MARKET CONCENTRATION AND BANKING FINANCIAL PERFORMANCE: MODERATING EFFECT OF MARKET SHARE

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Abstract: This paper investigates the relationship between banking concentration and financial performance, using financial ratio as an endogenous indicators of bank performance. It also investigates the influence of the moderator role of market share to alter the effect of concentration on bank performance. The study used panel data of 92 banks in the MENA countries, 21 of them are Islamic and the remaining 71 are conventional during the period 2005 – 2015. The empirical findings reveal that the relationship between concentration and profitability was not confirmed in Islamic banks and then the moderating effect of market shares was a significant determinant to affect the performance of banking system.

1. Introduction

The consolidation of the financial sector happens at a frantic pace around the globe. In addition, a great occurrence of new wave of mergers and acquisitions between major banking institutions and other types of financial services providers through the world, resulting the emergence of financial conglomerates that offer several commercial, investment, insurance and pension funds services. During the financial crisis 2007- 09, some countries encourage policymakers to favor concentration that may affect the financial stability in the banking system.

The trend towards a highly concentrated banking system is submitted to complex regulatory reasons. In terms of stability, a higher banking concentration level increase size, market power,

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bank profits, enhance diversification and create more incentives for secure banks in order to avoid excessive risk-taking. However, the emergence of powerful financial conglomerates can succeed by joining forces, forming lobbying, and implementing policies that serve their own interests to the detriment of the public interest. These powerful banking groups that form the ruling elite can implement laws and rules that hinder the functioning of the market and hence their development.

Given the increase in this strategy undertaken by most developed countries particularly in the United States and Europe during the last decades, it would be useful to consider the evolution of this strategy within the countries of MENA region which is less important than that observed in most of the developed economies. In light of the studies carried out on the effects of concentration of the US banking sector, some conclusions can be drawn concerning the development of banking activity in MENA region following the concentration strategy. In this context, due to the particular role of the market structure within banking systems and its ability to influence banking firms and consequently their stability, the industrial economy institutions as well as the recent financial literature highlight the link between concentration and profit and have became very concerned about the examination of the effects of concentration on bank performance. However, profitable banking operations are due to the dominant position of banks (SCP hypothesis), this can be explained by the fact that these firms will benefit from market power by fixing higher costs and interest rates to their clients allowing them to make higher profits.

The study is motivated by the fact that the concentrated banking system in Islamic and conventional banks has recently increased in light of increasing globalization, and the growing attraction of Islamic finance worldwide. However, the principal objective of this study is to examine the impact of concentrated banking-system on bank profitability highlighting the moderator role of the market share. We check then if the profitability of Islamic and conventional banks is dependent to monopolistic conditions or to other market conditions, with this, we also test if the banking industries of the different countries show the same behavior according to their positioning on a concentrated market.

The remainder of the paper is organized as follows. Section 1 provides the link between concentration and development of banking industry .Section 2 reviews literature. Section 3 presents the econometric methodology. Section 4 contains the estimation results together with robustness tests.

2. Concentration and development of banking industry in MENA region:

The relationship between bank concentration and financial performance has been an important topic with much discussion in the economic literature. However a serious concerns about potential collusion between banks that might occur in highly concentrated markets and in particular its effects on banks profitability.

Market concentration is considered as a major determinant of banks profitability. Under this assumption, following the financial crisis, major banking mergers process have been executed under the anticipation of improvement in the level of financial stability that implies greater concentration, and therefore less competition. Concentration plays a catalyst role for the different operations of financial institutions, affecting their management decisions on the costs of services provided to their clients. It can also impose costs on the financial system by expending the financial safety net which favors an additional protection to institutions being too big to fail. In light of these considerations, a concentrated banking system underlined a range of benefits. According to the traditional viewpoint, a concentrated banking system strengthens market power and boosts bank profits. Moreover, the overall risks of bankruptcy supported by a bank and the likelihood of banks suffering systemic banking distress decreases with the increase in market power that constitute a rampart against undesirable shocks increasing bank's charter value and reducing incentives for bank owners and managers to take excessive risks. However, a less concentrated banking system with many smaller banks is more disposed to banking crises and financial shocks than a concentrated banking with a few large banks. This viewpoint is supported by Allen and Gale (2004), who reported that banks in competitive markets will have more risk exposure than in concentrated markets due to the fact that an adverse shock can generate a chain reaction. In that sense, increasing concentration in a banking market can help banks to earn higher profits, to improve their level of efficiency, diminishing their bank fragility and their appetite for risk.

