Market structure and profitability: Evidence from the Tunisian banking industry

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Abstract

Regard the market structure and profitability in Tunisian banking industry, there are two competing hypothesis_ the traditional structure-conduct-performance (SCP) hypothesis and the efficiency hypothesis (ES). Using panel data for the period 2000-2015, this paper tests the validity of these two hypotheses. In general, our result stressed a non-significant effect between the market concentration and profitability of Tunisian banks, which resulted in the rejection of the paradigm 'Structure-Conduct-Performance". In addition, the efficiency (proxies using market share) is negatively associated with bank profitability. This result does not support the second hypothesis.

Keywords: Bank profitability , Market structure, Market share, Tunisian banks

1. Introduction

Since the financial crisis of 2007, an important movement of mergers and repurchases in the banking sector in many countries started, for example, Bank of America bought Merrill Lynch in 2008. The pre-crisis period has been already very rich in consolidation of banks, the degree of concentration of the banking market becomes more important and banking supervisory authorities start wondering about the effects of this phenomenon on the economy, and in particular on banking stability and profitability.

More generally, the relationship between the structure of the banking market and banking profitability is a fundamental subject for supervisors and public policy makers; because any factor of risk that could cause a crisis that affects the economy as a whole is a public issue. This relationship has been actively discussed in academic and regulatory circles. Market power, which has a positive effect on innovation, product quality and efficiency, is generally considered as a positive force in most sectors. However, the matter of market power among banks has always been disputable. However, before studying the

relationship between these two variables, it is necessary to define them more precisely, since they both cover vast realities.

The structure of the banking market has two main dimensions; the first is the degree of competition, i.e. the more economic structure. The second dimension is linked to the concentration of the banking market; it is a more real structure, more conceivable even if only through the gross number of banks. Nevertheless, even if the structure of a market has two main dimensions, they are not independent of one another. Thus, the degree of competition is difficult to measure because, although it emerges above all from a real structure of competition, such as the number of competitors, it is also the result of explicit and implicit rules and laws; this is why competition can take many forms such as barriers to market entry.

Traditionally, reviews of the literature on this subject are ranked according to whether they support the idea that concentration in the banking market has a stabilizing effect or if on the contrary it tends to increase the instability of the financial system. While this classification is generally effective, it appears that a channel approach can better account for how the concentration of the banking market affects financial stability. Three channels could be identified following extensive documentation on the subject.

First of all, market power arises from the fact that in a concentrated banking market competition may be reduced and consequently the banks operating there are less prone to competitive pressure. According to the theoretical literature, the anticipated effect of this channel is ambiguous. The second channel is that of diversification, which assumes that in a more concentrated banking system, banks have a larger average size and are therefore better able to diversify their assets. The effect of this channel is less ambiguous, as diversification remains the best way to reduce the risks and thus limit the instability of the financial sector. Finally, the third channel is that of the complexity of banks, the idea being that large banks are more opaque, and therefore more difficult to control; But also that they are less numerous in a concentrated rather than atomized system, which could then facilitate supervision by allowing the supervisory authorities to concern themselves only with a few banks.

When the concentration is particularly high, some banks have so much weight and market power that their bankruptcy would bring in their wake the entire national or even international financial system; these are the banks "Too big to fail". Because of the

enormous risk they pose to financial profitability, it is in the interest of States to avoid all possible means of bringing about such an event; So these "Too big to fail" institutions are always implicitly or even explicitly insured against the risk of total bankruptcy. This particular insurance creates a perverse effect, as Mishkin (1998) points out, because it encourages them to favor risky assets and loans because they are more profitable, assured of being rescued in the event of a major default. Thus these institutions that emerge when a banking market is highly concentrated are a real threat to financial stability.

The effect of market power as an emerging phenomenon of a concentrated banking market therefore has an ambiguous theoretical effect on financial stability, because although it provides banks with a surplus of income, it may be more volatile because it is acquired with A more risky loan portfolio. In addition, significant concentration may give rise to systemic institutions that represent a major threat to financial stability.

The main objective of this chapter is to provide evidence on this relationship using data on Tunisian banks over the period 2000–2015. Tunisia as a developing country provides a fertile laboratory to examine the market structure since the country engaged in a process of financial liberalization, privatization, economic integration and technological change.

Thus, this chapter tries to answer the following research question: Does banking market concentration and market share affects Tunisian banking profitability? The remainder of this chapter is organized as follow. Section 2 reviews the related theoretical developments. Section 3 discusses the previous empirical studies that have examined the topic of banking profitability in other contexts, which will provide us with a benchmark analysis that will help us in exploring our main question in the Tunisian context. Section 4 will be dedicated to an empirical analysis of the link between banking market concentration, power market and banking profitability in Tunisia by using a sample of the ten largest Tunisian banks over the period 2000-2015. Finally, section 5 presents our concluding remarks.

2. Theoretical literature on banking market structure

The literature on the measurement of competition which assesses the competitive behavior of the banking firms in the banking market can be divided into two approaches, that

is structural and non-structural approaches (Diallo, (2017); Fernandez and al, (2016); Diallo and al, (2015); Mohammed and al, (2015) ; Berger and al, (2013) ; Nguyen, (2012a) ; Turk - Ariss, 2010) ; and Haaf,(2002);

To measure market power, we draw insight the structure conduct-performance (SCP) paradigm and the efficient structure (ES) hypothesis. According to Bain (1951), structural theories examine the nature of competition in an industry from its structural characteristics such as concentration, firm's market share, the number of firms and conditions of entry. Hence, the autor argues, the existence of an association between competition and the structure of an industry.

In structural approach, concentration ratios have been used extensively in previous studies in order to investigate the relationship between competition and performance. Such investigation on market concentration is important to identify the degree of competition in a particular market whether it is lower or higher.

2.1.« Structure- Conduct-Performance » Paradigm

Theoretically, the SCP paradigm connecting the competitive strategies of firms within an industry to market structure proposed by Mason in 1939 and initiated by Bain (1951) in order to expose the notion of competitive behavior of American firms. Indeed, SCP constitutes to be one of the theoretical foundations of industrial organization.

This hypothesis assumes causal relationship between market structure and firm behavior in terms of fixing prices, profits realized and market power. This paradigm makes it possible to evaluate the impact of market structures on the behavior of a given firm and their influence on their results. Market structure describes market environment; i.e. the number and concentration of firms, the degree of product differentiation, and the existence of entry and exist barriers and the degree of diversification. Firm's behavior refers to firm's decisions of price fixing, product quality, development and research cost.

According to « Structure-Conduct-Performance » hypothesis, the structure of an industry (the number of suppliers) is considered exogenous and determines the behavior of the agents (price fixing and product quality). This model states that the concentration

encourages collusion between large firms in the market, which leads to an increase in their profits at non-competitive levels. This argument assumes that if a small number of firms dominate an industry, the nit will be easier and cheaper for these firms to collude. Therefore, large firms will set prices at non-competitive levels. Thus, the degree of concentration in a market has a direct effect on the degree of competition between firms. The more the market is concentrated the lesser the degree of competition. Thus, firms in the more concentrated market will gain more profit than firms operating in the less concentrated markets.

For the banking industry perspective, Heggestad (1984) argues that increasing concentration in this market allows banks to behave like monopolists. The more the structure of the market is approaching monopoly structure the higher the fixed prices and profits realized by banks and the lower banking services quality. Shaffer, (1994) indicates that the coexistence of a large number of banks forces these financial institutions to set competitive and concurrent prices (marginal cost pricing), which would reduce the market power of each bank.

