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2012

Online at <https://mpra.ub.uni-muenchen.de/65114/>

MPRA Paper No. 65114, posted 18 Jun 2015 12:02 UTC

Modelling non-interest income at Tunisian banks

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Abstract

The aim of this paper is to investigate the role of non-interest income as an important determinant of the total bank revenue for the Tunisian context. Our sample is based on 10 deposit banks observed during the period 1998-2009. By applying the panel data estimation our results indicate that only the information technology, the size of bank and the banking strategy affect significantly the non-interest income. However, the impact of macro factors appears to be insignificant.

Keywords: *Non-interest Income, advance in technology, banking strategy, macro factors, panel data, Tunisia*

JEL classification: C23, N2, G21

1. Introduction

Nowadays, banks have a very important role in economy and their role became more and more significant. As financial intermediaries, banks are the most important channel of money circulation between households, firms and financial markets. They become the backbone of the economic development.

The last few decades have been marked by a globalization of financial market and the creation of a global integrated economy. Financial markets have emerged spectacularly and financial innovations have developed at a stunning rate. Barriers to international investment and finance have declined dramatically and access to financial services is becoming ever easier than before. This new environment followed by the surge in Information and Communication Technology (ICT) of the mid-nineties have transformed the banking sector¹. This sector has known some spectacular change characterized by: The entry of non-bank financial institutions into traditional banking markets;

- The emergence of a new set of non-financial companies (such as many supermarkets) in the markets for retail and wholesale financial services;
- Non-banks offering payments facilities (Carrefour; Géant; etc...);
- The development of in-house company banks.

Nowadays, banks exercise an extensive variety of business than before² (their traditional financial intermediation: collecting deposits and making loans). Banks have become financial services enterprises and in many advanced financial service economies off-balance sheet income of banks exceeds income earned from traditional financial intermediation business. Banks start to be subject to substantial structural and operational change. As a result, some of the traditional monopolies and inherent comparative advantages possessed by banks are being eroded (Llewellyn–1999).

Due to the new banking environment, characterized by high competition and pressure, banks were moved toward the diversification of their activities and they launched new

¹ The growth of the Internet and wireless communication technologies are dramatically changing the structure and nature of financial services. Internet and related technologies are more than just new distribution channels—they are a completely different way of providing financial services. See HAMDI 2008.

² One example is commercial real estate (CRE) in the United States, an area in which some banks have become increasingly concentrated. The same things for the insurance industry, banks are interested to practice the insurance activities, they are moving toward the Bank Insurance Model (BIM), sometimes known as the Bancassurance.

products and services. In France for example, banks have become the ‘*one stop shop*’: they offer telecommunication services, all kind of insurance, mortgage and many other financial and non-financial services. In Korea, a legislation on the integration of the capital market” of 2009 allowed banks to expand further into financial services activities unrelated to traditional bank intermediation (Kim and Kim 2010). As a result, the interest income, which is the chief indicator of the banking profit, has decreased drastically and noninterest revenue increased surprisingly.

The importance of the non-interest revenue and factors that determine its level is the principal motivation of our study. To empirically analyse this issue, we use data of 10 Tunisian banks observed during the period 1998-2009 and we perform panel data regression.

The reminder of this paper is organized as follows. Firstly, we present the structure of the Tunisian banking system, the use of the electronic means of payment and the level of the Non-interest Income (NII, henceforth). Secondly, we present a literature review of the determinants of the NII and the hypothesis of the model. Thirdly, an empirical study on the determinants of the non-interest income is analysed. In the last section, we conclude.

2. The Tunisian banking system: structure, use of the electronic means of payments and the level of NII

In this section, we will give an idea on the structure of the Tunisian banking system, the degree of IT used by the Tunisian banks and the level of NII drawn from the operations and services other than those of credit.