Table 1: Herfindahl-Hischman Index (HH) and Three-bank total asset concentration (CR3) average in MENA Banking, 2005- 2015

Countries	CR3	HHI
Bahrain	84.77	0,42
Jordan	90.20	0.24
Kuwait	92.37	0.16
Lebanon	55.32	0.17
Oman	66.93	0.17
Qatar	88.24	0.20
Saudi Arabia	55.29	0.29
Tunisia	42.26	0.16
United Arab Emirates	56.67	0.39

Source: Author's calculations based on data retrieved from the BankScope database.

Banking system in the Middle East and North Africa (MENA) region has traditionally been a highly concentrated market displaying relatively low levels of competition. Table 1 shows the three-bank average concentration ratios over the period 2005–2015 based on total assets. While Lebanon, Saudi Arabia, Tunisia, and UAE have a three-bank concentration ratio ranging between 42 and 66 %, bank concentration in Bahrain, Jordan, Oman, Kuwait and Qatar exceeds 80%. Concerning Herfindahl-Hirschman index (HHI), the US department of justice has defined three threshold levels for HHI to find out the market structure in an industry. A HHI index below 0.1 (or 1,000) shows an unconcentrated market. Then, a HHI index between 0.1 to 0.18 (or 1,000 to 1,800) indicates moderate concentration and finally a HHI index above 0.18 (above 1,800) indicates high concentration.

In certain countries where a large number of banks operate, as Lebanon, Turkey and United Arab Emirates, the major banks have sought to consolidate their position at the national level before they expand in the region. For Egypt, among the first objectives to achieve is to promoting consolidation movement by reducing the number of banking establishments. Therefore, the banking sector in MENA region faces to activity restrictions and entry requirement in different countries such as the reduction of barriers to entry for new banks, it is also dominated by state-owned intermediaries who would benefit from public support in case of distress. In fact, due to the absence of entry barriers for foreign banks that affect the behavior of the banks, the banking market are mainly national, except the activities of some institutions in GCC region, which are more involving in cross-border banking activities, for those reasons, the banks in MENA region tend to exploit a relevant market concentration.

Whether banking concentration is a source of higher profit, this subject requires particular attention on the behavior of Islamic banks that are different from conventional banks especially under a concentrated banking sector. According to the World Islamic Banking Competitiveness Report (2013–14),Islamic banking constitute 53% of the market share in Saudi Arabia, 17% of the market share in UAE, 24% of the market share in Qatar. Compared with conventional banks, Islamic banks have more complex products, more process steps and more interfaces.

3. Literature Review

The literature on the assessment of the link existing between concentration and profitability is divided into two main streams. The Structure-Conduct-Performance (SCP) paradigm which predicts that banks are able to extract monopolistic rents on the concentrated markets through a behavioral effect linked to charge higher rates on loans and pay lower rates on retail deposits. In this configuration, the more the market is concentrated the more the competitive intensity is slowed and the relative Market Power hypothesis (RMP) based on the idea that banks with large market share and well-differentiated products are able to exercise their market power through a higher level of pricing which allows them to earn a surplus of income.

The recent financial literature has contradictory predictions about the relationship between bank concentration and financial performance in both theory and empirical studies. The supporters of concentration- performance argue that concentrated banks will earn higher profit, like, Berger and Bouwman (2013) who found a positive statistical relationship between market concentration and profitability measures of the banking industry. Molyneux and Thornton (1992) provide similar evidence suggesting that a higher level of banking concentration leads to monopoly profits. Sraïri (2010) reported that banking concentration has a positive and statistically significant impact on the profitability and therefore supports the idea that banks with market power appear to display higher incomes. Likewise, Ben-Khadiri, k and Ben-Khadiri, H. (2010) examine the determinants of profitability of Islamic banks in MENA region cover the period 1999-2006. Their results suggest that banking concentration positively affects bank profitability. Naceur and Omran (2011) also concluded that a more concentrated banking system generates a greater bank profitability motivated by the benefits of greater market power.