Overall, from the SCP hypothesis relies on the assumption that higher market concentration leads to lower competition as it enhances collusive behavior across firms within a given market. This is known as collusion hypotheses. From the perspective, one would expect that the relationship between concentration and competition is adverse.

2.2.« Efficient-Structure » paradigm

Demstez (1973) founded the «Efficiency-structure» paradigm. This theory suggests another alternative explanation of the positive relationship between concentration and profitability of banks. Indeed, this approach assumes that the efficiency of firms is a determinant of the structure of markets. In other words, efficient firms increase in both size and market share because of their ability to make significant profits. These profits are, in fact, able to make the market concentration stronger. Therefore, the positive correlation between profits and concentration is determined by the low costs resulting from performance, at the level of production or at the level of managerial superiority.

Moreover, smirlock (1985) conducts a study in which he tests both SCP and ES paradigms on a sample of 2,700 banks. He chooses, as exogenous variables, concentration

and market share in order to estimate profitability. He notices that the concentration has no impact on the profitability of banks. On the other hand, the market share has a positive impact on the latter. He also pointed out that market share plays both the role of source of market power and a proxy variable of banking efficiency.

From this perspective, many authors examine the relationship between the market structure and the performance within the Spanish banking sector. They test the "SCP" hypothesis and the "Efficiency-Structure" hypothesis. In order to measure the banking performance, they use return on assets. In addition, they measure the market structure using the concentration ratio CR3 and the banks' efficiency using the market share of each bank. there is a positive link between the bank performance and banking market concentration. However, the market share is found to be negatively related to bank performance. The authors argue that this positive relationship between bank performance and banking market concentration is not the result of bank efficiency.

Thus, it should be stressed that the two paradigms SCP and ES provide market policies that allow measuring the banking market structure and bank performance. These two approaches have been largely discussed by many authors such as Smirlock (1985), Williams and Molyneux (1994), Berger and al. (2004), Park and Weber (2006), Tan (2016), Mohamed and al, (2015), Simatele, (2015), Samad, (2008)

Diallo (2017) argue that, under some conditions, competition and concentration can coexist. Several researches that examine the relationship between concentration and competition through studying the changes in various concentrations indicators on a year-to-year basis found that structural changes in the banking sector have changed market concentration as well as the level of competition in the banking market.

3. Empirical literature on banking market concentration

Many studies have examined the effect of banking liberalization policies on bank market concentration. The studies have suggested that banking sector liberalization has decreased bank market concentrations, which has increased the degree of competition in the market.there, were finding of the studies of Abdul Majid and Sufian (2007) on the

Malaysian-banking sector, Sharma and Bal, (2010) on the Indian banking industry and Tushaj (2010) for the Albanian context.

Another strand of the related banking literature suggests that merger and consolidation operations have increased market concentration in many economies such that in the Greece (Rezitis, 2010), Malaysia (Abdul Majid and Sufian, 2007) and the European Union (casu and Giradime, 2006).

It is worth noting that the previous studies on banking mrket concentration have mostly focused on conventional banking sector and few researches have explored this subject in Islamic banking sector like those of Abdel Majud and Sufian (2007) for the Mlaysian context and Al-Muharrami (2006) for the Arab Gulf cooperation countries' context. Turk-Ariss (2010) examines banking market concentration for both conventional and Islamic banking system simultaneously for 13 economies that have implemented dual banking sector. In this context, the author tries to answer the question whether market concentration in banking market is good or bad as suggested by the concentration theory.

The theoretical and empirical literatures regarding the banking industry and the overall financial stability have largely examined the question of bank profitability. It has been argued that the ultimate risk that a given bank faces is the risk of going out of activities. Given the importance of the negative effects of bank failures on the soundness of the financial system and the whole economy, an increasing number of empirical studies examine the impact of a large set of accounting, market and general economic factors on bank profitability and stability.

There are two measures that have been used in the empirical literature, namely, the Hirschman-Herfindahl index (HHI) and the concentration ratio, both of which moderate the degree of market concentration (Tan, 2016). These two indicators are based on the structure-conduct-performance (PCS) assumption, which supposes that the behavior of banks is impacted by market power, whereas market structure cheeks a crucial role in bank profitability. The idea behind this assumption is that, in a more concentrated market where large shares are held by a few banks, competition is lower, whereas a higher concentration leads to greater market power and the resulting increase in collusive behavior to higher

profits. These indicators have recently been used by Al-Muharrami and al. (2006) and Fu and al. (2014) to measure competitive behavior in the banking sector.

The SCP hypothesis suggests that the structure of the market affects competitive behavior that has a greater influence on bank performance. In other words, this assumption indicates that the profitability of banks arises from the structure of the market.

3.1. Banking market concentration in developed economies

Beginning with Short (1979), which examined the relationship between the performance of sixty commercial banks in different countries, namely Japan, Canada and Western Europe, and the concentration of the local banking system in each of these countries over a period of two years 1972-1974. Banking performance was measured by the rate of profit (the annual net income statement over total equity). The market concentration was calculated country by country by the Herfindahl-Hirschman concentration Index, and by the CR1; CR2; CR3 concentration ratios. The authors have found that in high profit rates coincide with higher concentration. They also concluded that the higher the market power the higher the profitability of the banks.

Smirlock (1985) studied the impact of concentration and market share on bank profitability over the period from 1973 to 1978 and on 2700 publics banks located in 7 countries. The main results show that the concentration measured by the concentration ratio of the three largest banks in terms of deposits CR3, have no significant effect on profitability. But that there is a significant and positive relationship between the market share as measured by the ratio of total bank deposits to total deposits of all banks in the banking sector, and banking profitability.

In the same context, Bourke (1989) carried out a longitudinal study, over nine years (1972-1981), on 90 banks operating in 12 countries dispersed between North America, Australia and Europe. This study was also interested in the relationship between concentration and bank profitability. The author measured the concentration by the concentration ratio CR3 and the profitability by the value added on the total assets, the return on assets and the return on capital. He found a positive relationship between the concentration of the banking market and the profitability of the banks.

A study of the impact of the market structure on banking performance by testing the two approaches, namely the "Structure-Conduct-Performance" hypothesis, noted SCP, and the "Efficiency-Structure" hypothesis, noted ES, between 1986 and 1988 is performed by Williams and Molyneux (1994). Banking performance was measured by the return on assets ROA. The efficiency of the bank was measured by market share and the concentration of the banking market was measured by the concentration ratio CR3. The results show that a high level of concentration of the Spanish banking market reduces the cost of collusion between banks and increases the profits of the banks operating there, which leads to a decrease in the level of competition within the Spanish banking system. Thus, the SCP approach is supported. Moreover, the market share that reflects efficiency does not have a significant effect on banking performance, and thus the "Efficiency-Structure" approach is not supported. Moreover, the positive relationship between market concentration and bank performance is not a consequence of bank efficiency.

Williams and Molyneux (1994) also studied the conditions of competition in the main European banking markets over the period 1986-1989 using the H-statistic of Panzar and Ross to measure the structure and behavior of the banking market in each country. These authors have found that banks in France, Germany and the United Kingdom were into monopoly competition, whereas the structure of the Italian market is rather a monopoly. Consequently, a lack of integration of the European markets has been detected.

