International Journal of Scientific Research and Management (IJSRM)
||Volume||09||Issue||12||Pages||EM-2021-2785-2796||2021||
Website: www.ijsrm.in ISSN (e): 2321-3418
DOI: 10.18535/ijsrm/v9i12.em8

Non-interest income and bank profitability:Evidence from Tunisian banks

Ines Ghazouani, Nadia Basty

University of Tunis, ISG, GEF2A-Lab, Tunis
41 Av. de la Liberte, Cité Bouchoucha, Le Bardo, 2000 Tunis, Tunisia
University of Tunis, ISG, GEF2A-Lab, Tunis
41 Av. de la Liberte, Cité Bouchoucha, Le Bardo, 2000 Tunis, Tunisia

Abstract
This study investigates the impact of banks' diversified income structure on profitability among Tunisian banks during 2010-2018. We examine banks' profitability using accounting and market measures as relevant indicators. We focus on each category of non-interest income separately rather than on non-interest income as an overall measure to provide a clearer analysis helping bank managers assess relevant strategies, and show that income structure diversification enhances banks' profitability, albeit with their mixed effects. The empirical analysis of panel data indicates that Tunisian bank's market-to-book value is very sensitive to all types of non-interest income. Banking activity diversification improves stock market profitability particularly in large banks and a safe macroeconomic environment. However, only fees and commissions in comes increase Tunisian banks' assets profitability. Positive fees and commissions incomes' effect is more pronounced for large banks and in a deflationary environment. We conclude by recommending to Tunisian banks, the diversification of their activities and the search for non-interest income while trying to control the costs of adopting these innovations, to take the necessary precautions, and to develop their personal skills.

Keywords: Income structure, banks market value, bank performance, Tunisian banks.

1. Introduction

Banking systems are increasingly facing challenges from different fronts such as new market players, new technologies, and new central bank regulations. These challenges result in competition and innovation in the banking system. In this context, the decision to follow an appropriate strategy is important for bank managers. As a response to these challenges and new requirements, banks have followed a diversification strategy to undertake various non-traditional activities that can compensate for the decline in revenues caused by increased competition in core activities. As a result, the banks' income structure has become more complex, incorporating revenues from non-traditional activities such as securitization, investment, brokerage, derivatives, financial services, etc. Banks' survival and success have become increasingly dependent on non-interest income (Bian et al. 2015).

In the context of this new banking sector configuration and the expansion of services increasingly permeated by competition, the Tunisian banking system has undergone considerable evolution. It has gone from a protected and closed system to an open system, developed and a dynamic component of the Tunisian economy. According to the Governor of the Central Bank of Tunisia, "…This liberalization has called on Tunisian banks to define their scope of activity and reconsider their size to comply with the requirements of economic efficiency of the bank. " BCT Annual Report 2019. Tunisian banks are trying to develop their income structure to meet global challenges and offset losses related to increased competition in core businesses. Thus, we have witnessed in recent years a revolution in banking activities and an opening on the financial market. This evolution has resulted in a shift from traditional intermediation activities, generating simple interest income, to a wide and diversified range of activities such as financial intermediation, investment banking, brokerage, securities underwriting, financial derivatives, financial services, etc.

The impact of this new income structure on the profitability of banks has attracted the interest of several researchers. The answer to this question is of great value to regulators, supervisors, and shareholders, and managers in that it allows them to properly define their strategies. However, previous studies have failed to converge. The first wave of literature deals with the effect of income diversification on the banks' profitability measured from the financial statements, while a second one focuses on its impact on the market value of banks, i.e., the stock market profitability.

Our survey complements and improves upon previous studies on the relationship between income diversification and bank profitability by focusing on each category of non-interest income separately rather than on non-interest income as an overall measure. we consider the three main categories of non-interest income recognized by the Tunisian banking sector; investment securities income, trading and financial transaction income, and fee and commission income, in order to provide a clearer analysis to help bank managers assess relevant strategies. Second, while most previous literature has focused on accounting data only and ignored stock market data, we combine accounting and market data. Moreover, Tunisia is an interesting case study as it underwent several important financial reforms in the early 1990s such as the implementation of structural adjustment programs and trade liberalization (Hamdi, 2013). All these reforms resulted in improved financial products and services. To do so, we use a sample of eleven Tunisian listed banks representing more than 80% of Tunisian banking assets, from 2010 to 2018.

The rest of the paper proceeds as follows. Section 2 provides a review of the prior literature on the transition to non-traditional banking activities and discusses the impact of diversifying the income structure on banks' profitability. Section 3 describes the data, selected variables, econometric approaches, and main empirical results. Section 4 concludes.

2. Background and related literature

Corporate finance theory suggests that firms should concentrate on their traditional activities to reduce potential agency problems and focus on their management expertise (Jensen, (1986); Berger and Ofek (1995)). For banks, revenue concentration can lead to better screening and monitoring practices for credit extended, enable detection of borrowers' financial problems, and undertake rapid responses to mitigate potential conflicts of interest and moral hazard problems (Barth et al. (2004), Beck and De Jonghe (2013)). According to Jensen and Meckling (1976), managers may expand the range of activities in which a bank engages to extract personal benefits. These agency costs weaken the profitability of diversified banks or financial conglomerates. This has been asserted by Rajan et al. (2000), Laeven (2005), Laeven and Levine (2007), and De Jonghe, Vennet (2008), and Olarewaju et al. (2017), who showed that agency problems caused using nontraditional activities can lead to exorbitant agency costs that hinder bank performance if left unchecked. Again, Deng et al (2007) found for bank holding companies (BHCs) that the complexity of the revenue structure only intensifies agency problems, which negatively affects bank profitability. In addition, as the bank expands its operations, its organizational structure becomes more complex, which promotes information asymmetry between management and shareholders. This problem will generate costs borne by the bank, which decreases its profitability (Harris et al. (1992), Lin et al. (2007) and Elyasiani and Wang (2012)). Expansion of activities, generating non-interest income can lead to an increase in fixed costs. According to DeYoung and Roland (2001), Lepetit et al. (2008) non-interest income could lead to higher fixed costs due to new cost inputs in technology and human resources.