2.1. Structure of the Tunisian banking system

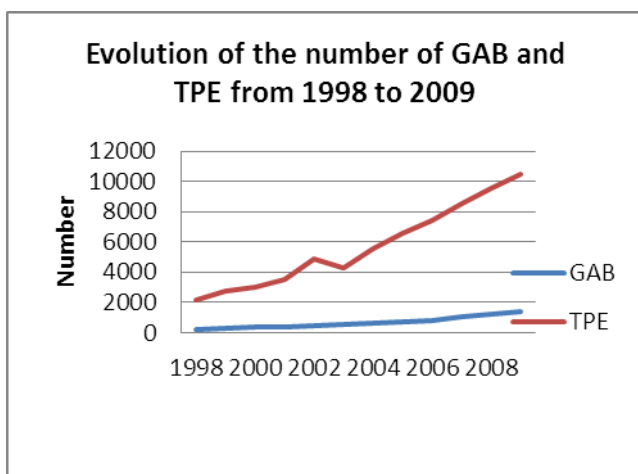
The Tunisian banking system currently includes 20 deposit banks. In 2005, its organization has known three major events: first the creation of a new bank called “Banks of Financing of Small and medium-sized firms”, second the privatization of the “Banque de Sud” which gives the birth of “Attijari Bank” and third the change of the statute of some development banks (STUSID, BTL, TQB and BTK) to universal banks. In January 2008 and within the framework of the programme of restructuring of the banking system there was the privatization of the “Tuniso-Koweitienne Bank” by the transfer of 60% of its capital to the

profit of financial company «OCEOR», a subsidiary of the French group “Caisse d’Epargne” (see Hakimi and Hamdi 2010).

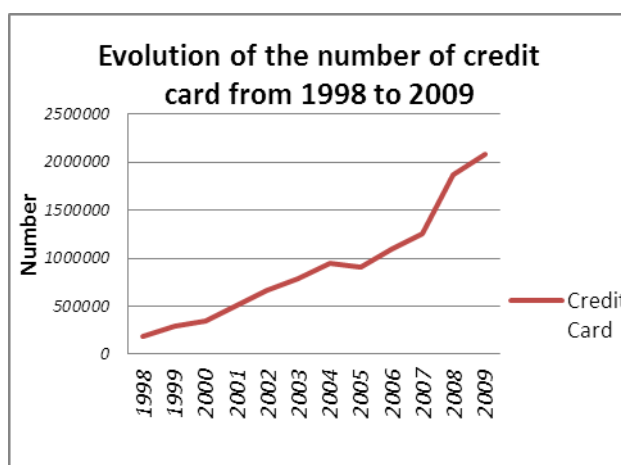
In Tunisia, the banking system is mostly made-up of private banks with mixed capital (70%); nevertheless the public banks play a major role in financing the Tunisian economy. Among the 20 despot banks, 11 of them are listed in Tunis Stock Exchange³.

1.1 The use of the electronic means of payments

Graph 1: Evolution of the number of GAB and TPE card



Graph 2: Evolution of the number of credit card



Source: *Tunisian professional association of the banks and the financial establishments*

The development of the new electronic payment system allowed banks the adoption of a modern means of payments to facilitate the everyday financial operations to their customers. In Tunisia, banks suggested two kinds of cards: a single purpose card which have a function of money withdrawal and the card of payment which is used to basic purchases.

According to the data available of Tunisia Electronic money, the number of the cards (of payment and withdrawal) passed from 341.000 in 2000 to 1087015 in 2006; with 52% for the payment card, against 16% for the withdrawal card and 32% for the CIBT card. In 2009, the number of card reached 2082905 against 1870125 in 2008 and 1259533 in 2007.

³ For more details for the Tunisian banking system see appendix n°3

As for the number of ATM it increased at moderated pace, moving from 206 in 1998 and they are 476 in 2002 to 829 in 2006 and 1409 ATM in 2009.