Berger and Hannan (1998) carried out an important study on the impact of market concentration, and consequently the market power of the banking firm, on the cost efficiency. This study involved 5263 US commercial banks operating in different local markets characterized by different degrees of concentration. The Herfindahl-Hirschman Index (IHH) measured the concentration of the banking market. They found that cost efficiency is low for banks operating in highly concentrated banking industries. Indeed, they found a significant and negative relationship between the efficiency of banks' costs and the concentration of the banking market. The authors explained their results by the fact that in a highly concentrated market, banks can set prices above their marginal costs. Therefore, managers do not have incentives to work hard to keep costs under control. That is, the power of the market allows managers to relieve their efforts. So the negative sense of causality has been biased by studying the inverse relationship. The authors found a positive relationship

between the latter and this result was identical to that of Demsetz (1973), which studied the effect of banking efficiency on market concentration, within the framework of the "efficiency-structure" paradigm. This hypothesis asserts that the efficiency of firms allows them to increase their market share, which leads to an increase in bank concentration.

Maudos and Guevara (2007) examined the relationship between market power and banking efficiency in the European market over the period 1993-2002. Market power was evaluated alternatively by the Herfindahl-Hirschman concentration index (HHI) and the Lerner index. The two measures are at the same time proxy variables of the competition. The authors found a positive realization between market power and the cost efficiency estimated by logistic regression, reflecting a negative relationship between market power and banking efficiency in the different markets studied. Various reasons have been offered by Maudos and Guevara (2007) explaining the positive effect of market power and cost efficiency: banks with monopoly power incur lower costs to monitor transactions with customers because of their location; banks that possess market power due to geographic or technological specialization may have cost advantages in filtering certain groups of borrowers; market power allows banks benefit from more profits, which can create incentives to behave with caution. This more conservative behavior leads to the selection of less risky activities with reduced monitoring costs. This increases the efficiency of the costs; and finally, banks that enjoy greater market power are trying to improve the quality of their services. This improvement lowers the cost of operation and increases cost efficiency.

In their study investigating the impact of banking competition, measured by the concentration of the banking market, on the financial strength of 2600 banks operating in twenty-five countries, members of the European Union (EU), Uhde and Heimshoff (2009) measured bank robustness by the Z-score. On the other hand, the concentration of the banking market was measured by the CR3 and CR5 ratios and by the Herfindahl-Hirschman index (HHI). These authors found that the concentration of the national banking market, measured alternately by the three indicators, negatively affects the financial stability of European banks. Therefore, there is a positive relationship between the competition of the national banking system and the financial soundness of European banks. According to these researchers, an increase in the competition of the banking system at the national level has a beneficial effect on the profitability of the European banks. The authors found that banking markets in Eastern Europe characterized by low competitive pressure, high government

participation in the bank, and weak opportunities for diversification to capture are financially fragile.

Hann and al. (2012) examine whether the volatility of banking profits depends on the size of the banks and the degree of concentration in the banking sector. Using quarterly data from US non-investment banks for the period 2004-2009 and monitoring the quality of management, leverage and diversification, they state that bank size reduces volatility of returns. The negative impact of bank size on the volatility of bank profits decreases with market concentration. They also find that large banks in concentrated markets experienced greater volatility during the recent financial crisis.

Mirzaei and al. (2013) study the impact of market structure on profitability and stability for 1929 banks in 40 emerging and advanced economies over the period 1999-2008, integrating the classic « Structure-Conduct-Performance « (SCP) assumptions. They state that a larger market share leads to a higher profitability of the banks supporting the RMP hypothesis in the advanced economies, but none of the assumptions is sustained for the profitability in emerging economies. The SCP appears to have a negative effect on advanced banks stability, suggesting that a more concentrated banking system may be vulnerable to financial instability, but the RMP appears to have a positive effect on banks stability in both economies. The evidence also demonstrates that profitability and stability increase with an increase in interest margin income in a less competitive environment for emerging markets.

3.2. Banking market concentration in emerging economies

Al-Muharrami and al, (2006) examined the degree of competition and competitive conditions in the banking industry of six economies in the Gulf Cooperation Council between 1993 and 2002. They assessed the degree of competition market by the concentration ratio CRk and by the Herfindahl-Hirschman index. The competition was on the other hand, measured by the statistics of Panzar and Ross "H-statistic". The main results are based on the following interpretations: the banking sectors in Qatar, Oman and Bahrain are characterized by a high concentration and the incumbent banks operate under monopolistic competition. However, the banking sectors in Kuwait, Saudi Arabia and the United Arab Emirates are characterized by moderate concentration and banks operate under conditions of pure and perfect competition.

Park and Weber (2006) analyzed the relationship between market structure and bank profitability by testing the two main hypotheses that seek to explain this relationship, namely the SCP hypothesis and the SE hypothesis. They carry out this study on twenty-seven Korean banks, between 1992 and 2002. ROA and ROE measured banking profitability. The Herfindahl-Hirschman Index (HHI) measured the concentration, while the market share corresponds to the bank's share of total market assets. Through this study, Weber and Park (2006) found that when banking efficiency is neglected, the market share of banking profitability becomes insignificant, thus, providing evidence to support the hypothesis of "Efficiency - Structure".

Al Jarrah and Gharaibeh (2009) examined the impact of market concentration on the banking efficiency of 16 Jordanian banks over a four-year period (between 2001 and 2008). The concentration was measured by the Herfindahl-Hirschman Index (HHI) and was perceived as a proxy variable of market power. The empirical results confirm a positive but statistically and quantitatively non-significant relationship between cost efficiency and market power. To address this risk and to improve the efficiency-cost ratio and the quality of banking services, the authors proposed to reduce the competitive disadvantage related to market concentration.

Mirzaei, Moore and Liu (2011) studied the impact of market structure on the profitability and stability of 1929 banks in forty emerging and developed countries, while incorporating both the Structure-Conduct- Performance and the Market Power Hypothesis (RPM), between 1999 and 2008. Over this period, bank profitability was measured by the average return on assets (ROAA) And the average return on equity (ROAE). Financial stability was measured by the Z-score and by the interest rate. The autors found that market power has no significant impact on the profitability of emerging market banks, which does not confirm the market power assumption that a large market share leads to an increase in the profitability of banks, whereas this hypothesis is confirmed in developed countries. They also found that there is a negative relationship between the concentration of the market and the profitability of banks operating in emerging countries which does not approve the "Structure-Conduct-Performance" (SCP) hypothesis stating that a high concentration of a market increases the profitability of the companies operating there.

Tan, (2016) tests the impact of power market and risk on bank profitability in China over the period 2003-2011. He uses two different measurements of bank competition, which are Lerner Index, and Herfindahl-Hirschman index.The profitability is measured by ROA, ROE, NIM and PBT. He found that market concentration has a significant and negative effect on bank profitability (PBT). This study does not support the traditional SCP hypothesis; the author explains that by the fact that in the Chinese banking sector, the « Efficience-Structure » hypothesis may be prevailing.

Mouhammed and al, (2015), analyze the link between concentration and competition in both conventional and Islamic Malaysian banks from 1997 to 2010 and from 2000 to 2010, respectively. They use the structural approach to analyze the evolution in banking market concentration in both banking streams. The results support the « Structure-Conduct-performance » (SCP) paradigm, where concentration ratios (CR3, CR5 and HHI) show a decreasing trend over the sample period, which reflect greater degree of competition in the Malaysian banking industry.

Tabak and al, (2015) examine the competitive behavior of the Brazilian banks. They suggest that the banking sector is characterized by monopolistic competition mesured by H-statistic of Panzar and Ross, and then the market power measured by MSi is negatively related to their risk-taking behavior. Also, the bank's efficiency and their services quality are directly impacted by market power level.