Conversely, Boyd, De Nicolo and Jalal (2006) argue that the more concentrated banking markets are associated with an increased risk of bank failures. In other words, a positive and significant relationship between market concentration and the probability of bank failures found.

According to the relative market power hypothesis (RMP), only banks with large market share and well differentiated products that can be sold at high prices are able to achieve high profits. Although the first published studies have reported for several decades a positive association between profitability and market share (e.g., Shepherd, 1972). The nature of this relationship continues to receive much attention, however, many theoretical studies confirm the relative market power (RMP) hypothesis by involving the effect of market share to make abnormal profits and to mitigate risks (e.g., Berger and al., 2000; Maniatis, 2006and Seelanatha, 2010).Some research suggests the effects of market share on bank performance such as O'Regan Nicholas (2002)who reveals that companies with higher market share are likely to have a better performance, in particular, to improve their financial performance, to better satisfy their clients and to increase their loyalty.

4. Empirical Study

The purpose of this paper is to explore the impact of concentration on the MENA bank performance and to investigate the moderator role of market share to alter market structure – performance relationship. The sample includes 92 conventional and Islamic banks for11 countries (Saudi Arabia, Qatar, Kuwait, Bahrain, Oman, Jordan, United Arabe Emirates, Lebanon, Tunisia, Egypt, Israel) over the period 2005-2015employing panel data. Financial data and ownership information are collected from The Bureau Van Dijk's Bankscope database. Besides, we use the World Governance Indicators produced by Kaufmann et al. (2010) over the period 1996-2015, for six dimensions of governance to control for the quality of institutions. As for the bank-specific variables, data were extracted by the World Bank and the World Development Indicators completed by the bank annual reports. Finally, we refer to the World Bank for the macroeconomics variables. The detail of the definition and sources of all variables are provided in TableA.1 (in the appendix).

In this part, we conduct firstly to construct the synthetic governance index employing the Principal Component Analysis (PCA).In the second, we test the influence of market concentration through the concentration index HHI in conjunction with bank – specific and macroeconomic variables on bank performance measure (ROA).The first regression including all banks, deals with 1012 observations, provides a reference point. The two other regressions are carried out by subdividing the sample into conventional and Islamic banks. Model (1) reports the preliminary regression results without interaction term. Model (2) presents the coefficients estimations obtained from the basic specification, using an interaction term constructed as a product between concentration and market share. Then, the hypothesis that we want to test consists if the market share moderates the concentration-performance relationship.

In the next step, we use robustness checks to analyze the effect of using the CR3 ratio as a proxy of concentration, which measures the market share of the top three banks in the country, and to verify if our results corroborate previous results estimated from the Herfindahl Hirshman index and estimate in the second series of regression the following models to highlight the difference between large and small banks.