However, according to the classical financial theory presented by Markowitz (1952), if revenues are derived from various financial activities, and if these are far from perfectly correlated, this should increase the bank's profitability. Similarly, banking theory asserts a positive relationship between revenue diversification and suggests that non-interest income is considered uncorrelated or imperfectly correlated with net interest income, which should lead to more stable operating income and superior risk-adjusted financial performance (Sawada (2013)). Klein and Saidenberg (1998) suggest that banks can increase efficiency and improve profitability when they have multiple sources of income because activity' diversification allows them to avoid redundant operations and to take advantage of the information obtained for their core business. Saunders and Walter (1994), indicate that information and data on customers of banks or similar products will be shared with subsidiaries at no additional cost. Thus, saving information costs is a benefit that banks can derive from engaging in activities other than their intermediation function. Also, Kanatas and Qi (2003) tried to examine the implications of integrating non-traditional activities and were able to show that

universal banks can save some costs (information search costs, etc.) by engaging in new non-traditional activities. Following the same line of thinking, Elsas et al. (2010) found that through their long-term relationships with customers, banks can obtain more information about customers, which allows them to achieve economies of scope. In addition, Elyasiani and Wang (2012) confirmed that a more complex revenue structure is likely to improve banks' profitability through economies of scale obtained through activities such as shared supervision, factor reuse, advertising between banks' products and financial institutions.

Liang et al (2016) highlighted the positive impact of revenue diversification through improved governance. Indeed, banks will be forced to improve the quality of their governance to cope with the demands of non-traditional activities. As banks expand their activities and become more open to the financial market, they will be more controlled by the agents. Thus, their managers will be obliged to behave transparently and to communicate the consequences of their decisions on an ongoing basis, which reduces the possibility of opportunistic behavior and lowers the cost of governance (Saunders (1994)).

Most of the empirical studies dealing with this topic have been conducted in a developed financial market context, where the banking sector is at an advanced stage of development. The banking system in emerging markets is currently at an earlier stage of development, and banks are facing many problematic issues, trying to define a clear strategy. Nevertheless, the results remain mixed. Sanya and Wolfe (2011) were among the first to examine the impact of income diversification of 226 listed banks across 11 emerging economies for the period 2000 to 2007. They showed that the more complex a bank's revenue structure, the more profitable it is. Meslier et al (2014) confirmed the positive impact of non-traditional bank revenues on the profitability of banks in developing countries, in contrast to banks in developed ones. Indeed, income generated by equity, private and public securities, derivatives, commercial paper, foreign exchange, etc., accounts for about half of the non-interest banks' income in emerging countries. While in the US, income from securities trading accounts for less than 10% of banks' non-interest income. Consistent with the standard portfolio theory argument that trading activities are less correlated with standard intermediation activities, Meslier et al. (2014) found that non-traditional income sources improved the banks' profitability in the Philippines during 1999-2005. Alhassan (2015) shows that for the Ghanaian banking sector, non-interest-generating activities do not enhance efficiency and that efficiency benefits are achieved only at higher levels of diversification. Moreover, the benefits of diversification are more pronounced in large banks than in small ones. Thus, large banks can use diversification strategies that ensure the efficient use of resources to maximize their potential revenue. Furthermore, Edirisuriya et al. (2015a) found that diversification of Australian banks' activities supported their profitability. They postulate that at higher levels of diversification, Australian banks can overcome the costs associated with a complex income structure and improve their profits by a statistically significant margin. In addition, incomes generated from securities trading and other sources (e.g., insurance) contribute positively and significantly to bank profitability, so incomes generated from commissions and fees exert a significant positive influence. In addition, Sa and Mai (2016) employed a dataset of 37 Vietnamese commercial banks from 2006 to 2013, they found that increased income diversification results in higher bank' return rates. Yet in the same context, Hang et al. (2017) found that income diversification is not beneficial for commercial banks in Vietnam. More recently, Nguyen (2018) analyzed the impact of non-interest income on the operational efficiency of 34 Vietnamese commercial banks over the period 2007-2015. The results of their research indicate that income diversification has positive effects on the operational efficiency of Vietnamese commercial banks over the research period.

Selecting a sample of 25 banks in Tanzania, Ramadhani (2015) found that increasing the share of non-interest income hurts bank performance across all bank types. Sun et al (2017) unveiled a non-linear relationship between non-interest income and profitability of 16 Chinese commercial banks. Moreover, they suggest that there is a negative association between the non-interest income rate and the profitability of commercial banks.