Simatele, (2015) examines the link between bank structure, performance and competition in the South African banking industry. South Africa is characterized by very concentrated banking industry with a CR4 concentration ratio of over 80%. The « Structure-Conduct-Performance » hypothesis would suggest that competition in the sector would therefore be very low. He applies the Panzar-Rosse approach to bank level data for the period 1997 to 2014 to assess the competitive environment in the South African banking industry. He estimates a revenue equation to obtain the H statistic. The author finds that competition has increased over time. This funding is consistent no matter how the time variable enters the revenue equation. The estimated H statistic suggests that banks operate in monopolistically competitive market structure. Bank specific factors are generally consistent across alternative measures and in line with expectations.

Chan and al, (2015) examine the role of institutional framework on the effect of market concentration towards bank efficiency in the ASEAN-5. Their result provides evidence for the theory, which assumes that higher bank concentration reduces the efficiency level of commercial banks. However, better institutional framework – as proxies by higher foreign ownership, political stability and regulatory quality play an important role in improving bank efficiency level even when the banking industry is highly concentrated. This is an important policy implication in light of the current trend of bank consolidation, which results in increased concentration of the industry.

Nguyen and al., (2016) provide an evidence that African banks with important market power in lending and deposit markets gain more from non-traditional activities. This is consistent with the dominant banks' ability to identify better non-traditional. Non-African banks are exploiting non-traditional banking activities and earning higher non-interest income. On the other hand, African banks in other African countries are concentrating more on traditional financial intermediation. The results are important for other emerging markets because their banks are traditionally focused on financial intermediation and the monitoring and supervision of non-traditional activities is relatively less developed.

Samad (2008) tests the link between the market structure and performance in Bangladesh banking sector, there are two competing hypotheses, namely, the classical « Structure–Conduct–Performance » (SCP) hypothesis and the « Efficiency-Structure » hypothesis (ES). Using pooled and annual data for the period 1999–2002, this research examines the validity of these two hypotheses. In general, the results of this study support the ES hypothesis as an explanation for market performances in Bangladesh.

4. Banking Market Concentration, Market Share and Profitability relationship: empirical evidence from Tunisian banks

In this section, we empirically examine the impact of market structure on bank's profitability in the Tunisian banking sector over the period 2000-2015. Our aim is to test whether banking market concentration and banking market share have a positive impact on profitability in Tunisia. In addition, to these two potential determinants, we check whether

banking profitability is affected by other bank-specific factors like bank activities diversification, loan portfolio concentration, size and Npls.

We start our empirical analysis by a brief description of our data and discussion about the evolution of banking market share and banking market structure in Tunisia. Afterwards, we explain our choices in terms of variables specification and we present our hypotheses to be tested in this chapter. Later in this chapter, we present our methodology and the empirical results.

4.1. Data description

We use in this section three datasets containing bank-specific factors and macroeconomic variables. The dataset containing bank-specific information is drawn from the central bank of Tunisia "Central risk". The dataset containing macroeconomic variables is drawn from the National Institute of Statistics (NIS). The sample is composed of the ten largest banks in Tunisia. We only retained banks that are quoted on the stock exchange for the sake of availability and continuity of data. These banks account for more than 82% of total banking assets in 2007 and 88% of total credits granted to the economy in 2009 (Mac, 2009). The period of analysis is 2000-2015. The number of observations is equal to 160. The frequency of the data is annual. The regressions are performed using STATA software.

4.2. Descriptive analysis

Table 3.1 shows the descriptive statistics of the various continuous variables of our study for the whole sample as well as for two subsamples of banks, namely, those having high market share in terms of assets and those with low market share. We choose the sample median of market share in terms of assets as a three should to distinguish between the two subgroups of banks.

Table 3.1 shows that banks with low market share in terms of assets are less profitable than those with higher market share but riskier than the latter, as the standard deviation of their profitability is higher than the one of the second subgroup of banks. As expected the descriptive statistics displayed in table 3.1 show that banks with high market in terms of assets are larger compared to those with low market share.

However, banks with high market share are undercapitalized compared to banks with low market share. In addition, as are would expect, banks with high market share are more credit-risky as their NPL ratio is higher than the one of banks with low market share. In addition, the descriptive statistics show that banks with low market share in terms of assets are more diversified as the non-interest income ratio is higher than the one of those with higher market share. This is expected, as banks with low market share in terms of assets (mainly loans) are more active in non-interest generating activities such as investment, trade and other service-based activities.

Table 1. : Descriptive statistics of the variables used in the analysis			
	Banks with high market share	Banks with low market share	Total sample
RAROA	2,11	3,17	2,64
	(1,56)	(2,86)	(2,35)
RAROE	1,39	2,48	1,93
	(1,59)	(2,35)	(2,08)
LN_TA	8,11	7,39	9,01
	(0,37)	(0,41)	(3,71)
EQUITY	7,72	9,93	8,45
	(2,46)	(3,51)	(3,11)
NPL	18,53	16,31	17,18
	(8,30)	(10,27)	(13,1)
NII	0,36	0,39	0,38
	(2,84)	(0,18)	(1,56)
Number of Obs.	80	80	160

In order to go further in our descriptive analysis, we display in table 3.2 the descriptive statistics related to the variables used in this chapter by banks 'ownership type (private versus public and foreign versus domestic).

As expected, table 3.2 shows that private and foreign banks are more profitable than public and domestic banks, respectively. In addition, table 3.2 shows that public and domestic banks benefit from greater market shares in terms of assets, deposits and loans than private and foreign banks, respectively. However, public and domestic banks are riskier than private and foreign banks, respectively, as they display higher standard deviation of their market shares as well as higher NPL ratio.

These results confirm that banks 'ownership type does have an impact on profitability which would be taken into consideration when we will empirically examine the relationship between market share and bank profitability.

Table 3.3 shows the pair wise correlation between the variables taken into consideration in this chapter. We notice that both proxies for bank performance, namely RAROA and RAROE, are negatively and significantly correlated with the banking market share but not correlated with the concentration ratio (CR3_A) and HHI_A. In addition the results of Table 3.3 shows that bank performance is negatively and statistically correlated with bank size and efficiency but positively and statistically correlated with bank equity. An interesting result is that private and foreign banks are found to be more likely to have higher performance measured by RAROA and RAROE than public and domestic banks.

Table 2 : Descriptive statistics of the variables used in the analysis					
	Private versus public banks		Foreign versus domestic banks		Total sample
	Private banks	Public banks	Foreign banks	Domestic banks	
RAROA	3,53	1,37	3,45	2,34	2,64
	(2,47)	(1,44)	(3,27)	(1,82)	(2,35)
RAROE	2,85	0,64	2,01	1,91	1,93
	(2,06)	(1,23)	(1,92)	(2,14)	(2,08)
MS_A	6,57	9,46	4,64	8,95	7,76
	(2,82)	(4,15)	(1,42)	(3,62)	(3,71)
MS_D	8,29	9,40	7,22	9,33	8,75
	(3,32)	(3,51)	(2,69)	(3,51)	(3,43)
MS_L	7,82	10,71	5,89	10,20	9,01
	(2,82)	(4,15)	(1,42)	(3,62)	(3,71)
LN_TA	7,69	7,84	7,56	7,83	7,75
	(0,48)	(0,59)	(0,41)	(0,56)	(0,53)
EQUITY	9,24	8,23	7,92	9,17	8,83
	(3,17)	(3,20)	(2,38)	(3,43)	(3,21)
NPL	16,38	18,90	21,65	15,82	17,42
	(8,73)	(10,11)	(9,96)	(8,66)	(9,38)
Number of obs.	94	66	44	116	160

	year	HHI	CR$_3$
	2000	0,1205	0.4743
	2001	0,119	0.4646
	2002	0,1205	0.4716
	2003	0,1183	0.4667
Table 3:	**2004**	0,1185	0.4715
	2005	0,1165	0.4616
	2006	0,1167	0.4621
	2007	0,1171	0.4669
	2008	0,1157	0.4625
	2009	0,1131	0.4375
	2010	0,1112	0.4272
	2011	0,1115	0.4301
	2012	0,1118	0.4290
	2013	0,1108	0.4150
	2014	0,1084	0.4112
	2015	0,1083	0.4038

Evolution of Tunisian Herfindhal-Hirshman Index HHI and Concentration Ratio CR$_3$ over the period 2000-2015

The banking market concentration can be measured by the concentration ratio that reflects the share of operations carried out by the largest establishments in relation to the total overall situation of all the establishments. It assesses the oligopolistic nature of the sector. This ratio is usually calculated for the 3 largest establishments.