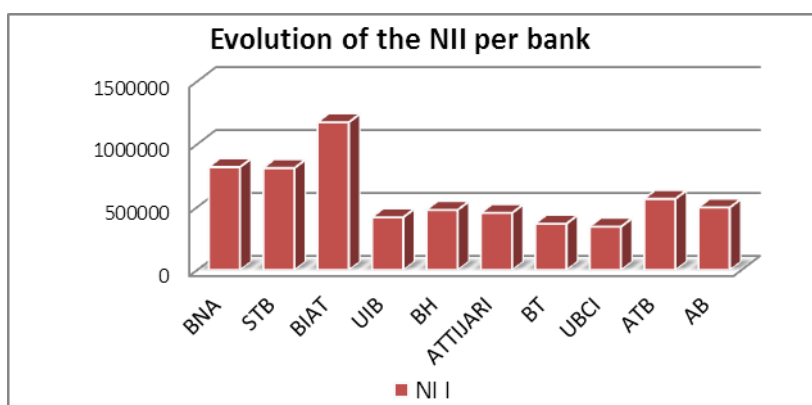
1.3 Evolution of NII per bank and per period

This study reveals which bank earns more NII during the period of our study. It also shows the credit and lending strategy and the degree of IT used in each bank (for more detail see De Young and Tara (2003))

Table 1: Evolution of the NII per banks

BANKS	NII
BNA	817813
STB	810215
BIAT	1174333
UIB	418809
BH	477782
ATTIJARI	453312
BT	368303
UBCI	343788
ATB	565036
AB	496443

Graph 1: Evolution of the NII per banks



Source: Tunisian professional association of the banks and the financial establishments

The graph shows that BIAT bank earns the highest amount of NII with a level of 1174333 MDT. This bank was followed by BNA bank. This satisfying level of NII indicates that these two banks distributed more of the electronic means of payments towards their customers which will be remunerated in the form of commissions. Thus, these two banks provide more services towards their customers.

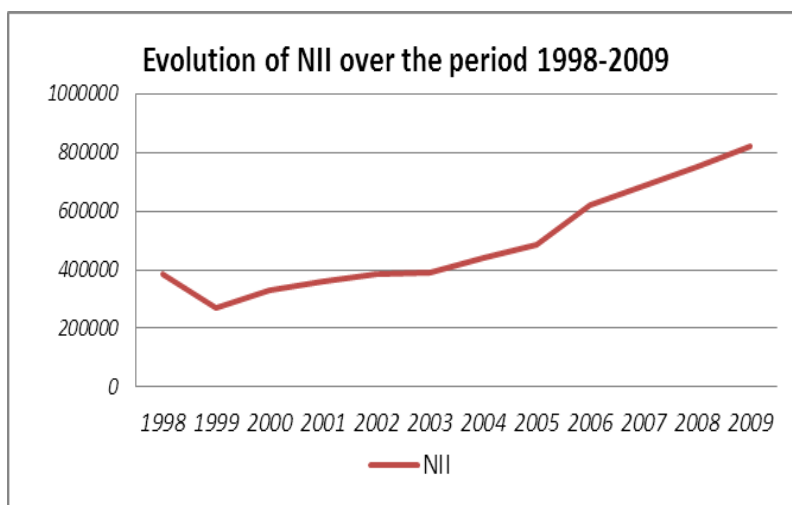
The two banks BT and UBCI earn less NII, this is explained by the banking strategy adopted by these two banks and who are turned towards the concentration of the distribution of credit to draw from the received interests.

In order to have an idea about the evolution of the NII per period, we will examine the level of the NII for the period 1998-2009. This study allows determining the period in which we have an increase in the NII.

Table 2: Annual evolution of the NII

Years	NII
1998	386325
1999	270150
2000	328524
2001	359689
2002	386264
2003	391552
2004	439225
2005	487426
2006	620863
2007	683745
2008	752777
2009	819294

Graph 2: Annual evolution of the NII



Source: Tunisian professional association of the banks and the financial establishments

The most remarkable conclusion to be drawn from this graph is that we see an increase in the NII since 1998 to 2009. The level of the NII starts to take higher values since 2005 with a value of 487426 MDT. This increase can be explained by the orientation of the banks to the use of new technologies of information and communication. In the same way, it result an increase in the use of the electronic means of payment such as GAB, TPE and credit card. We quote for example the evolution of the number of the GAB from 206 in 1998 to 1409 in 2009, from 2158 TPE in 1998 to 10450 in 2009 and from 185000 credit cards in 1998 to 2082905 in 2009.

