals.

Therefore, we estimated two models in which we adopted the two variables ddepliab and nim as explained variables. The results of the OLS estimation of these two models are presented in both Table 5 and table 6.

Before starting estimates for the two models, we also conducted a test of the unit root panel data. Thus, we used the test of Levin-Lin-Chu. The null hypothesis of this test is H0: all series are non-stationary and the alternative hypothesis is H1: all series are stationary. The acceptance or rejection of the null hypothesis is based on the value of the p-value. This value is compared to a threshold of 10%. If the value of the p-value is less than 10%, then we reject H0 and if the value of the p-value is greater than 10%, then we accept H0.

According to the results presented in Table 4, we found that only three variables that present the p-value greater than 10%. These three variables are size, scale and marketcap and have no material impact on the net interest margin (nim). Thus, the non-stationarity of these three variables does not pose a problem in the estimated model. For other variables, the values of p-values for them are less than 10%. In this case, we reject H0 e thereafter all these variables are stationary.

Table 4. Testing the unit root

Variables	Statistic	p-value
Nim	-3.0359	0.0012
Capstruc	-0.5884	0.0781
Deppliab	-3.5578	0.0002
Inf	-2.2377	0.0126
Pg	0.9498	0.0000
Credrisk	-1.7568	0.0395
Size	0.7823	0.7830
Oppcost	-2.9825	0.0014
Scale	1.6300	0.9485
Conc	-2.5219	0.0058
Growthasset	-6.1053	0.0000
Marketcap	1.9967	0.9771
In this test, the p-value is compared to 10%. If p-value <10% and therefore we reject H0 if p-value> 10% then we accept H0. With H0: all series are non-stationary.		

However, the problem that arises when estimating is the choice of the estimation method, the estimation of a fixed effects model or the estimation of a random effects model. Thus, approached this problem solution is the Hausman test which allows you to choose between the estimation of a fixed effects model and the estimation of a random effects model.

In model 1 (ddepliab), we chose the random effects model as an estimation method. This choice is justified by the probability of the Hausman test which is equal to 0.9836. Thus, this probability is greater than 10%, therefore, we chose the random effects model.

Next, we conducted tests of autocorrelation of the first order of each estimated model. This test is based on the interpretation of the probability value (Prob> F). This value is compared to a threshold of 5%. If the probability is less than 5%, reject H0 therefore, that is to say it rejects the hypothesis of absence of the self-correlation of the first order. In this case, we will correct this problem in the presence of autocorrelation

For the model (ddepliab), the probability value (Prob> F =0.0001) is less than 5% and we have corrected the problem that is presented in Table 6 (estimate 3). In this context, there is not a problem of correlation between the explanatory variables and residuals.

We also conducted additional tests to show the validity of the estimated models and justify the significance of the estimates. We tested the correlation between the explanatory variables and the residuals. This type of test is based on the value (Prob> chi2). If this probability is less than 5%, so we accept H0 that verifies the absence of correlation between the residuals and the explanatory variables. If this probability is greater than 5% in this case there is a problem of correlation between the residuals and the explanatory variables that must be corrected.

In the three estimates of the model (1), the probability values (Prob> chi2) are all less than 5%. So there are not problems of correlation between the explanatory variables and residuals.

The test of significance of the model is based on the probability of Fisher. We noticed that all the probability value Fisher is less than 5% in all estimates first model. So we can deny that the estimated (ddepliab) model is globally significant.

Thus, we found that the coefficient of determination R^2 is equal to 0.6756 in the estimate used; therefore the model (1) is characterized by a good linear fit.

Model (1) to be estimated is as follows:

$$\boldsymbol{ddepliab_{it} = \beta_0 + \beta_{1t} inf_t + \beta_{2t} gdp_t + \beta_{3t} size_{it} + \beta_{4t} oppcost_{it} + \beta_{5t} scale_{it} + \beta_{6t} growthasset_{it} + \epsilon_{it}}$$

Table 5. Estimating the variable ddepliab

Dependent Variable: ddepliab			
	Estimation 1 Fixed effects model	Estimation 2 Random effects model	Estimation 3 (Correcting the problem of autocorrelation)
	2000-2012	2000-2012	2000-2012
Explanatory variables	Coefficients (T-Student)	Coefficients (T-Student)	Coefficients (T-Student)
inf	0.5761678 (0.72)	0.567826 (0.72)	-0.1008473 (-0.27)
gdp	0.7449829 (2.26) **	0.7132656 (2.25) **	0.1027148 (0.48)
size	0.0376901 (0.49)	0.0571115 (0.77)	0.083147 (1.23)
oppcost	-3.208795 (-7.29) *	-3.223474 (-7.68) *	-2.68375 (-5.18) *
scale	0.488877 (0.55)	0.2646303 (0.31)	-0.3377341 (-0.47)
growthasset	-0.178439 (-2.02) **	-0.1791969 (-2.08) **	-0.1921107 (-3.39) *
const	-0.8712385 (-2.06) **	-0.8547434 (-2.15) **	-0.2412108 (-0.49)
Number of Obs	143	143	143
By Fisher	Prob> F = 0.0000		
The value of Fisher	F (6.126) = 14.42		
The probability of chi2 ()[a]		Prob> chi2 = 0.0000	Prob> chi2 = 0.0000
The value of Wald chi2		Wald chi2 (6) = 108.26	Wald chi2 (6) = 40.10
R^2	0.6104	0.4068	0.6756
Probability of Hausman test	Prob> chi2 = 0.9836	Prob> chi2 = 0.9836	Prob> chi2 = 0.9836
Chosen in the estimation model	The random effects model		
Auto-correlation test (P> F) [b]	0.0001		
Assumption	H0 is rejected: absence of autocorrelation		