A market is considered concentrated if the share of the 4 largest institutions exceeds 35% or if the share of the 8 largest institutions exceeds 50%. Thus, the measurement of the concentration of the banking sector can be supplemented by the Herfindhal-Hirshman index, which summarizes the squares of the market shares of all the establishments. It highlights dominant positions within the market. This index is all the more relevant given that the market under consideration is of small size. As regards its interpretation, if HHI= $\frac{1}{n}$ with n is the number of banks, the market is in competition,a value of less than 0.1 bears witness to a low-concentration market, between 0.1 and 0.18 of a moderately concentrated market and above 0.18 of a highly concentrated market (Annual Report CBT, 2016)..

According to Table 3.3, we note that the CR_3 concentration ratio is more or less stable throughout the study period, reflecting the overall stability of the banking market structure.

The results of our calculations for this ratio indicate that for the ten Tunisian depository banks studied, the concentration index varies between a maximum value and another minimum value, respectively 0.4743 and 0.4038, close to 0.5. Therefore, the Tunisian banking industry is moderately concentrated. Thus, these results confirm what we obtained through the Herfindahl-Hirschman Index (HHI).

Fig 3.1: Evolution of market shares in terms of assets
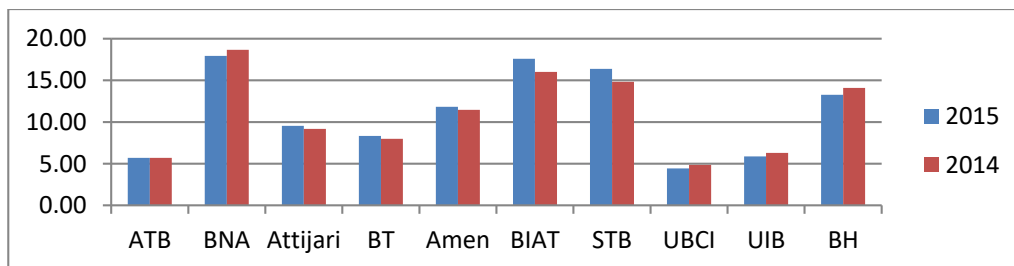
Source: Author

Nevertheless, there is no dominant position as evidenced by the level of the Herfindhal-Hirshman index close to 0.1. Moreover, the share of the first bank is 12.3% at the level of assets as shown in figure fig 3.1.

4.3.Definition of variables and hypothesis development

In this section, we define the variables used in this study. We explain how we specify our dependent variables, independent variables and control variables. In addition, we show the hypotheses to be tested in this chapter. In order to answer the question of the impact of market power on bank profitability for the Tunisian banks, we use bank-specific information (banks' market share in terms of total assets, bank ownership type (public versus private and foreign versus domestic banks), nonperforming loans, bank size, equity ratio) as well as banking industry structure (concentration ratio (CR3)). We add a set of macroeconomic variables namely GDP growth and inflation rates.

The dependent variables : Bank Profitability : The banking empirical literature has used many variables to proxy for bank profitability. Meselier and al. (2014) and Chiorazzo and al. (2008) use risk adjusted return on assets (RAROA) as a measure of bank profitability. This measure presents the advantage of being easy to be calculated for all banks included in the sample. Other accounting-based proxies for bank profitability that have been used in the related empirical literature include return on assets (ROA) and return on equity (ROE) and net interest margin (NIM) defined as net interest income divided by total assets. In this chapter, we will be using RAROA and RAROE as measures of bank profitability as these indicators take into account banks 'risk through dividing ROA and ROE by their standard deviations.

RAROA: We define it as the ratio of return on asset (ROA) to the standard deviation σ_{ROA} over the period 2000-2015 following Ahamed and al. (2017); Tan, (2016); Meselier and al. (2014); Chiorazzo and al. (2008).

RAROE: We define it as the ratio of return on equity (ROE) to the standard deviation σ_{ROE} over the period 2000-2015 following Ahamed and al. (2017) and Tan, (2016).

Independents variables : In this part of the chapter, we define the different independent variables that we use in our empirical analysis of bank profitability in the Tunisian banking

sector. We show how they are calculated. In addition, we present a brief overview of the discussion in the related empirical literature about their interpretation. These explanatory variables include banks' market share in terms of total assets, bank ownership type (public versus private and foreign versus domestic banks), nonperforming loans, bank size, equity ratio as well as banking industry structure measured using HHI and concentration ratio (CRk).

Banking Market Concentration :   In order to estimate the impact of the concentration of Tunisian banks we will use two indicators: the concentration of the three largest banks CR3. This indicator measures the concentration through market share of each bank from the financial parameters (assets, deposits, credits). Tan, (2016), Mouhammad and al, (2015), Simatele, (2015), has used these measures.

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Table 4: Pair wise correlation between variables used in the analysis

	RAROA	RAROE	MS_A	CR3_A	LN_TA	EQUITY	OWNER	NAT	GDP	INF
RAROA	1									
RAROE	0,86***	1								
MS_A	-0,20**	-0,24***	1							
CR3_A	0,01	-0,02	0,21**	1						
LN_TA	-0,14*	-0,20**	0,79***	0,50***	1					
EQUITY	0,46***	0,62***	-0,33***	-0,26***	-0,39***	1				
OWNER	0,45***	0,53***	-0,38***	0,21**	-0,15*	0,16*	1			
NAT	0,21**	0,02	-0,52***	0,23***	-0,23***	-0,17**	0,00	1		
GDP	0,00	-0,01	-0,10	-0,44***	-0,24***	0,10	0,30	-0,10	1	
INF	0,05	0,04	0,11	0,45***	0,30***	-0,14*	0,11***	0,14*	-0,27***	1

Notes: *, ** and ***   means that there is a high likelihood (90%, 95% and 99%, respectively) that there is a significant relationship between the two variables. **RAROA** and **RAROE** are the measures of risk-adjusted return on assets and on equity, respectively. **MS_A** is the market share computed as the assets of a given bank divided by the sector's total assets. **CR3_A** measures the market share of the first three banks. **HHI_A** measures assets diversification across banks (using the Herfindahl Hirschman Index). **LN_TA** is the logarithm of total assets. **EQUITY** measures the ratio of total equity over total assets. **Owner** is a dummy variable that takes 1 for private banks and 0 for public ones. **NAT** is a dummy variable that takes 1 for foreign banks and 0 for domestic ones. EFF is the efficiency ratio. **NII** is computed as non-interest income divided by total operating income. **GDP** is the gross domestic product growth ratio and **INF** measures the inflation ratio.