Figure1: Conceptual Framework
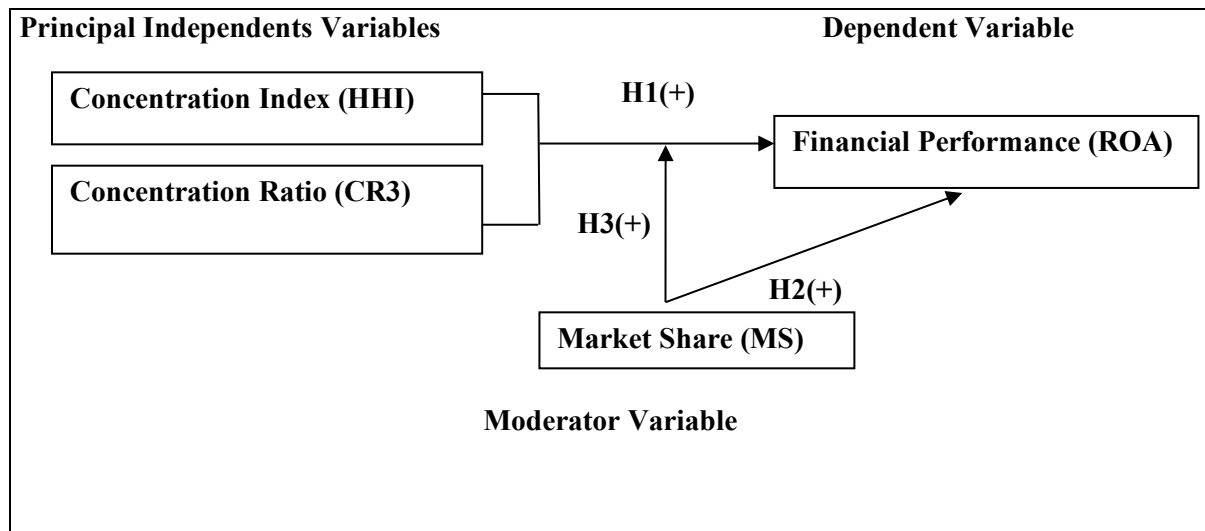
Source: By Researcher

Figure 1 presents the conceptual framework of this study**.** Specifically, we shed light on three testable hypotheses, first we check if more concentrated markets have more profitability. Second, we assess if the level of market share affects the performance of banking. Third, we study how market share interact to influence concentration- performance relationship.

H.1: Market concentration exerts a stimulating effect on bank performance.

H.2: Market share has a positive effect on bank performance.

H.3: The moderator variable, market share, has a positive effect on the relationship between concentration and performance.

4.1. Data description:

Dependent variable:

Financial performance (ROA): we measure bank performance by return on assets ratios calculated by the relationship between the net income and the total assets. This measure is the most common use of performance variables (e.g., Claessens et al., 2001; Berger et al., 2005; and Beck et al., 2013). A high coefficient of ROA indicates a significant banking performance and therefore a lower probability of default risk.
Independent variables:

Market structure is approximated by the concentration measures such as the Herfindhal – Hirshman (HHI) and the (CR3) ratio.

● Herfindahl-Hirschman index:

The Herfindahl-Hirschman Index is defined as the sum of the squared market share of each bank in the banking sector. It is the most used concentration measure in the literature which captures the entire distribution of firm sizes and plays a significant role in the enforcement process of antitrust laws in banking. The value of HHI is between the two extremes 0 and 1. The maximum index- value (HHI=1) indicates a monopoly situation. Conversely, the minimum index-value (HHI=0) shows the case of a perfectly competitive market. The more the index-value tends towards 1 the more the market is concentrated (position of monopoly).If a positive relationship is found, the SCP hypothesis would be accepted.

●Concentration ratio (CR3)

A measure of the degree of concentration in the banking industry, calculated as the fraction of assets held by the three largest banks in each country. The concentration ratio represents one of the most frequently used measure of concentration in the empirical literature summing the market shares of the 3 largest banks in the market. This ratio varies between 0 and 100%. The more the ratio is close to 0, the more the market is competitive. Therefore, the three largest banks of the banking sector have a CR3 equal to 75% meaning that these banks own the three quarters of the market. Concentration is considered weak if the three largest banks have together a cumulative market share between 0 and 40%. A 100% CR3 ratio presents a monopoly situation.

● Market Share (MS): represents the ratio between the total assets of bank i, and the total assets of the banking sector. A positive relationship with bank profitability would suggest the acceptance of the RMP hypothesis (Maniatis, 2006 and Seelanatha, 2010).

●CONC*MS: to measure moderator effects, we use the interaction term by adding the product of the independent variable (concentration) and the moderator variable (market share). Within this framework, moderation implies that the causal relation between two variables changes as a function of the moderator variable. A positive coefficient on the interaction term will positively affect the concentration - performance relationship

●Capital adequacy: capital adequacy is recommended by Basel accord for judging asset quality and prudent credit risk management. It is the ratio of equity to total asset (EQTA) is also included as a measure of capital strength. A positive coefficient of this ratio indicates an efficient management of capital structure of banks. A higher capital adequacy ratio indicates a better asset quality, therefore, a lower defaults risk.