In the same way, the banks introduced other services online for their customer's with commission. We quote for example information relating to the follow-up of account such as the balance of account.

2. The determinants of non-Interest Income: literature review and hypothesis

Several theoretical and empirical studies have analysed the determinants of non-interest income showed that it can be determined by the level of advance in information and communication technology, the banking characteristics, the banking strategies and the macro factors.

2.1 The advance in information and communication technology and the deregulation policy

Advances in information and communications technology (the Internet, ATMs), new intermediation technologies and the introduction and expansion of financial instruments and markets all would have occurred in the absence of deregulation. Many of these new technologies have emphasized non-interest income while de-emphasizing interest income at banks.

The increase of non-interest income for banks results from the deregulation of banks. When banks no longer had the restriction of Regulation, banks could pay market rates of interest to depositors. This also allowed banks to offer the individual services from bundled products as standalone account features. The elimination of the barriers of expansion for banks leads to go across state lines and purchase other banks. These deregulations along with advancements in technology, such as automatic teller machines and Internet banking, allowed banks to develop new streams of revenue through noninterest income

Deregulation fostered competition between banks, nonbanks, and financial markets where none existed before. Many banks embraced the new technologies that drastically altered their production and distribution strategies and resulted in large increases in non-interest income.

The empirical evidence of the study of Craigwell, R and Maxwell, C (2005) supports bank characteristics and the ATM technology as the most influential factors shaping the trend of non-interest income in the banking industry in Barbados and suggests that non-interest income is positively related to both bank profitability and earnings volatility.

Technological improvements in the services provided by financial intermediaries help increase income and reduce costs in several ways: for example the non-interest income: By making more nonloan products available to customers through the computers to customers such as letters of credit and commercial paper and derivatives. *H1 the advance in information and communication technology exert an effect on the level of the non-interest income*

2.2 Banking characteristics and banking strategies

The size of bank is one of the important characteristics which can affect the non-interest income. Joon-Ho Hahm (2008), by using a dataset of 662 relatively large commercial banks in 29 OECD countries from 1992 to 2006, find that banks with relatively large asset sizes, low net interest margins, high impaired loan ratios, and high cost-income ratios tend to exhibit higher non-interest income shares. De Young and Hunter (2003) and De Young *et al.* (2004) also argue that bank size is positively correlated with the degree of non-interest income expansion.

Rogers and Sinkey (1999) find that core deposits and net-interest margins are both negatively correlated with non-interest income, while bank size is positively correlated with non-interest income. *H2: The size of the bank can affect the level of the non-interest income.*

Another factor related to the banks can increase or reduce the level of the non-interest income. It's the deregulation policy. Well-managed banks responded to these competitive pressures by becoming more cost-efficient and more revenue-efficient. This included offering customers an expanded array of new and/or non-traditional fee-based products, selling increased amounts of existing fee-based products, pricing fee-based products more efficiently (e.g., by unbundling retail deposit products), and improving the quality of fee-based products and services so that they commanded higher prices.

De Young and Rice (2004) find that well-managed banks expand more slowly into non-interest activity and that greater levels of non-interest income are associated with poorer risk-return tradeoffs. De Young and Roland (2001), using the data of 472 US commercial banks between 1988 and 1995, also find that non-traditional activities of banks are associated with both higher revenue volatility and higher total leverage. Valverde and Fernandez (2007), using bank data, find that revenue and market power increase as output becomes more diversified toward non-traditional activities in banking.