In the Tunisian context, there are very few works that have analyzed the impact of non-interest income on the profitability of banks. We find Mnasri and Abaoub (2010) who studied the effect of non-interest income on the performance and total risk of Tunisian banks during the 1997-2006 period. They found that a higher share of non-interest income allows decreasing the performance using the interest margin as a measure of

performance. More recently, Belghuith and Bellouma (2017) documented the effect of revenue diversification on the performance and stability of Tunisian banks for the 2001-2014 period. The results of their study show that a compound income structure increases performance. However, they looked at non-interest income as an aggregate component. Thus, for an accurate and relevant answer to the question: "how non-interest income affect banking profitability? "In the Tunisian context, we consider the impacts of the different components of non-interest income.

3. Empirical analysis

The purpose of this section is to define the data used in this research, describe the empirical model as well as different variables of bank diversification, profitability measures, and control variables included in the estimations.

3.1 Sample and database

To test the impact of diversification of bank revenues on their profitability in the Tunisian context, we collected data from the eleven largest banks operating in Tunisia and listed on the stock market (namely: Amen Bank, ATB, AttijariBank, BH, BIAT, BNA, BT, BTE, STB, UBCI, UIB) over the period 2010 to 2018, totaling 99 observations. these present more than 80% of Tunisian banking assets. Our data sources are mainly the annual reports of banks published on the website of the stock exchange. The quotation data are obtained from the daily historical quotation and prices after having made the necessary calculations. Finally, from the World Bank reports we have extracted the macroeconomic data.

3.2 Empirical model and measurement variables

We proceed through panel data techniques as they address both heterogeneities over time and across individual problems following Edirisuriya et al. (2015a) and Vo (2017). In the panel regression model, the dependent variable is bank profitability measure and the main explanatory variables are components of non-interest income.

$$Yi,t = \alpha + \sum_{i=0}^{n} \beta_{j} Xi,j,t + \sum_{i=0}^{n} \delta_{k} Zi,k,t + \sum_{i=1}^{n} \theta_{h} wi,h,t + \omega\ dummyi,t + i,t$$

With:

α: constant; $\varepsilon_{i,t}$: error term of the bank I on the period t

i = 1 ... 11 presents our sample which is composed by 11 Tunisian listed banks

- $Y_{i,t}$ is the profitability variable for each bank i over the year t
- $X_{i,j,t}$ presents the matrix of income structure variables for each bank i in each year t, according to j = 1 ... 3:
  - j = 1: Investment income (INVINC).
  - j = 2: Commercial securities and Financial Transactions income (COMINC).
  - j = 3: Fees and commissions (FCINC).
- $Z_{i,k,t}$ is the matrix of the control variables for each bank i over year t, according to k=1…6:
  - k = 1: capital adequacy ratio (CAPAD).
  - k = 2: deposit ratio (DEP).
  - k = 3: loan ratio (Loan).
  - k = 4: loan loss provisions ratio (LLP).
  - k = 5: bank's size (Size).
  - k = 6: overhead ratio (OVER).
- $W_{i,h,t}$ macroeconomic variables according to h = 1, 2:
  - h = 1: the GDP growth rate (GDP).
  - h = 2: the inflation rate (INF).
  - Dummy = 1 if t = 2011
    0 if not

To control for Tunisian stock market chock (suspension of quotations and disruptions), caused by the 2011 revolution, we introduce a dummy variable that takes the value of 1 in 2011 and 0 elsewhere.

3.2.1 Profitability measures

To determine the impact of income structure on banks' performance, we use both accounting-based and market-based measures.

- ROA: bank's overall profitability, measured by the ratio of net income to total assets. This measure has two components, effectiveness (profit margin) and efficiency (total assets). It shows the profit earned per dollar of assets and reflects the ability of the bank's management to generate profits using the bank's available financial and real assets (Edirisuriya et al. (2015a) and Rahman et al. (2015)).

- MTB: We opted for the Market to Book ratio (MTB) as an indicator of the bank's market value (Laeven and Levine(2007), Sawada(2013), Edirisuriya et al. (2015b), Vo (2017)). The literature has shown that MTB is a more appropriate indicator than Tobin's Q in terms of market valuation. indeed, Tobin's Q is expected to have a very small variance due to the nature of banks that are highly leveraged. Moreover, the measure of Tobin's Q is difficult to apply in the Tunisian context because of the lack of data.

3.2.2 Non-interest income measures

Following Sawada (2013) and Edirisuriya et al. (2015a) we decompose the whole non-interest income in three components, with respect of Tunisian statement non-interest income classification, to capture bank income structure:

- Investment income:

$$INVINC = Investment\ income / Total\ income$$

- Commercial securities and financial transaction income:

$$COMINC = Commercial\ Securities\ and\ Financial\ Transactions\ income / Total\ income$$

- Fees and commissions income:

$$Fees\ and\ commissions\ income / Total\ income$$

3.2.3 Control variables

To control for the other determinants of bank risk-taking, we introduce bank-specific and macroeconomic environment indicators.

- Capital Adequacy (CAPAD): The ratio of equity to total assets. (Nguyen et al., 2015)

$$CAPAD = Equity / Total\ assets$$

- Deposits (DEP): The ratio of total deposits to total assets. (Betz et al., 2014)

$$DEP = Deposits / Total\ assets$$

- Loans (Loans): The ratio of total loans to total assets. (Nguyen et al., 2015)

$$Loans = Total\ loans / Total\ assets$$

- Loan loss provisions (LLP): The ratio of loan loss provisions to total assets reflects loans' quality (Berger et al., 2010)

$$LLP = Loan\ loss\ provision / Total\ assets$$

- Size (Size): Logarithm of total assets is a bank size proxy (Baele et al., 2007, Sanya and Wolfe,2011)

$$Size = \ln(total\ assets)$$

- Overhead: The ratio of overhead to total assets (Nguyen et al., 2015)

$$OVER = Total\ overhead / Total\ assets$$

The economic and environmental conditions in which banks operate have a significant impact on bank stability. Thus, given the specificity of the Tunisian macroeconomic environment, we can expect a specific impact of income structure diversification on bank risk-taking.