●Z-score: It is the most commonly used measure of default risk and banking stability that represents proximity to bankruptcy indicated by a null score. The higher the ratio is, the lower the risk of bank failure.

●Credit risk (CRISK): It isthe ratio of nonperforming loan to gross loan. It is considered as one of the most important indicator of credit risk and loan quality of the bank. The lower the ratio is the indication of better asset quality and lower doubtful loan, therefore, lower credit risk.

●GOV*CONC: represents the product between the degree of governance and concentration (governance x concentration). Consequently, we study how the eventual success of the concentration strategy in terms of performance depends on the institutional characteristics that allowed a concentrated market to adapt to the new rules in order to ensure a banking performance. If the interaction term coefficient is positive and significant, this involves that the marginal effect of concentration on bank performance depends on the level of governance.

● Inflation (GDP deflator annual %): Inflation is one of the main channels through which interest rates and bank margins can be affected. The major effects of inflation damage the stability of the financial system and the ability of the regulator to control the solvency of the financial intermediaries. Revell (1979) noted that fluctuations of bank performance can be strongly explained by the level of inflation. An important indirect influence of inflation on banks is through its impact on customers and the consequent changes in demand for different types of financial services. However, unexpected increases in inflation lead to cash flow difficulties for borrowers, which may lead to premature termination of loan agreements and precipitate loan losses.

● GDP growth rate (annual %): is an important variable influencing bank's profitability and economic activity in the country. Banks are generally able to increase loans when the economy is booming. Furthermore, they generate less non-performing loans when the companies are doing well, which increases profitability (e.g., Athanasoglou et al., 2008). Margins are also increasingly high in periods of economic growth, further contributing to bank profitability.

4.2. Model Specification:

We use the following regression models by regressing the measure of profitability on the potential determinants, applying the panel data model to all estimations. The structural form of the models presents the nature of relationships between bank performance and its determinants. In the first step, we estimate the following Model (1) to examine the impact of concentration index HHI on bank performance.

$$\text{ROA}_{it}= \alpha_0+\beta1 HHI_{it}+\beta2 MS_{it} +\beta3\ EQTA_{it} +\beta4\ Z\text{-score}_{it}+ \beta5 CRISK_{it}+ \beta6 X'_{it}+ \beta7\ (GOV*HHI)_{it}+ \mu_t+ \mathcal{E}_{it}\quad \textbf{(1)}$$

In the second step, we add to Model (2) an interaction term that represents the product between concentration and market share (MS*HHI) as an additional explanatory variable, apart

from the standard variables used in the Model (1)to examine the moderator role of the market sharein the relationship between concentration and performance.

$ROA_{it} = \alpha_0 + \beta1 HHI_{it} + \beta2 MS_{it} + \beta3\ EQTA_{it} + \beta4\ Z\text{-score}_{it} + \beta5\ CRISK_{it} + \beta6 X'_{it} + \beta7\ (GOV*HHI)_{it} + \beta8\ (MS*HHI)_{it} + \mu_t + \mathcal{E}_{it}$ **(2)**

Where subscripts *i* and *t* refer to bank and year, respectively. ROA is the profitability ratio to measure bank performance.HHI is the index of market concentration that represents market structure. CR3 is the three largest banks' assets to total banking sector assets. MS is the market share of assets of the bank. EQTA represents capital adequacy of bank. Z-score is an indicator of banking stability. CRISK is a measure of the credit risk of the bank. X^i is a vector that represents the macroeconomic variables (GDP growth is the real gross domestic product and inflation represents the annual inflation rate). GOV*HHI is an interaction term between governance and market concentration. MS*HHI is an interaction term between market share and CR3 concentration ratio. α_0 is a constant term of the model. μ_t is the time-specific effect and$\mathcal{E}_{it}$ is the error term.