Given the literature which treats the relationships between the banking strategy and the level of noninterest income we can put the following hypothesis: *H3 the banking strategy can affects the non- interest income*

2.3 The macro factors

Theoretical determinants of bank performance and financial resilience stem from two broad sources: micro bank-specific factors and macro factors. In this development we will be interested for the macro factors which include (*GDP*) growth and inflation rate (*INF*). Previous studies have reported a positive association between inflation and bank profitability. High inflation rates are generally associated with high loan interest rates. However, if inflation are not anticipated and banks are sluggish in adjusting their interest rates then there is a possibility that bank costs may increase faster than bank revenues and hence adversely affect bank profitability. The GDP per capital growth is expected to have a positive impact on bank's performance according to the well documented literature on the association between economic growth and financial sector performance. Ben Naceur.S and Goaid.M (2008). As the macroeconomic factors can affect the performance of the banks, they can affect the level of non-interest income. *H4 the macro factors exert an effect on the NII.*

3. Modeling the determinants of the NII

In this development we present the data and the methodology, the model specification and the results and interpretation.

3.1 Data, methodology and model specification

To empirically analyse the determinants of the NII, we use a data relating to 10 Tunisian banks observed during the period 1998-2009. For these 10 banks we dispose for the countable and financial data. They are collected form the reports of the Tunisian central banks or of the Tunisian professional association of the banks and financial establishments. For the macroeconomic variables they are drawn from the national institute of statistics (INS). The econometric method used is the panel data.

The non-interest income is a function of many variables which can affect it level. From those factors we can note: technological factor, banking strategy variable and macro economic variable. The equation of the model of the determinant of the NII can be written as following:

$$NII = f \{ \text{Technology, banking characteristics, banking strategy and Macro factors} \}$$

$$NII = \beta_0 + \beta_1 GAB_{i,t} + \beta_2 CARD_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 EQUITY_{i,t} + \beta_5 STRAT_{i,t} + \beta_6 NIM_{i,t} + \beta_7 DEPOSIT_{i,t} + \beta_8 CREDQ_{i,t} + \beta_9 EFFEC_{i,t} + \beta_{10} HHI + \beta_{11} GDP + \beta_{12} INF + \varepsilon_{i,t}$$

Where;

(*NII*) the ratio of non-interest income, measured by noninterest income divided by the total assets. (*GAB*) the number of the GAB/DAB per capita. (*CARD*) the number of credit card per capita. (*SIZE*), the bank size measured by the natural logarithm of total assets. (*EQUITY*) value of equity measured by the total equity to the total assets. (*STRAT*) the banking strategy measured by total credits to total assets. (*NIM*) net interest margin measured by the differential of interest divided by the total assets. (*DEPOSIT*) total deposits to total assets. (*CREDQ*) credit quality (credit risk) measured by the total credit to the total assets. (*EFFEC*) the banking efficiency measured by the total interest received by the total versed interest. (*HHI*), measured by the Herfindahl-Hirschman Index. (*DEREG*), dummy variable to measure the banking deregulation. It takes 1 in the period of deregulation, 0 otherwise. (*GDP*) measured by the growth of real GDP per capita. (*INF*) the inflation rate.

3.2 Results and interpretation

In the following development, we will discuss the results of regression of the determinants of the non-interest income.

Table 3: Random effects regression of the determinants of NII

Random-effects GLS regression		Number of obs = 120		
R-sq: within = 0.2491		Wald chi2(12) = 46.17		
between = 0.5414		Prob > chi2 = 0.0000		
overall = 0.3014				
nii	Coef.	Std. Err.	z	P> z
size	.0054659	.0026489	2.06	0.039**
equity	-.0327362	.0253844	-1.29	0.197
strat	.008254	.0044447	1.86	0.063*
nim	-.3725853	.0107907	-3.45	0.001***
credq	.0221968	.0073254	3.03	0.002***
deposit	.0774106	.0608994	1.27	0.204
effec	.0410315	.0308362	1.33	0.183
hhi	-.071574	.0243518	-2.94	0.003***
gab	.1638908	.0530391	3.09	0.002***
card	.1550211	.0570049	2.72	0.007***
inf	-.1758621	.0831965	-2.11	0.035**
gdp	.0303428	.0569247	0.53	0.594
_cons	.1013369	.0369104	2.75	0.006***
sigma_u		0		
sigma_e		.00492973		
rho 0 (fraction of variance due to u i)				

We show that the result of the Hausman test is not significant and the R-sq *between* at the level of 24.91% is superior to the R-sq *within* 54.14%. So the specification is the Random effect. For more detail on the descriptive statistic and the correlation matrix, see appendix 4 table 1 and table 2.