- Gross domestic product growth (GDP): Kohler (2014) and Doumpos et al. (2016)

- Inflation (INF): Köhler (2014) and Doumpos et al. (2016)

3.3Preliminary analysis

Table 1 presents the descriptive statistics of all data used in this study. According to the accounting measure, the level of Tunisian banks profitability is about 0.92% on average while according to a market measure, it is about 4.39 on average, with a strong disparity from one bank to another between 2010 and 2018.

Tunisian banks' non-interest income seems to be dominated by fees and commissions. Indeed, fees and commissions represent 14.9% of total income on average. While commercial revenues represent 9.05% of total income on average. Investment income represents only 3.49% of total income during the study period. This shows that the non-interest income of Tunisian banks is more dependent on income from commercial securities and financial transactions than on investment securities.

Turning to control variables, we find that Tunisian banks are characterized by a relatively low capital adequacy ratio (9.54% on average), marked by a wide dispersion of the level of capital among Tunisian banks. Deposits represent a large share of the assets of Tunisian banks, 71% on average, while loans are around 81% of total assets on average. We conclude that 10% of the short-term assets of banks come from other liabilities. In addition, Tunisian banks seem to be operationally efficient since overheads represent only 2% of total assets on average with a relatively low standard deviation of about 0.007. The Tunisian macroeconomic context is marked by low economic growth and high inflation, with a high dispersion of GDP during our study period.

Table 1: Descriptive statistics

	Obs	mean	STD	min	max
ROA	99	0.00926	0.00756	-0.0295	0.0262
MTB	98	4.3976	2.800	0.775	12
Investment Income (INVINC)	99	0.0349	0.0221	0.00253	0.102
Commercial Income (COMINC)	99	0.0905	0.0609	0.0190	0.300
Fees and commissions Income (FCINC)	99	0.149	0.0363	0.0517	0.226
Capital Adequacy Ratio (CAPAD)	99	0.0954	0.0491	0.0126	0.313
Deposit to Total Assets ratio (DEP)	99	0.710	0.133	0.0516	0.971
Loans to Total Assets Ratio (Loans)	99	0.814	0.101	0.614	1.561
Loan Loss Provision to Total Assets Ratio (LLP)	98	0.0612	0.0338	0.0263	0.182
Bank Size (Size)	99	15.23	0.702	12.97	16.24
Overhead to Total Assets Ratio (OVER)	99	0.0202	0.00733	0.00842	0.0640
Growth Domestic Product (GDP)	99	0.0206	0.0175	-0.0192	0.0420
Inflation (INF)	99	0.0472	0.00878	0.0350	0.0610

Note: Obs, S.D, Min, and Max denote the number of observations, the standard deviation, the minimum, and the maximum values, respectively.

Table 2. Econometric tests

	Statistic of the test	*P-value*	*Conclusion*
Hausman test for model specification			
ROA	114,56	0.000	FE model is appropriate
MTB	49.52	0.000	FE model is appropriate
Hausman test for endogeneity			
ROA	132.51	0.000	Absence of endogeneity problem
MTB	223.21	0.000	Absence of endogeneity problem
Breusch-Pagan test for heteroscedasticity			
ROA	46.48	0.000	GLS technique is appropriate
MTB	1.43	0.000	GLS technique is appropriate

With reference to Hausman tests, we selected a fixed-effects model to estimate the impact of non-interest income on the ROA and MTB. We found no endogeneity of the explanatory variables. However, based on the Breusch-Pagan heteroskedasticity test, the impact on bank profitability can be captured by the residuals of the model rather than by the non-interest income indicators. We, therefore, use the generalized least squares (GLS) estimation technique which resolves the biases and inconsistencies in our estimates.

3.4 Results and discussions

Table 3 presents the results of the main estimates. Our models are globally significant. The regression R^2 indicates that the independent variables used explain 71.46% and 70.84%of the dependent variable ROA and MTB respectively. Thus, our results provide an effective interpretation of the effect of all variables on the Tunisian banks' profitability.

3.4.1 Income structure and profitability

Table 3 presents the results for the impact of non-interest income variables on profitability for the entire sample. Outcomes indicate that Tunisian banks' investment activities (invinc) and operations on commercial securities portfolio and other financial operations (cominc) don't affect the accounting profitability. This is consistent with Meslier et al. (2014) and Chunhachinda (2014) findings, who showed that exposure to trading activities and derivatives, and other securities would not affect the return on assets of a bank. However, our results confirm those of Brighi and Venturelli (2016), Saunders et al. (2016), and Edirisuriya et al. (2015a), conducted in an emerging country. However, the third category of non-interest income (fees and commissions) shows a positive and significant impact at the 5% threshold on ROA. An increase in the proportion of fees and commissions to total revenue (fcinc) by one unit (1%) is associated with an increase in ROA by 0.0622%. This means that Tunisian banks have an interest in increasing the use of activities generating fees and commissions. Our findings are consistent with those of Meslier et al. (2014), Chunhachinda (2014), Casalin and Dia (2010), and Edirisuriya et al. (2015a) conducted in an emerging market context.