4.3. Explanatory Analysis: Principal Component Analysis (PCA)

Principal component analysis is used is to reduce the dimensionality of the dataset composed of six governance indicators of Kaufman: voice and accountability, political stability, regulatory quality, rule of law and corruption. Higher values correspond to better governance. This is obtained by transforming into a new set of variables, the principal components (PCs), which are uncorrelated and which are ordered in such a way that the former retain the major part of the variation present in all the original variables.

In order to construct the synthetic governance index, we begin to determine the main components to be retained for the interpretation of results throughout the study period, which extends from 2005 to 2015 for all countries of our sample. Table A.2 (in the appendix) provides the Eigen values classified in descending order, it also shows the inertia of each axis and the cumulated inertia. Additional retention criteria were based on Kaiser's rule of thumb that the Eigen values of the component should be >1.0, the proportion of the variation in the original variables explained by the component and the shape of the screen and loading plots. However, the number of axes to take into account is determined according to the absolute criterion (Kaiser Criterion) allowing retaining only the axes whose values are greater than 1. The first two axes are then retained.

Table A.3 (in the appendix) describes the contribution of each variable in each major component. Only the highest contributions for each of the main axes selected are represented. This makes it possible to obtain a well-defined classification.

The synthetic governance index is calculated using the linear combination of the first two components (PC1 and PC2) express 85.49% of the total dataset inertia that means that 85.94%

of the variables cloud total variability is explained by the plane. This percentage is relatively high and thus the first plane well represents the data variability. In particular, the weighting of each component by its inertia relative to the inertia of the first principal plan formed by the first two factorial axes. The governance synthetic index is followed by:

$$\text{GOV= [(F1*0, 6262) + (F2*0, 2287)]/ 85, 49} \quad (3)$$

5. Regression Results:

5.1. Descriptive Statistics

Before we start estimations of panel data, it is interesting to performed a stationarity test for all variables in our sample to ensure the validity of our results by applying the unit root tests of Im et al., (2003) suggesting that all the variables are stationary. We then verified the homogenous or heterogeneous specification of the data generating process, meaning to precise whether the studied model is perfectly identical to all banks or if there are specific effects related to each bank. It is therefore important to test whether individual effects are included in our data. Applying this test resulting in the rejection of the null hypothesis of non-stationarity at the 1% significance level.

The statistics of Hausman test are reported in Table A.4 and Table A.5 (in the appendix). The null hypothesis, that the individual effect is uncorrelated with the independent variable, is not rejected at the significance level of 10 percent for the sample including all banks and for the sample of conventional banks. For Islamic banks, Hausman test providing evidence in favor of the random effect at the 5 percent significance level. For CR3 concentration ratio, Hausman test lead to reject the null hypothesis of the presence of random effect in all the model specifications.

According to the descriptive statistics provided in Table A.6 (in the appendix), we briefly describe some statistical properties of our variables. We notice that the profitability ratio for Islamic banks is significantly higher compared to conventional banks. Results indicates also that Islamic banks recorded higher level of market power with 46% of concentration index and an average of market share with24% that is greater than conventional peers having an average of concentration index and market share respectively 27% and 15%. The tested difference of capital adequacy ratio between Islamic and conventional banks indicates that Islamic banks are well capitalized than conventional banks having an average of EQTA ratio which is about 19% and 13% respectively. The z-score averages is 0,20 for conventional banks and 0,17 for the Islamic banks. The credit risk show averages of 0,06 and 0,08 respectively for conventional and Islamic banks.

To control for any multicolinearity bias, we present the correlation matrix. The results as presented in Table A.7 (in the appendix) show that return on assets is positively correlated with concentration (HHI),which is consistent with theoretical predictions stating that the more concentrated banking sector is more profitable. As for the market share variable, it is positively

correlated with profitability. The result also show a positive correlation between the interaction term (MS*HHI) and profitability.