Market Concentration (CRk): The concentration ratio (CRk) is the most used indicators d by empirical literature to measure the degree of concentration of a given economic industry (Al-Muharrami, 2006). This ratio is characterized by the simplicity of its calculation and the non-requirement of a large number of data. It is obtained by adding only the market shares of the K largest firms operating in a given sector and there are no rules for the determination of the K value (Al-Muharrami and al, (2006)., Ben Ali, (2015)). In the context of our study, we will limit to a value of K = 3. (Following Uhde and Heimeshoff, (2009))

The Market Concentration is defined as follow:

$$CR_3 = \sum_{i=1}^{3} MS_i$$

H1: "*Banking market concentration positively affects bank's profitability"*

Market Share

In order to estimate the impact of the banking market structure of Tunisian banks we will use the percentage of the market share of each bank in terms of assets. This indicator measures the market power of banks. Samad, (2008) in the Bangladesch banking sector, Tabak and al, (2015) in the Brazilian banking sector used this measure.

Market share (MSi): MSi is the share of banks "i" in banking industry, it is calculated either in terms of total assets, total deposits or total credits:

$$MS_i = \frac{Total\ assets\ of\ bank\ i}{Total\ assets\ of\ all\ banks}$$

Based on the aforementioned theoretical and empirical developments we formulate and test the following hypothesis:

H2: "*Market share positively impact profitability of Tunisian banks".*

1.1.1.1. Market share and ownership type

-**MS* Private** and **MS*Foreign:** In order to check whether bank ownership type affects the relationship between market power and bank profitability, we construct ownership dummies

variables. These variables indicate whether a bank is a State, Private, Domestic or a foreign bank. We interacts these dummy variables with our explanatory variables which are MS_i.

The ownership dummies are measured as follows:

- **Private-owned**   : Takes the value 1 if the bank is private and 0 if the bank is state-owned.

- **Foreign-owned**   : Takes the value 1 if the bank is a foreign owned bank and 0 if it is domestic owned.

Based on the aforementioned theoretical and empirical developments and following Tabak (2015) we formulate and test the hypotheses:

H3: *"The positive effect of market power on bank profitability is more pronounced in private banks than state-owned banks."*

H4 *"The positive effect of market power on bank profitability is more pronounced in foreign banks than national banks."*

Market share and Diversification

$MS_{it}*NII_{it}$**:** We use the interaction between market share and the share of non interest income in order to explain the effects on profitabili profitability, with NII is the share of non interst income over total revenue.

$$NII_{it}:\frac{\text{Non interest income}}{\text{Total operating income}}$$

Meselier and al, (2014) show that, conversely to studies on Western economies, a shift toward non-interest activities increases bank profits and risk-adjusted profits particularly when banks are more involved in trading in government securities However, Chiorazzo and al. (2008) find that an increase of the share of non-interest income by Italian banks will lead to higher risk-adjusted returns. For the case of Germany, Busch and Kick (2009) show that savings and cooperative banks will have their performance improved if they increase their share of non-interest income, while the authors find no impact of non-interest income on the

profitability of commercial banks. For developing countries, there are also findings which suggest that banks benefit from a better revenue diversification (Sanya and Wolfe, 2011).

Thus, following Nguyen and al, (2016) we formulate the fourth hypotheses:

H5: "*Bank with greater market share and more involved in nontraditional activities are more profitable.*"

Market share and loan portfolio diversification

MS*HHI_{it}: we use the interaction of market power and loan portfolio diversification in order to explain risk-adjusted profitability.

As proxy of loan portfolio diversification, we consider in this chapter, the classical concentration measure: the Hirshmann–Herfindahl Index which is computed as the sum of the square of the share of credit exposure to each economic sector. This diversification measure is based on the assumption of considering an equal exposure to every sector.

It is important to highlight that the goal of our analysis is to examine whether the credit portfolio composition affect the banks' return. Portfolio composition means the bank's relative exposure to certain sectors. Hirschman-Herfindhl Index (HHI) is usually used as a measure of market concentration. It supposes ideal diversification as equal exposure to every sector.

We define relative exposure of each sector i at time t as its nominal exposure it divided by the total exposure kt, then we calculate the concentration measure, for each bank,

$$relative\ exposure_k = \frac{exposure_{kt}}{\sum_{k=1}^{n} exposure_{it}}$$

The HHI is the sum of the squares of the relative exposures which has been one of the most used concentration measure in industrial organization due to its relatively simplicity (Raei, 2016 ; Chen, 2013). The HHI of bank i at time t is defined as following:

$$\text{HHI }_{it} = \sum_{k=1}^{n} \left(\frac{exposure_{kt}}{\sum_{k=1}^{n} exposure_{kt}} \right)^2$$

Where

- **HHI $_{it}$:** Credit based Herfindahl index for bank i in year t

- **Exposure $_{kt}$:** Credit provided for a special sector k by bank i at year t.

- **Exposure $_{it}$:** Total credit provided by bank i at year t.

- **n:** Total number of economic sectors to which the banks have provided credits.

Thus, we formulate ans test the following hypothesis:

H 6: "*The positive effect market power and bank profitability is more pronounced in banks with higher credit exposure to certain sectors.***"**

As control variables, we use in this chapter several bank-specific indicators as well as macroeconomic variables.

Bank-Specific variables

Bank size *(SIZE):* we use the natural logarithm of total assets to measure the size of banks. This measurement is frequently used in the empirical literature (Tan, 2016; Tabak and al, 2015, Tabak and al, 2011). Indeed, banks with larger size are able to reduce costs from economy of scale and scope (Bourke, 1989; Elsas and al. 2010; Fu and al, 2014).

Equity ratio (EQUITY): It is   measured as total equity divided by total assets, reflectiong the capital structure of the bank, following Tan, (2016) and Tabak and al. (2015).

Credit risk: Non performing loans Ratio is calculated as the ratio of nonperforming loans to total loans following Tan, (2016), Tabak and al, (2015) and Meselier and al. (2014).

$$NPL= \frac{non\ performing\ loans}{total\ loans}$$

Many variables have been used in the banking literature to proxy for credit risk. According to the regulation of Central Bank of Tunisia, banking institutions classify their loans into two sub-groups such as: current assets and classified assets.

In our case, non-performing loans are those classified in classes ranging from 2 to 5. However, the performing loans are those classified in classes 0 and 1. The credit default is measured as credit and interest, which have become overdue for more than 90 day

Macroeconomic variables: We use two macroeconomic indicators such as GDP growth and inflation rate.Economic growth (GDP): is defined as the annual growth of the gross domestic product .and Inflation rate (INF): is the annual growth of the Consumer Price Index (CPI). It reflects the changes associated with the cost of living.

4.4.Econometric methodology

In this section, we present the models to be tested in order to the influence of market share and banking market concentration on Tunisian banks' profitability. First, we estimate the average effect of market share in term of assets on Risk-Adjusted Returns. Second, we introduce banking market concentration measured by in order to measure of banking market concentration. Then, we check whether this relationship depends on the type of bank's ownership. Finally, we introduce variables of revenue diversification (NII) and loan portfolio diversification (HHI_L) in order to see how this relation changes as function of income and loan portfolio diversification.

We use in this study a panel dataset on 10 Tunisian banks over 16 years (from 2000 to 2015) for a total 160 observations. We regresses bank profitability on a banking market share in term of assets and banking market concentration and we control for a set of bank specific factors including bank's size, equity ratio, and credit risk. We control also for macroeconomic condition by taking into account information on economic growth and inflation rate.