Table 3: Non-interest income and profitability

	GLS FE	**GLS FE**
	ROA	**MTB**
invinc	0.0234	24.311**
	(0.0307)	(11.13)
cominc	0.0184	16.235***
	(0.0127)	(4.591)
fcinc	0.0622**	30.261***
	(0.0267)	(9.710)
capad	0.1075***	34.7512***
	(0.0258)	(9.337)
dep	0.0023	0.0824**
	(0.00606)	(2.194)
loans	0.0167**	7.3781***
	(0.00714)	(02.584)
llp	-0.6053**	-17.1001*
	(0.0249)	(9.005)
size	0.0072***	3.0182***
	(0.00161)	(0.591)
over	-0.0546	23.96
	(0.0982)	(35.89)
gdp	0.0491	54.06**
	(0.0746)	(27.14)
inf	-0.174**	-18.37
	(0.0802)	(29.72)

dummy	-0.00306	1.456
	(0.00377)	(1.366)
Constant	-0.123***	-57.60***
	(0.0296)	(10.77)
R^2	0,7146	0,7084

Note: Standard errors in parentheses; ***, **, * respectively indicate statistical significance at the 1%, 5%, and 10% level.
*** p<0.01, ** p<0.05, * p<0.1.

Using the market value, we find that all non-interest income categories have a positive and significant impact on the profitability of Tunisian banks. There is a positive and statistically significant relationship at the 5% between the proportion of income from investment securities and market profitability (MTB). This means that the Tunisian stock market gives higher values to banks that trade more investment securities. These results are consistent with Filson and Olfati (2014), Kurniawan and Firsty (2016), Cosma et al. (2017). Commercial securities and financial transactions portfolio earnings to total revenue (cominc) have a positive and significant relationship with MTB ratio. This shows that investors in the Tunisian market place a higher value on banks that use the most activities other than their intermediation function. This is explained by the fact that the financial market expects that the multiplicity of sources of income within banks can improve their profits and they will subsequently assign higher values. These findings confirm those of Baele et al (2007), Lelyveled and Knot (2009), Edirisuriya et al (2015b), Albert (2016) and Vo (2017); the proportion of non-interest income enhances the Tunisian banks' stock market profitability. Consistent with the results of Sawada (2013), Edirisuriya et al. (2015a), Kurniawan and Firsty (2016), Cosma et al. (2017), the measure of return from fees and commissions (fcinc) is positively and significantly associated with stock market profitability of Tunisian banks. An increase of 1% of the ratio fcinc generates an increase of 30.261% of the MTB ratio. The stock market value of banks is therefore very sensitive to the proportions of fees and commissions because investors believe that the more a bank generates commissions and fees, the more its customer portfolio is important and the closer it is to its customers, which increases their confidence and raises their expectations. As a result, they will assign a higher value to the bank.

However, we can notice that the profitability of Tunisian banks, measured by both asset returns or market to book, was not affected by the Tunisian revolution of 2011. Indeed, the dummy variable used in our model does not have a statistically significant effect.

3.4.2 Bank specific and macroeconomic environment indicators and bank risk-taking

Regarding the other control variables, the regression results showed a positive and significant relationship between the indicators of capital and the profitability of the bank. This result can be explained by the fact that highly capitalized Tunisian banks are more profitable. Our results confirm those of Damankah et al. (2014), Karakaya & Er (2013), Chiorazzo et al. (2008), Meslier et al. (2014), Guerry and Wallmeier (2017), and Nguyen (2018). The strong sensitivity of the MTB ratio to the equity held by banks is explained by the fact that the MTB ratio is obtained by relating the book value to the stock market value of the share, yet the book value is obtained from the equity. Thus, the Tunisian stock market grants a higher valuation to the most capitalized banks.

Bank deposits seem to have a positive and significant impact only on the profitability of the market. This means that the increase in deposits sends a positive signal to the market as they reflect depositors' confidence in the bank and a good outlook. This perception is reflected in the stock market by high stock values for the concerned bank. Our findings confirm those of Gaganis et al. (2013) Jouida et al. (2016), Gandhi et al. (2017), Nguyen (2018)

According to Table 3, the results agree with Mergaerts and Vennet (2016), Laeven and Majnoni (2005), Nguyen (2018), Borroni and Rossi (2017), Gaganis et al. (2013), Abdul (2015), and Sawada (2013). The proportion of loans in the total assets of banks has a significant impact on Tunisian banks' profitability. This result can be explained by the fact that the higher the proportion of loans in the total assets of banks is allocated to loans, the higher the return that Tunisian banks can obtain. The strong sensitivity of the MTB ratio to the proportion of loans in the bank's total assets can be explained by the fact that when banks extend more loans, they transmit signals of liquidity and good financial health to the market. Therefore, the market

will react by assigning higher values to the prices of these banks.

With respect to loan loss provisions, our results confirm those of Nguyen (2018), Borroni et Rossi (2017), Gaganis et al. (2013) et Abdul (2015), attesting to a negative and significant relationship between the proportion of loan loss provisions in total assets and Tunisian banks' profitability measured by ROA. A higher ratio of loan loss provisions means poor assets quality, which is likely to decrease banks' profitability. This finding is confirmed when we approximate the banks' profitability by the MTB ratio. Subsequently, we admit that when this ratio is high, Tunisian banks will face low profitability. This negative impact is consistent with most theoretical work (Sawada (2013), Kurniawan and Firsty (2016), Edirisuriya et al. (2015)).