- ✓ Values in parentheses represent the t-Student.
- ✓ Significant at a threshold value (*) 1% (**) and 5% (***) 10%.
- ✓ [a]Wall test is used to test the correlation between the explanatory variables and residuals. We compare the probability (Prob> chi2) with a threshold of 5% with H0: no correlation between the variables used and residuals. If (Prob> chi2) <5%, then we accept H0.
- ✓ [b]For the autocorrelation test, comparing the probability of a Fisher 5% threshold with H0: absence of autocorrelation of the first order. If (P> F) <5%, then, we reject H0.

From the results shown in Table 6, we noticed that there are two significant variables: oppcost growthasset. However, the variable is statistically significant oppcost negatively to a threshold of 1% with a value of t-student that is equal to (-5.18). So, the variable that measures the importance of mandatory reserves held by banks in Tunis negatively influences the dependent variable ddepliab which measures the proportion of deposits in total liabilities.

The second variable (growthasset) has a negative impact on the variable ddepliab. The growthasset is a statistically significant level of 1% with a value of t-student who is (-3.39). In this case, the increase in the level of assets negatively affects ddepliab.

In the model 2 (nim), we chose the random effects model as an estimation method. This choice is justified by the probability of the Hausman test which is equal to 0.2315. Thus, this probability is greater than 10%, therefore, we chose the random effects model.

Next, we conducted tests of autocorrelation of the first order of each estimated model. This test is based on the interpretation of the probability value (Prob> F). This value is compared to a threshold of 5%. If the probability is less than 5%, reject H0 therefore, that is to say it rejects the hypothesis of absence of the self-correlation of the first order. In this case, we will correct this problem in the presence of autocorrelation

In model 2 (nim), the probability value (Prob> F =0.0887) is greater than 5%. In this case, one accepts H0: lack of correlation of first self-. In this context, there is not a problem of correlation between the explanatory variables and residuals.

We also conducted additional tests to show the validity of the estimated models and justify the significance of the estimates. We tested the correlation between the explanatory variables and the residuals. This type of test is based on the value (Prob> chi2). If this probability is less than 5%, so we accept H0 that verifies the absence of correlation between the residuals and the explanatory variables. If this probability is greater than 5% in this case there is a problem of correlation between the residuals and the explanatory variables that must be corrected.

In both estimates of the model (2), the probability values (Prob> chi2) are all less than 5%. So there are not problems of correlation between the explanatory variables and residuals.

The test of significance of the model is based on the probability of Fisher. We noticed that all the probability value Fisher is less than 5% in the estimation of the second model (Prob> F = 0.0000). So we can deny that the estimated (ddepliab) model is globally significant.

Thus, we found that the coefficient of determination R^2 is equal to 0.6433 retaining in the estimation, therefore the model (2) is characterized by a good linear fit. Model (2) to be estimated is as follows:

$$\boldsymbol{nim_{it} = \alpha_0 + \alpha_{1t} capstruc_{it} + \alpha_{2t} ddepliab_{it} + \alpha_{3t} inf_t + \alpha_{4t} gdp_t + \alpha_{5t} credrisk_{it} + \alpha_{6t} size_{it} + \alpha_{7t} oppcost_{it} + \alpha_{8t} scale_{it} + \alpha_{9t} conc_{it} + \alpha_{10t} growthasset_{it} + \alpha_{11t} marketcap_{it} + \varepsilon_{it}}$$