For the variables which exert a negative and significant effect on the NII we can note the net interest margin (NIM), the level of concentration (HHI) and the inflation rate (INF). For the variables which are correlated significantly and positively with the dependent variable we note the size of the banks (SIZE), the credit quality (CREDC) the banking strategy (STRAT), the number of GAB and the number of credit CARD. The other variables referring to the equity, the credit quality, the efficiency and the growth of GDP have no significant effect.

The variable *SIZE* has a positive and significant effect on the non-interest income with a level of 5% and with a weak coefficient of 0,72%. More than a bank is of big size, more than the number of the services offered towards its customers increase. Among these services, there are of them those which bring back commission to the bank and there are other electronics services which require additional expenses for their realization. Once the commissions and the expenses relating to the electronic operations others than the traditional activities of the bank are increased the non-interest income can be raised. With this finding the hypothesis *H2 the size of the bank can affect the level of the non-interest income* is accepted.

There is a positive and significant relation between the banking strategy (*STRAT*) and the level of the non-interest income. The banking strategy measured by total credits to total assets, so an orientation and an interest granted to other new activities other than those traditional and relating to the distribution of the credit, can bring back other return different from those coming from the interest received. On the contrary, a less of interest granted to the new operations and new the means of payment to the profit of a strategy based towards the concentration of the distribution of credit lead to an increase in NIM and a reduction in NII. However, the bank can undergo the credit risk and consequently its NIM is seen decreasing for this reason the banks must be more interested to the concept of NII. For the Tunisian case, there is a positive relation between *STRAT* and NII, so we can conclude that the Tunisian banks are interested by the new activities and the new means of payment based on the information technology and communication and which reported profit other

than coming from the traditional activities. This result leads to accept the hypothesis *H3* *the banking strategy can affects the non-interest income.*

The net interest margin (*NIM*), is negatively and significantly correlated with the non-interest income. We can say that there is an opposite function between those two variables. Once the level of the net interest margin increases it results a reduction on the non interest income. A banks with a higher net interest margin compared to the NII indicates that there is an orientation for the development of the traditional activities more than the new activities based on the informational technology and witch generates more fees and commissions.

The credit quality (*CREDQ*) exerts a positive and significative effect on the non-interest income. This relation is seen very logical for the (*NIM*) owing to the fact that more the credit risk is well managed and very weak more than the net interest margin increases. Within the framework of the (NII), this relation can be explained as follows. If the debtor is more risky, the future possibility of the transaction and services with the banks is reduced. Consequently, the fees and commissions charged on this debtor or customer are decreased witch affects negatively the non-interest income.

The level of the non-interest income is negatively and significantly correlated with the level of concentration of the Tunisian banks. A more concentrated banking system presents a weak competition characterized by the absence of the incentive to more innovation and modernization of the banking system. This did not means that the Tunisian banking system has not knew an effort of modernization but it requires a more development of the process of innovation and more diffusion of the adoption of the IT.

For the variables representing the advance in information technology (*GAB* and *CARD*), they exert a positive and significative effect on the dependent variable (NII). This finding can be interpreted as follows. More the number of credit cards and the banking automatic teller machine increase, more than the banks charge fees and commissions. Consequently, the level of the interest income increases. With this result, we can accept the hypothesis *H1* *the advance in information and communication technology exert an effect on the level of the non-interest income*

The results show that there is no significant effect of the variables: equity, deposit, efficiency and growth domestic product on the level of non-interest income for the Tunisian banks. For the macro factor, we find that only the inflation rate (*INF*) exerts a negative and significant effect on the level of non-interest income. The coefficient of inflation rate is significantly negative with the non-interest income. These results suggest that a higher inflation environment and limit the non-interest income expansion of commercial banks. So, we reject the hypothesis *H4 the macro factors exert an effect on the NII* since the effect of GDP is positive and not significant.