The size of Tunisian banks has a positive and significant impact on their profitability. Our finding confirms those of Baele et al. (2007), Sanya and Wolfe (2011), Nepali (2018), Saunders et al. (2016), Rahman et. Al. (2015), and Meng et al. (2018). As bank size increases, they may have better opportunities for revenue diversification, as they can reach new markets. This also shows that the expectations of the Tunisian stock market as to the future evolution of bank prices is more favorable for large banks because they are more powerful, able to overcome shocks and difficulties, and more solid than small banks. Our results confirm our hypothesis and challenge those of Edirisuriya et al. (2015), Kurniawan and Firsty (2016) and Vo (2017).

Overhead costs measure the level of firm expenses such as salaries for employees and marketing costs. An increase in overhead costs does not seem to affect the Tunisian banks' profitability, since the coefficients associated with ROA and MTB are insignificant. These results agree with those of Jouida et al. (2016), Karakaya and Er (2013), Bashir (2003), Sawada (2013), and Edirisuriya et al. (2015)

According to Doumpos et al. (2016), under conditions of high economic growth, banks may have more opportunities to generate profits, and thus, they will have more resources to enter new business areas. However, Table 3, shows that growth in the gross domestic product is significantly associated only with profitability' market measure. This is because when macroeconomic conditions are favorable, the stock market is more active and demand for various financial assets is high. As a result, bank share prices rise.

Regarding the inflation rate, we find a negative and significant effect only on profitability' accountable measure. The inflation rate does not influence banks' stock market profitability. According to the literature, inflation is not fully anticipated by Tunisian banks. Hence, a high inflation rate may cause instabilities, increase bad debts, and consequently reduce banks' profitability. Our results confirm those of Tan and Floros (2012) and Nguyen et al. (2018).

4. Conclusion

In this paper, we examine the impact of non-interest income on the eleven Tunisian listed banks' profitability during the 2010 to 2018 period. To do so, we employ a panel regression model, in which the dependent variable is the bank profitability proxied by both accounting and stock market measures and the main explanatory variables are the components of non-interest income, namely investment income, commercial securities, and financial transaction income, and fees and commissions income. This empirical specification technique allows for both heterogeneity over time and heterogeneity across individuals. We focus on Tunisian banks, as they have undergone a profound development of their income structure and given the competitive environment that has marked the Tunisian banking sector in recent years. However, the role of non-interest income in enhancing Tunisian banks' profitability has not yet been identified.

Our results revealed that investment securities and commercial securities portfolio and financial operations incomes do not affect the Tunisian banks' assets profitability. However, fees and commissions incomes increase their performance. The positive fees and commissions incomes' effect is more pronounced for large banks and in a deflationary environment. The Tunisian bank's stock market value seems to be very sensitive to all types of non-interest income. Banking activity diversification improves stock market profitability; the Tunisian stock market appreciates a complex income structure and places more value on banks that have diversified their income sources. This effect is more pronounced for large banks, those with good capital adequacy, and when operating in a favorable economic environment.

Based on these observations, we can recommend that Tunisian banks develop their income structures by introducing new financial products, but they should try to control the costs of adopting these innovations,

take the necessary safeguards and precautions, and develop their personal skills. Managers also need to be more concerned about these modern business banking practices. However, our survey appears to be incomplete. We do not consider bank governance mechanisms that may affect the bank's profitability. Indeed, given the nature of the banking industry, the implementation of good governance practices is necessary to avoid the negative effect of competition on the level of risk held by Tunisian banks.