Table 2 presents the results of two regressions as specified of (1) and (2) models. The results of model (1) who examine the impact of each of industry controls and banking concentration separately on bank performance show that the coefficient of concentration index is not significant across all models. However, the market share has a significant effect on the bank performance which is consistent with the expectations. The coefficients estimates is positive at 5% significance level (for the overall sample and the subsample of conventional banks), and at 1% significance level for Islamic banks. So the successful firm's profit is related to higher market share. This result is consistent with Goldberg and Rai (1996) whose find that banks with higher market share charges higher profits. Therefore, hypothesis 2 is accepted and we confirm the validity of the relative market power hypothesis (RMP).

An important finding of this study is to show the moderator effects of market shares on concentration-performance relationship. Model (2) presents the regression results based on the interaction term between market share and concentration index (MS*HHI). First, in terms of the coefficient of concentration, that becomes significant at 1% level for the whole sample and for the sample composed by conventional banks. This result shows that conventional banks reach a higher profitability level in a concentrated market. Indeed, according to the traditional structure–conduct–performance hypothesis, a more concentrated banking sector could lead to monopoly profits (Molyneux and Thornton, 1992).Hence, concentration measure is still unchanged with a negative and non significant sign for Islamic banks which suggest that in spite of recent merger and acquisition activities, Islamic banking sector in MENA region is still characterized as non-concentrated.

The regression coefficient obtained for the market share variable is positively significant which supports the idea that banks with higher market share display higher income.

The coefficient estimates on the interaction term (concentration*market share) is negative and significant for the overall sample and for the sub-sample of conventional banks. Although, a weak negative relationship between concentration and bank performance is associated with significantly higher market shares. It can be said that the causal relation between concentration and bank profitability decreased as a function of market share. At a conceptual level, a moderator may be more impressive if we go from a strong to a weak relation or to no relation at all as opposed to finding a crossover interaction. Within this framework, we can therefore suspect the importance of the moderator role of market share to mitigate the effect of concentration on bank performance. According to the presented empirical evidence, the concentration measure of banking system and the market shares of individual banks have both a significant influence on bank performance, but the effect of these two variables together is not cumulative.

Our results provide evidence of the positive and significant effect of the capital adequacy (equity over total assets) on bank performance at 1% significance level for all regression. The result confirmed the hypothesis that bank capital has a significant positive impact on performance. Capital adequacy increases the strength of the bank which improves the solvency of the bank and capacity to absorb the loan loss and protect bank by run. For instance, well-capitalized banks face lower financing and financial distress costs, including bankruptcy and therefore higher profits. However, a higher capitalization ratio can also lead to greater profitability by reducing barriers to entry and expansion of some profitable products and services. This result is also in line with Pasiouras and Kosmidou (2007), Ben Khediri and Ben-Khedhiri (2010) who also revealed a statistically significant positive relationship between capitalization and profitability.

The regression coefficient obtained for the banking stability (z-score) is significantly positive on Islamic banks profitability at 1% significance level. A high level of this ratio reflects the strength of Islamic banking which will reduce risk default and equally lead to a better risk assessment and increase efficiency and profitability. Our findings corroborate the results of Beck et al., (2013) investigate that Islamic bank is less risky that may have a significantly lower credit risk compared to their conventional peers.

The coefficient of credit risk exhibits negative and statistically significant relationship in all regression at 1% significance level for the overall sample and for the subsample of conventional banks and at 5% significance level for the Islamic banks indicating that high non performing loan reduces the profitability and sound credit risk management. This finding confirmed the hypothesis that credit risk has a negative effect on bank performance and then supports the argument of Athanasoglou, Brissimis and al., (2008) which shows that an increase of non-performing loans reduces the profitability of banks.

Given the importance of governance in banking economy, we are interested in the impact of governance in concentrated banking-system on performance. The coefficient estimates on the interaction term has a statistically significant negative sign at 1% significance level for the overall sample and for the sub-sample of Islamic banks, implying that in a concentrated banking-system, governance is seen as a constraining factor to bank performance. In relation to this, the creation of a regulatory framework, based on the Basel III agreements, in a concentrated market has led to a less bank profitability.