The most fundamental question concerning to this subject is if the SCP paradigm SE paradigm are verified on Tunisian context and we can examine with this topic by regressing profitability on a banks 'market share and banking market concentration , as in the following model:

Model 1:

$$Return_{it} = \alpha + \beta\, CR_3 + \gamma\, V_{it} + \delta M_t + \varepsilon_{it} \tag{1}$$

$$i = 1,....,N = 10; \quad t = 1,.....,T = 16$$

Where,

Risk-adjusted profitability	Risk-adjusted Return on Assets, risk-adjusted return on equity
MS_{it} ; CR_3	Market share and banking market concentration
V_{it}	Size, Equity and credit risk of bank.
M_t	GDP growth and Inflation rate in year t,
ε_{it}	Error term

Second, we substitute CR3 by MS_{it} in order to tests the impact of banking market concentration on banking profitability.

Model 2:

$$Return_{it} = \alpha + \beta\, MS_{it} + \gamma\, V_{it} + \delta M_t + \varepsilon_{it} \tag{2}$$

In addition, another interesting question is to test whether ownership type control affects the relationship between banks 'market share and banks risk-adjusted returns. Thus, we estimate equation including interaction of diversification measure with two ownership dummies, as in the following models.

Model 3 a:

$$Return_{it} = \alpha + \beta_1 MS_{it} + \beta_2\, MS * private + \gamma V_{it} + \delta M_t + \varepsilon_{it}. \tag{3}$$

Model 3 b:

$$Return_{it} = \alpha + \beta_1 MS_{it} + \beta_2\, MS * foreign + \gamma V_{it} + \delta M_t + \varepsilon_{it}. \tag{4}$$

We estimate the relationship between banks' market share and profitability as function of income diversification and loan portfolio diversification by another equation. For this purpose, we use the variable NII_{it}, which represents, in this case, the ratio of the share of non-interest income to total operating income. We use its interaction with market share measure to test the effect of bank 'income diversification on the relationship between profitability and market share.

We also use the variable HHI_{it_L} which represents the ratio of loan portfolio diversification equal to the sum of squares of the relative exposures, with relative exposure which equal of the share of exposure of the bank i at time t to each economic sector. We consider the following model:

Model 4

$$Return_{it} = \alpha + \beta_1\, MS_{it} + \beta_2 MS^* NII + \beta_3 MS^* HHI\_L + \gamma V_{it} + \delta M_t + \varepsilon_{it} \quad (5)$$

Afterwards, we go further in our econometric analysis by interacting loan portfolio diversification with ownership dummies variables and examining the effect of their interaction on bank profitability and risk adjusted-profitability. To do so, we first create binary variables private and foreign. The first dummy variable takes the value 1 if a bank is private owned. The second dummy variable takes the value 1 if a bank is foreign owned. The coefficient of the interaction between HHI and private would indicate the type of bank ownership impact on bank profitability and risk adjusted profitability. However, the coefficient of the interaction between loan portfolio diversification and foreign would indicate the attenuation effect of loan portfolio diversification of foreign bank on bank profitability.

5. Empirical Results

In the part of our empirical analysis, we regress bank profitability using RAROA and RAROE on bank's market share which proxies for market power. In models 1 and 2, we regress bank profitability on market share and market concentration (CR3) as well as on other bank specific variables and macroeconomic indicators. In models 3 and 4, we introduce in the model MSi as a proxy for market share and we exclude CR3 from the model.

Notice that we compute market share and market concentration in terms of total assets. Market share and market concentration in terms of deposits and loans are used for robustness checks, however, the related results are not shown for two reasons: first because they provide similar results and, second, to save space. In models 5 and 6, we add to the specification the interaction between market share and the dummy indicators related to the bank ownership type (private and foreign). This is because we expect that the type of bank ownership would affect the relationship between market power and bank profitability. In models 7 and 8, we

introduce into the model the interaction between market share and the variable NII (non-interest income) in order to examine the impact of banking activity diversification on the relationship between market power and bank profitability. In addition, we test in models 7 and 8, the effect of loan portfolio diversification in the relationship between market power and bank profitability through adding the interaction between market share and the HHI relates to the credit exposure to different economic sectors. All the equations are estimated using random effects method as suggested by the hausman test.

Table 3.5: Regression analysis results using random effects regressions

Y=Dependent variable	RAROA (1)	RAROE (2)	RAROA (3)	RAROE (4)	RAROA (5)	RAROE (6)	RAROA (7)	RAROE (8)
MS_A			-0.20**	-0.10*	-0.16**	-0.05	-0.07	-0.05
			(-2.46)	(-1.75)	(-1.98)	(-0.84)	(-0.86)	(-0.88)
CR3_A	0.07	0.08*						
	(1.14)	(1.78)						
MS_A * PRIVATE					0.08*	0.12***		
					(1.89)	(4.2)		
MS_A * FOREIGN					0.28***	0.1		
					(3.20)	(1.56)		
BANK SIZE	0.98	0.31	0.09	0.18	0.87	-0.21	0.72	0.7
	(1.59)	(0.72)	(1.37)	(0.39)	(1.14)	(-0.47)	(1.09)	(0.15)
BANK EQUITY	0.09	0.17***	0.09	0.16***	0.12*	0.20***	0.13**	0.18***
	(1.44)	(3.59)	(1.55)	(3.50)	(1.73)	(4.45)	(1.99)	(3.75)
MS_A*NII							-2.25***	-3.81***
							(-4.00)	(-3.99)
MS_A*HHI_L							1.98***	1.44***
	(-1.78)	(-2.42)	(-1.78)	(-2.48)	(-1.61)	(-2.21)	(3.97)	(3.97)
NPL	-0.09***	-0.06***	-0.09***	-0.06***	-0.08***	-0.04***	-0.09	-0.06***
	(-4.22)	(-4.09)	(-4.21)	(-4.09)	(-3.53)	(-2.93)	(-4.43)	(-4.15)
GDP	0.012	0.01	0.01	0.01	0.01	0.01	0.01	0.02
	(0.15)	(0.03)	(0.07)	(0.26)	(0.07)	(0.28)	(0.17)	(0.31)
INF	0.13	0.08	0.17	0.13	0.17	0.12	0.13	0.12
	(0.85)	(0.8)	(1.17)	(1.29)	(1.13)	(1.24)	(0.86)	(1.12)
R-sq	0.3442	0.5860	0.3401	0.5847	0.3512	0.6262	0.3783	0.5888

The coefficients of MS_A in models 3, 4, 5, 6, 7 and 8 are negative and statistically significant which suggest that market power (proxies using market share) is negatively associated with bank profitability. These results do not support our first hypothesis. The impact of market share was mainly studied by Liu H et al, (2010). These authors show that, at least in Japan, there is a negative relationship between market share and performance (measured by the NIM), regardless of the type of bank. Only the performance of banks of the City and Trust type are indifferent to this variable.

On the one hand, by analyzing the behavior of banks with a small market share, these banks are seeking to grow and gain market share. To do this, one of the only resources available to them is the granting of credit to risky individuals. These risky credits, which the large banks refuse to grant, allow banks with smaller market shares to expand. As these credits are more risky, they will match them with higher interest rates, which will increase their NIM and their performance.

On the other hand, we can, with Tan et al, (2016) place us from the point of view of banks with a large market share. They can use their market shares and size to eliminate existing or potential competitors by reducing their margins on interest rates. This has the effect of reducing ROA and the performance of these banks in the short term.

However, the estimation results presented in the table above show that the banking market concentration measured by the CR3 index positively affects the risk-adjusted return on assets (RAROA) as well as the risk-adjusted return on capital (RAROE) of Tunisian banks in accordance with our expectations.

Consequently, and since concentration and competition vary in the opposite direction; we can also deduce the existence of a negative effect of competition on the profitability of Tunisian banks. However, this variable is statistically significant at 1% for RAROE and not significant for RAROA. This result is expected since, in our Tunisian context, the banking industry is weakly concentrated and consequently the concentration has no impact on the profitability of Tunisian banks.