References

1. Abdul, L. A. (2015), « Income diversification and bank efficiency in an emerging market », *Managerial Finance*, 41, 1318-1335.
2. Albert, S. (2016), « Banking, Not banking and the Valuation of Banks », *working paper.*
3. Alhassan, A.L. (2015), « Income diversification and bank efficiency in an emerging market », *Managerial Finance*, 41, 1-24.
4. Barth, J.R., Caprio, G., and Levine, R. (2004), « Bank regulation and supervision: what works best? », *Journal of Financial intermediation*, 13, 205-248.
5. Baele, L., De Jonghe, O. and Vennet, R.V. (2007). Does the stock market value bank diversification? *Journal of Banking and Finance*, 31(7), 1999-2023.
6. Bashir, A.M. (2003), « Determinants of Profitability in Islamic Banks: Some Evidence from The Middle East », *Islamic Economic Studies*, 11, 31-57.
7. Beck, T. and De Jonghe, O. (2013), « Bank competition and stability: Cross-country heterogeneity », *Journal of Financial Intermediation*, 22, 218-244.
8. Belguith, H. and Bellouma, M. (2017), « Income Structure, Profitability and Stability in the Tunisian Banking Sector », *International Journal of Engineering Research and Science*, 3, 31- 45.
9. Berger, A. N., Hasan, I. and Zhou, M. (2010), « The effects of focus versus diversification on bank performance: Evidence from Chinese banks », *Journal of Banking and Finance*, 34, 1417-1435.
10. Berger, P. and Ofek, E. (1996), « Bust-up takeovers of value-destroying diversified firms », *Journal of Finance*, 51, 1175-1200.
11. Betz, F., Oprică, S., Peltonen, T.A., and Sarlin, P. (2014), « Predicting Distress in European Banks », *Journal of Banking and Finance*, 45, 225-241.
12. Bian, W.L., Wang, X.N. and Sun, Q.X. (2015), «Non-interest Income, Profit, and Risk Efficiencies: Evidence from Commercial Banks in China », *Asia-Pacific Journal of Financial Studies*, 44, 762–782.
13. Borroni, M., and Rossi, S. (2017), « Does revenue diversification still matter in banking? Evidence from some European Countries », *working paper*, Università Cattolica del Sacro Cuore.
14. Brighi, P. and Venturelli, V. (2016), « How functional and geographic diversification affect bank profitability during the crisis. » *Finance Research Letters*, 16, 1-10.
15. Casalin, F. and Dia, E. (2010), « The Diversification Benefits of Universal Banking », *Working Paper Series*, University of Millan-Bicocca.
16. Chiorazzo, V., Milani, C. and Salvini, F. (2008), « Income Diversification and Bank Performance: Evidence from Italian Banks », *Journal of Financial Services Research*, 33, 181-203.
17. Chunhachinda, P. (2014), « Income Structure, Competitiveness, Profitability, and Risk: Evidence from Asian Banks », *Review of Pacific Basin Financial Markets and Policies*, 17, 1-23.
18. Cosma, S., Gualandri, E., Ferretti, R., Landi, A. and Valeria Venturelli, V. (2017), « How Does Financial Market Evaluate Business Models? Evidence From European Banks», *Working Paper*.
19. Damankah, B.S., Anku-tsede, O., and Amankwaa, A. (2014), « Analysis of Non-Interest Income of Commercial Banks in Ghana », *International Journal of Academic Research in Accounting, Finance and Management Sciences*, 4, 263-271.
20. De Jonghe, O. and Vennet, R.V. (2008), « Competition versus efficiency: what drives franchise values in European banking », *Journal of Banking and Finance*, 32, 1820-1835.
21. Deng, S., Elyasiani, E. and Mao C.X. (2007), « Diversification and the cost of debt of bank holding companies », *Journal of Banking and Finance*, 31, 2435-2473.
22. DeYoung, R., and Roland, K.P. (2001), « Product mix and earnings volatility at commercial banks: Evidence from a degree of total leverage model », *Journal of Financial Intermediation*, 10, 54-84.
23. Doumpos, M., Gaganis, C., and Pasiouras, F. (2016). Bank diversification and overall financial strength:International evidence, *Financial Markets, Institutions, and Money*, 25(3), 169-213.

24. Edirisuriya, P., Gunasekarage, A. and Dempsey, M. (2015a), « Australian Specific Bank Features and The Impact of Income Diversification on Bank Performance And Risk », *Australian Economic Papers*, 54, 63-87.
25. Edirisuriya, P., Gunasekarage, A., and Dempsey, M. (2015b), «Bank Diversification, Performance and Stockmarket Response: Evidence from Listed Public Banks in South Asian Countries », *Journal of Asian Economics*, 41, 69-85.
26. Elsas, R., Hackethal, A., Holzhäuser, M. (2010), « The anatomy of bank diversification », *Journal of banking and Finance*, 34, 1274–1287.
27. Elyasiani, E., and Wang, Y. (2012), « Bank holding company diversification and production efficiency », *Applied Financial Economics*, 22, 1409–1428.
28. Filson, D., Olfati, S. (2014), « The impacts of Gramm–Leach–Bliley bank diversification on value and risk », Journal of Banking and Finance, 41, 209–221.
29. Gaganis, C., Pasiouras, F. and Tsaklanganos, A. (2013), « Taxation and Bank Efficiency: Cross-Country Evidence », *International Journal of the Economics of Business*, 20, 229-244.
30. Gandhi, P., Kiefer, P. and Plazzi, A. (2017), « Diversification by U.S. Banks: True Safety or a False Sense of Security? », *working paper.*
31. Guerry, N. and Wallmeier, M. (2017), « Valuation of Diversified Banks: New Evidence », *Journal of Banking and Finance*, 80, 203-214.
32. Hamdi, H. (2013), « Testing Export-led Growth in Tunisia and Morocco: New Evidence using the Toda and Yamamoto procedure », *Economics Bulletin*, 33, 677–686.
33. Harris, M., Kriebel, C. and Raviv, A. (1992), « Asymmetric Information, Incentives, and Intra firm Resource Allocation », *Management Science*, 28, 604-620.
34. Jensen, M.C. and Meckling, W.H. (1976), « Theory of the firm: Managerial behavior, agency costs, ownership structure », *Journal of Financial Economics*, 3, 305-360.
35. Jensen, M.C. (1986), « Agency costs of free-cash-flow, corporate finance, and takeovers », *American Economics Review*, 76, 323-329.
36. Kantas, G. and Qi, J. (2003), « Integration of lending and underwriting: Implications of Scope Economies », *Journal of Finance*, 58, 1167-119.
37. Karakaya, A. and Er, B. (2013), « Non-interest (Nonprofit) Income and Financial Performance at Turkish Commercial and Participation Banks », *International Business Research*, 6, 106–118.
38. Klein, P.G., Saidenberg, M.R. (1998), « Diversification, Organization, and Efficiency: Evidence from Bank Holding Companies », *Journal of Economics Behavior and Organization*, 3, 39-64.
39. Kurniawan, N.M.R., and Firsty, R.R. (2016), « Bank Income Diversification from Stock Market Perspective: Evidence from ASEAN+3 », *Indonesian Capital Market Review*, 8, 3245.
40. Köhler, M. (2014), « Does non-interest income make banks riskier? Retail- versus investment-oriented banks», *Working Paper*, Deutsche Bundesbank.
41. Laeven, L. (2005), «Banking sector Performance in East Asian countries: The Effects of competition, Diversification, and ownership », *working paper*, The World Bank and CEPR.
42. Laeven, L., and Levine, R. (2007), « Is there a diversification discount in financial conglomerates? », *Journal of Financial Economics*, 85, 331-367.
43. Laeven, L. and Majnoni, G. (2005), «Does judicial efficiency lower the cost of credit? », *Journal of Banking and Finance*, 29, 1791-1812.
44. Lelyveld, I.V. and Knot, K. (2009), « Do financial conglomerates create or destroy value? Evidence for the EU. », *Journal of Banking and Finance*, 33, 2312–2321.
45. Lepetit, L., Nys, E., Rous, P. and Tarazi, A. (2008), « Bank income structure and risk: An empirical analysis of European banks », *Journal of Banking and Finance*, 32, 1452– 1467.
46. Liang, H.Y., Chen, I.-J. and Chen, S.S. (2016), « Does corporate governance mitigate bank diversification discount? », *International Review of Economics and Finance*, 45, 129143.
47. Lin, J.B., Pantzalis, C., and Park, J.C. (2007), « Corporate use of derivatives and excess value of diversification», *Journal of Banking and Finance*, 31, 889-913.
48. Markowitz, H. (1952). «Portfolio Selection», *The Journal of Finance*, 7(1), 77-91.
49. Meng, X., Cavoli, T., and Deng, X. (2018), « Determinants of income diversification: evidence from Chinese banks », *Applied Economics*, 50, 1934-1951.
50. Mercieca, S., Schaek, K., and Wolfe, S. (2007). Small European banks: Benefits from