Table 6. Estimating the variable nim

Dependent variable: nim		
	Estimation 1 Fixed effects	Estimate 2 Random effects
	2000-2012	2000-2012
Explanatory variables	Coefficients (T-Student)	Coefficients (T-Student)
capstruc	0.0564646 (2.40) **	0.0335728 (1.78) ***
deppliab	0.009289 (0.88)	0.0328918 (3.89) *
inf	-0.0321035 (-0.46)	0.0348916 (0.39)
gdp	-0.0026214 (-0.09)	0.0094484 (0.28)
credrisk	0.0315514 (0.52)	-0.0474652 (-0.66)
size	-0.0067563 (-0.16)	-0.0706218 (-1.50)
oppcost	0.0120062 (0.25)	0.13869 (3.89) *
scale	0.0971386 (0.21)	0.7045701 (1.35)
conc	-0.0472139 (-1.37)	0.0265904 (1.68) ***
growthasset	0.0004938 (0.07)	0.0067919 (0.75)
marketcap	-0.0001173 (-2.84) *	0.0000431 (1.02)
cons	-0.0369134 (-0.54)	0.1801702 (2.23) **
Number of Obs	143	143
By Fisher	Prob> F = 0.0000	
The value of Fisher	F (11.121) = 6.64	
The probability of chi2 ()[a]		Prob> chi2 = 0.0000
The value of Wald chi2		Wald chi2 (11) = 91.48
R^2	0.1380	0.6433
Probability of Hausman test	Prob> chi2 = 0.2315	Prob> chi2 = 0.2315
Chosen in the estimation model	The random effects model	
Auto-correlation test (P> F)[b]	0.0887	
Assumption	Autocorrelation lack: It accepts H0	

- ✓ Values in parentheses represent the t-Student.
- ✓ Significant at a threshold value (*) 1% (**) and 5% (***) 10%.
- ✓ [a]Wall test is used to test the correlation between the explanatory variables and residuals. We compare the probability (Prob> chi2) with a threshold of 5% with H0: no correlation between the variables used and residuals. If (Prob> chi2) <5%, then we accept H0.
- ✓ [b]For the autocorrelation test, comparing the probability of a Fisher 5% threshold with H0: absence of autocorrelation of the first order. If (P> F) <5%, then we reject the hypothesis H0.

The analysis in Table 7 reveals the existence of four statistically significant variables in Model 2. These four variables are capstruc, oppcost, ddepliab and conc. Other variables have an impact on the net interest margin, but this impact is marginally significant or relative.

The strategy capital management has a positive and significant impact on the net interest margin. This strategy is represented by the variable capstruc. This variable is statistically significant and positively to a threshold of 10% and a value of t-student which is equal to 1.78. So, the more the bank adopted a good strategy for managing capital plus its net interest margin will be maximized.

Policy compliance with regulations imposed by the BCT has a positive and significant impact. This strategy is represented by the oppcost variable is statistically and positively significant at the 1% level and with a value of t-student which is equal to 3.89. However, over the bank complies with the regulations imposed by the CBT plus net interest margin will be maximized.

The strategy is to manage relationships with customers. That is to say how we can assign a balance between collecting deposits and granting loans. This strategy has a positive and significant impact on the net interest margin. This strategy, which is represented by the variable ddepliab affects net interest Tunisian banks at a threshold of 1% margin. This effect allows us to deduce the importance of adopting a good strategy to better manage the relationship with customers. That is to say, to assign equilibrium between stakeholders who are the agents in lending and borrowers who are agents financing needs. Better management of this relationship maximizes the net interest margin.

The fourth significant variable is the variable conc which has a statistically significant and positive impact on net interest a threshold margin of 10% and a value of 1.68 t-student. This variable defines the strategy of concentration and competition. Thus, the more the bank adopts best strategies of concentration and competition more it maximizes its net interest margin.

Finally, we presented in Table 7 different results for the verification of research hypotheses of this study.

Table 7. Verification of research hypotheses

Type of strategy	Accepted hypothesis	Hypothesis rejected
Banking strategies for specific characteristics to banks	*H1a: Banking strategies for specific characteristics can affect the bank's net interest margin (capstruc, ddepliab).*	*H2a: Banking strategies for specific characteristics banks can not affect the net interest margin (credrisk, size, growthasset)*
Banking strategies for the macro-economic environment		*H2b: Banking strategies for the macro-economic environment can not affect the net interest margin (inf, gdp).*
Banking strategies for financial regulation	*H1c: Banking strategies on financial regulation may affect the net interest margin (oppcost).*	
Banking strategies on financial development	*H1d: Banking strategies on financial development can affect the net interest margin (marketcap).*	*H2d: Bank financial development strategies can not affect the net interest margin (marketcap).*
Banking strategies on concentration and competition	*H1e:Banking strategies on concentration and competition can affect the net interest margin (conc, scale).*	

6 CONCLUSION

The study of the impact of banking strategies on the net interest margin is one of the main objectives in the recent financial literature. In our work, we have devoted this chapter to study the impact of banking strategies on the level of net interest margins Tunisian banks.

Furthermore, the observation of the results allowed us to conclude that a portion of bank strategies on specific characteristics of banks, banking strategies on financial regulation and banking strategies on concentration and competition have an impact on the performance of Tunisian banks measured by NIM variable. On the other hand, bank strategies on specific characteristics of banks and banking strategies on the macro-economic and banking strategies on financial development environment does have an impact on the net interest margin of banks Tunisian.

The study the impact of banking strategies on the net interest margin is one of the main objectives of the various banks in the banking systems. Indeed, for a net margin of maximum interest must adopt clear and adaptable to any economic situation property strategies. Thus, a focused strategy allows a bank to expose themselves against various banking risks. It allows him to maximize profit while minimizing operating costs.

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