3. Conclusion

The recent banking literature attributes record bank profitability in recent years to the significant growth of non-interest income. This non-interest income constitutes the revenue that banks earn from areas outside their lending operations. An increase of the NII leads to improve the banking profitability and to reduce the risk of the lending operation by more diversification of banking activity.

The growth and the diffusion of the non-interest income is explained in the literature by the advance in technology and the deregulation which are associated with the birth of the new activities based on the use of electronic means of payment. Thus, the non-interest income include deposit and transaction fees, annual fees, monthly account service charges; inactivity fees, check and deposit slip fees.

In this paper, we tried to analyze the determinants of the non-interest income in the Tunisian context. For this reason, we used a data relating to 10 Tunisian banks observed during the period 1998-2009 and the panel data method.

Our findings indicate that only the advance in technology, the banking characteristics and the banking strategy can be considered as determinants factors of the non-interest income. However, we can not consider that all of the macro factors affect the level of the NII since the effect of the GDP is not significant.

A question can be posed and can be considered like a further research: the orientation towards the new activities in order to increase the non-interest income can incite the banks to adopt a behavior of risk taking?

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Appendix N°1: Values of NII per bank in MDT

YEARS	1	2	3	UIB	BH
1998	64216	71558	60645	29280	28920
1999	44030	42956	42131	28426	16612
2000	47500	67471	56070	32259	18950
2001	53678	62089	62401	38831	30135
2002	55367	69086	69772	35890	31562
2003	55518	63938	68026	29743	29991
2004	56493	69215	82296	36319	34005
2005	63051	64458	86083	34023	42589
2006	82156	69322	141597	36956	52598
2007	91463	71352	150270	35558	64559
2008	102881	74243	171563	40663	62748
2009	101460	84527	183479	40861	65113
YEARS	ATTIJARI	BT	UBCI	ATB	AB
1998	27754	23762	30371	17527	32292
1999	17210	18412	17484	17646	25243
2000	20231	20626	19537	18363	27517
2001	20875	18903	19376	22423	30978
2002	23176	24399	19175	24386	33451
2003	23235	26342	21564	37469	35726
2004	27852	27955	24503	43483	37104
2005	38204	33198	27900	56206	41714
2006	43242	43641	37403	68732	45216
2007	58055	40671	43479	77486	50852
2008	68763	42079	41039	85670	63128
2009	84715	48315	41957	95645	73222

Source: *Tunisian professional association of the banks and the financial establishments*



The difference of the colors red and blue indicates the difference of the NII values from the period of departure (1998 color blue) towards the end of the period of our study (2009 red color). We notice an increase of the NII for all of Tunisian banks.



Appendix N°2: Evolution of the number of GAB, TPE and credit card

ANNEES	GAB	TPE	Credit Card
1998	206	2158	185000
1999	296	2714	295000
2000	350	3027	341000
2001	392	3509	508000
2002	476	4842	666000
2003	560	4321	791641
2004	615	5535	951798
2005	729	6577	960348
2006	829	7391	1087015
2007	1071	8506	1259533
2008	1246	9583	1870125
2009	1409	10450	2082905