diversification? *Journal of Banking and Finance*, 31(7), 1975-1998.
51. Mergaerts, F. and Vennet, R.V. (2016), « Business models and bank performance: a long-term perspective », *Journal of Financial Stability*, 22, 57-75.
52. Meslier, C., Tacneng, R., and Tarazi, A. (2014), « Is bank income diversification beneficial? Evidence from an emerging economy », *Journal of International Financial Markets, Institutions, and Money*, 31, 97-126.
53. Mnasri, K., and Abaoub, E. (2010), « Diversification, bank risk-taking, and performance: evidence from Tunisian banks », *International Journal of Monetary Economics and Finance*, 3, 13-32.
54. Nepali, S.R. (2018), « Income diversification and bank risk-return trade-off in the Nepalese commercial banks», *Asian Economic and Financial Review*, 8, 279-293.
55. Nguyen, M.S. (2018), « Income Diversification and Bank Efficiency in Vietnam », *Journal of Economics and Development*, 19, 52 – 67.
56. Nguyen, D.T., Ta, H.T., and Nguyen, H.T.D. (2018), « What Determines the Profitability of Vietnam Commercial Banks? », *International Business Research*, 11, 231-245.
57. Nguyen, T.C., Vo, D.V., and Nguyen, V.C. (2015), « Risk and Income Diversification in the Vietnamese Banking System », *Journal of Applied Finance and Banking*, 5, 99-115
58. Olarewaju, O.M., Migiro, S.O. and Sibanda, M. (2017), « Operational Diversification and Financial Performance of Sub-Saharan Africa Commercial Banks: Static and Dynamic Approach », *Financial Institutions and Services*, 13, 5-28.
59. Rahman, M.W., Luo, J., Hafeez, G. and Sun, T. (2015), « A Comprehensive Review of Microfinance Impacts, Sustainability and Outreach », *Asian Journal of Agricultural Extension, Economics and Sociology*, 6, 64-76.
60. Rajan, R. Servaes, H., and Zingales, L. (2000), « The cost of diversity: The diversification discount and inefficient investment », *Journal of Finance*, 55, 35-80.
61. Sanya, S., and Wolfe, S., (2011). Can banks in emerging countries benefit from revenue diversification? *Journal of Financial Services Research*, 40(1-2), 79-101.
62. Saunders, A. and Walter, I. (1994), «Universal Banking in the United States », *Working paper*, Oxford University Press, New York.
63. Saunders, A. (1994), « Banking and commerce: An overview of the public policy issues », *Journal of Banking and Finance*, 18, 231-254.
64. Saunders, A., Schmid, M., and Walter, I. (2014). « Non-Interest Income and Bank Performance: Is Banks' Increased Reliance on Non-Interest Income Bad? », *working paper.*
65. Saunders, A., Schmid, M., and Walter, I. (2016), «Non-Interest Income and Bank Performance: Does Ring-Fencing Reduce Bank Risk? », *working paper*
66. Sawada, M. (2013), « How does the stock market value bank diversification? Empirical evidence from Japanese banks », *Pacific-Basin Finance Journal*, 25, 40-61.
67. Sun, L., Wu, S., Zhu, Z., and Stephenson, A. (2017), «Noninterest Income and Performance of Commercial Banking in China », *Hindawi Scientific Programming*, 17, 40-48.
68. Tan, Y. and Floros, C. (2012), « Bank profitability and inflation: the case of China », *Journal of Economic Studies*, 39, 675-696.
69. Vinh, V.X., and Phuong Mai, T.T. (2016), « Profitability and Risk in Relation to Income Diversification of Vietnamese Commercial Banking System », *Journal of Economic Development*, 23, 61-76.
70. Vo, X.V. (2017), « How does the stock market value bank diversification - Evidence from Vietnam », *Finance Research Letters*, 22, 101-104.