Our result is consistent with that found by Ben Naceur and Goaied (2008), Ayadi and Aboujelbene (2012) who stressed a non-significant effect between the concentration and profitability of Tunisian banks, which resulted in the rejection of the paradigm 'Structure-

Conduct-Performance'. However, our finding is not consistent with Ben Naceur's (2003), Mensi and Zouari (2011), Ghazouni and Moussa (2013) who have shown a negative and statistically significant effect between the concentration and return on asset of Tunisian banks.

According to our expectations, the coefficient associated with the EQUITY ratio variable, measured by the ratio of equity to total assets, is statistically significant and positively correlated with the risk-adjusted return on equity (RAROE) at the 10% threshold.(models (2) (4) (6) and (8)). In addition, is significant at the 1% or 5% threshold and positively correlated with the risk-adjusted return on assets (RAROA). Therefore, we can say that in the Tunisian context, an increase in equity leads to an improvement in financial profitability and economic efficiency adjusted to the risks. This is in line with several studies, including Bourke (1989), Demirguc-Kunt and Huizina (1999), Ben Naceur and Goaied (2001), Ben Naceur (2003), Ben Naceur and Goaied (2008) Have found that the best performing banks are those that are highly capitalized. Due to their high level of equity relative to their assets, these banks will be able to absorb potential losses and thereby reduce their risk of bankruptcy and their long-term financing needs. Thus, a strong capital structure is essential for banks, especially in developing economies, as it provides the added strength to withstand financial crises and provides greater security for depositors under unstable macroeconomic condition.

The study shows that the coefficient associated with the interaction variable between the share of the market and the private property of the bank "MSi * Private" has a positive and significant effect on RAROA and RAROE. According to this result, they are active in strategic sectors (tourism, industry, agriculture, real estate, etc.) which present a high level of risk, thus requiring enormous capital in order to build a solid economic base , Public banks are less profitable than their private counterparts, whose main objective is to maximize their profits. This result was reached by several research studies with a significant statistic such as Short (1979), Micco et al (2007) and Iannotta et al (2007).

However, it is partially confirmed by the study by Ghazouani and Moussa (2013) who found a positive and statistically significant relationship between ownership and profitability of Tunisian banks (ROA) while a negative and statistically unreliable between the ownership and the financial profitability of the Tunisian banks (ROE).

According to Table 3.5, The results indicate that bank size does not affect bank profitability. our empirical results show that, in the Tunisian context, the size of the bank, measured by the logarithm of its assets, does not have a significant impact on its adjusted profitability. However, the sign of the coefficient for this variable is positive. The eight models used confirm this. This result partly reflects the work of Bikker and HU (2002), who found that the size of the bank has a positive and significant impact on its profitability. These authors argue that large banks have the potential to have a high level of diversified products and credit, and benefit from economies of scale and thus reduce these costs. In models 5 and 6, the results show that the negative effect of market share on bank profitability is attenuated for private and foreign banks. These findings support our third and fourth hypothesis. However, in our context, Tunisian banks are considered small compared to European banks. Subsequently, we can say that Tunisian banks operate above their optimal sizes or the insignificant impact of size on Tunisian banking profitability.

As expected, credit risk proxies using NPL ratio is negatively and statistically associated with bank profitability. In models 7 and 8, our finding the negative effect of market share on bank profitability is more pronounced for those banks, which are more oriented towards non-interest generating activities but attenuated for banks, which have higher loan portfolio concentration.

The sign of the coefficient attached to the variable reflecting the "GDP growth" economic growth is in line with our expectations. More precisely, the results show that the rate of economic growth has an insignificant positive effect on the profitability of Tunisian banks. Therefore, we can conclude that the state of the economy does not influence the profitability of Tunisian banks. In a period of recession, generally associated with deterioration in the quality of bank credit, defaults increase and subsequently non-performing loans increase, thus generating losses attributed to the profitability of the banks. On the other hand, during periods of expansions, borrowers generally have sufficient funds to repay their debts, thus generating a positive impact on banks' profitability. Thus, profitability is called pro-cyclical.

Analyzing the impact of inflation on bank profitability, our empirical results show a statistically insignificant relationship between inflation and adjusted asset return (RAROA) and the Adjusted capital (RAROE) of Tunisian banks. This result is in line with those put

forward by Ghazouani and Moussa (2013) who found that inflation has no impact on the profitability of Tunisian banks.

6. Conclusion

In this chapter, we examine the impact of market power on bank profitability as well as the impact of many other indicators on this relationship. Our study's context is the Tunisian banks sector and our sample period is 2000-2015.

At the chapter , we first examined the notion of the concentration of the banking market and determined its main indicators as well as the different types of market structures. We have noted, in fact, the existence of a variety of market structures, namely pure and perfect competition, monopoly, duopoly, oligopoly and monopolistic competition. Secondly, we presented the instruments for measuring banking competition, which are grouped into two main approaches: structural and non-structural approaches. And finally, we tried to present a review of the empirical literature, we noticed that the scholars did not reach a consensus as to the nature of this relationship.

The review of the literature led to the identification of two channels through which concentration can have an effect on profitability and financial stability. These are those identified by Beck, Dermiguc-Kunt and Levine (2007); In the first place, market power, which from both a theoretical and empirical point of view has an ambiguous effect, for if weak competition can limit the risk of crises by protecting banks from excessive competition, these banks are in return more fragile in case of shock. Moreover, the presence of market power can intrinsically reduce the quality of the banks' portfolio, as shown by Boyd, De Nicolo and Al Jalal (2006). Finally, the last channel that of diversification as a phenomenon linked to the presence of large banks in concentrated banking markets, has as much, from a theoretical as empirical point of view, a clear effect; Diversification by reducing the risk carried by banks is a factor of major financial stability.

Our finding show that market power negatively affects banks profitability and this result is robust to several specifications. In addition, we find evidence to the fact that bank's ownership type does affect the relationship between market power and bank profitability. From this perspective, for a given bank, being a private of foreign owned bank, attenuate the

negative impact of market share on bank profitability. This can be explained by the fact the private and foreign owned bank became more efficient when they increase their market share, which leads to better profitability.

An interesting result found in this chapter regarding the impact of revenue diversification (measured using NII) on the relationship between market share and bank profitability. Indeed, we find that for banks which are oriented to non-traditional banking activities (non interest income), the increase of their market share in terms of assets (loans as an interest based activity) leads to lower profitability. This can be explained by the fact that those banks do not have grand expertise in terms of the lending activity and therefore, if the increase their market shares in terms of assets (loans) they will decrease their returns.

Another, no less interesting result is found with regard to the impact of bank's loan portfolio diversification on bank profitability. In fact, we find that when banks focus on fewer economic sectors (in other terms a higher volume of HHI_L), the increase of their market share in terms of assets (loans) positively affects their profitability. This can be explained by the fact that those banks are focusing a few sectors in which they benefit from a grand expertise. Therefore, an increase of their exposure to these well known economic sectors will lead to higher returns.

Our study has several policy implications. For, instance, shareholders who are interested in the risk-adjusted returns, should pay attention to the bank's ownership type, revenue diversification and loan portfolio diversification when they before they decide to increase their market share in terms of assets.

Finally, this study presents some drawbacks that should be highlighted. First, this study focuses on one country. The specific banking features of the Tunisian banks sector may affect the results regarding the relationship between market power and bank profitability. In future researches we recommend to examine this relationship with several economies. Second, the use of accounting based indicators of bank profitability (RAROA and RAROE) may suffer from the accounting manipulations. Thus, we recd for the future studies on bank profitability t use market based indicators of performance.

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