Appendix N°3

Table 1: Presentation of banks

Abbreviation	Full Name	Social Capital (DT)
AB	Amen Bank	85.000.000
ABC	Arab Banking Corporation (Branch onshore)	40.000.000
ATB	Arab Tunisian Bank	80.000.000
ATTIJARI	Attijari Bank	150.000.000
BIAT	Internationale Arabe Tunisian Bank	170.000.000
BFPME	Banks of Financing of Small and medium-sized firms	50.000.000
BFT	Franco-Tunisian Bank	5.000.000
BH	Banque de l'Habitat	90.000.000
BNA	Nationale Agricole Bank	100.000.000
BT	Tunisian Bank	75.000.000
BTE	Tunisian Emirates Bank	90.000.000
BTK	Tuniso-kuweitienne Bank	100.000.000
BTL	Tuniso Lybienne Bank	70.000.000
BTS	Tunisian Bank of Solidarity	40.000.000
Citibank	CitiBank (branche onshore)	25.000.000
STB	Tunisian company Bank	124.300.000
STUSID	Bank Société Tuniso Séoudienne d'Investissement et de	100.000.000
TQB	Tunisian developpement Qatari Bank	30.000.000
UBCI	Union Banks of trade and industry	50.000.000
UIB	International Union of Banks	106.000.000

Source: Tunisian Central Bank and the Tunisian association of banks and financial establishments

Table 2: Classification of the Tunisian banks by their total of assessment and the GNP in thousands of dinars (2009)

RANG	BANKS	TOTAL OF ASSESSMENT	GNP
1	STB	3 670 928	142507
2	BNA	3 503 083	137220
3	BIAT	3 220 923	165891
4	BH	2 905 423	113288
5	AMEN BANK	1 880 160	76833
6	ATTIJARI BANK	1 692 268	63546
7	ATB	1 686 155	64559
8	UIB	1 450 316	60402
9	TUNISIAN BANK	1 415 736	86042
10	UBCI	1 067 747	57307

Appendix 4:

Table 1: descriptive statistics of the three regressions

Variable	Obs	Mean	Std. Dev.	Min	Max
nii	120	.0211382	.0058061	.0128129	.043066
size	120	14.57534	.5212384	13.62969	15.74801
fp	120	.0917461	.0274043	-.0109848	.1871569
strat	120	.7133845	.1647161	.0302931	1.845829
nim	120	.0272321	.0089555	.0044348	.0585486
dep	120	.435136	.1121987	.2693281	1.346369
credq	120	-.0116103	.0116993	-.0997496	0
effec	120	.0009735	.0206367	-.1030483	.1175545
hhi	120	.0150496	.0116134	.0021065	.0434322
gab	120	.0000678	.0000349	.0000221	.000135
card	120	.0904013	.0542387	.0198215	.1995196
inf	120	.0324167	.0083762	.021	.05
gdp	120	.034191	.0169095	.0165835	.063

Table 2: Correlation matrix

	nii	size	equity	strat	nim	dep	credq	effec	hhi	gab	card	inf	gdp
nii	1.0000												
size	0.1594	1.0000											
equity	-0.0273	-0.3127	1.0000										
strat	0.0287	0.0687	0.3060	1.0000									
nim	-0.0624	-0.4558	0.0796	0.2529	1.0000								
dep	0.2758	-0.1479	0.2335	0.5992	0.3838	1.0000							
credq	0.0084	0.0695	0.3470	-0.1905	-0.0943	-0.3432	1.0000						
effec	0.0805	0.0856	0.3614	-0.0708	-0.1006	-0.1763	0.0333	1.0000					
hhi	-0.1442	0.3787	-0.3154	-0.1628	-0.2638	-0.0942	0.0745	0.0641	1.0000				
gab	0.1611	0.1963	-0.0077	0.2987	-0.2565	0.2089	-0.0470	0.0233	-0.0775	1.0000			
card	0.1291	0.0975	-0.0032	0.2975	-0.2581	0.1977	0.0018	0.0444	-0.0699	0.1832	1.0000		
inf	-0.0343	0.3013	-0.1197	0.0224	-0.2971	-0.0283	-0.0117	0.0326	-0.0459	0.3912	0.2169	1.0000	
gdp	0.1961	0.0292	-0.0148	0.2268	-0.1016	0.2931	-0.0700	-0.0458	-0.0835	0.2107	0.4027	0.3958	1.0000