These findings might mainly be explained by the fact that, a better investment environment associated with a more developed legal system and a more political stability system with less corruption can be considered as barriers which inhibit the freedom of bankers to improve and conduct their business and, consequently, weaken their profitability. However, the rigorous application of legal rules as well as transparency on the real situation of the market and restrictions on foreign bank entry impedes the evolution of bank profits in a concentrated market. Hypothesis that the development of institutional quality in a concentrated market has a positive effect on bank performance is rejected.

As regards macroeconomic variables, being introduced in order to take into account the state of economy, we observe that the coefficients of the inflation rate and GDP Growth are mostly positive at a 1% significance level for the overall sample and for the sample of conventional banks which conformed our hypothesis that . In addition, inflation may have a positive effect on banks profitability, since the basic finding rule of higher return is expected to operate in a riskier environment. However, the degree to which inflation affects bank profitability depends on whether inflation expectations are fully anticipated. Another reason for which inflation may have a positive effect on bank profitability is explained by the advantage that banks required compared to companies in terms of their ability to predict inflation. A positive association between inflation and banks profitability was noted by Molyneux and Thornton (1992). Bourke (1989) also revealed the growth of banking profitability in inflationary environment.

Furthermore, for economic growth this result confirms the idea that an evolution of economic activity contributes to improve bank performance, and consequently, decreases the probability of the occurrence of a systemic crisis. Thus, a higher economic growth favors the increase of consumption and investment, which will lead to higher credit demand, at the same time, to a better bank performance. Our result confirms the hypothesis of positive effect of economic growth on financial sector performance that supports by Athanasoglou et al., (2008).

Table 2: Determinants of the Return on Assets

variables	Dependant Variable ROA					
	Full Sample		Conventional Banks		Islamic Banks	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
HHI	0,0013	0.0037**	0,0034	0.0089 **	-0,0067	- 0.0297
	(0,673)	(0,056)	(0,264)	(0.012)	(0,539)	(0.111)
MS	0,0062**	0.0205***	0,0046 **	0.0171***	0,0210 ***	-0.0146
	(0,008)	(0,000)	(0,021)	(0.000)	(0,002)	(0.532)
EQTA	0,0996***	0.0999***	0,0844***	0.0873***	0,1502***	0.1496** *
	(0,000)	(0,000)	(0,000)	(0,000)	(0,000)	(0.000)
Z-score	-0,0053	- 0.0055	-0,0051	-0.0043	0,0713*	0.0681*
	(0,257)	(0,249)	(0,259)	(0.330)	(0,064)	(0.063)
CRISK	-0,0805***	-0.0806***	-0,0689***	-0,0689***	-0,0591 **	-0.0584**

	(0,000)	(0,000)	(0,000)	(0,000)	(0,032)	(0.034)
GDPG	0,0002***	0.0002 ***	0,0002 ***	0.0002***	0,0005	0.0005
	(0,000)	(0,000)	(0,000)	(0.000)	(0,229)	(0.225)
INF	0,0247***	0.0253 ***	0,0197 ***	0.0200***	0,0260	0.0264
	(0,000)	(0,000)	(0,000)	(0.000)	(0,348)	(0.317)
HHI*GOV	-0,0030***	-0.0030***	- 0,0007	-0.0006	-0,0066**	-0.0065 **
	(0,000)	(0,000)	(0,324)	(0.361)	(0,039)	(0.034)
MS*HHI		-0.0447**		0.0301***		0.0652
		(0,006)		(0.003)		(0.131)
Cst	0,0035***	0.0019	0,0044 ***	-0.0017	-0,0225**	-0.0097
	(0,001)	(0,164)	(0,000)	(0.122)	(0,024)	(0.436)
R-squared	0,1939	0,1959	0,1716	0,1719	0,4454	0,4464
Adjusted R2	0,1875	0,1886	0,1630	0,1622	0,4255	0,4238

Note. *p <0.01; **p <0.05; ***p <0.001

5.2. Robustness Checks:

In order to test the sensitivity of our results, we perform a set of robustness tests in this section. The dependent and independent variables are similar to those reported in the principal regression. The first set of robustness checks involves using an alternative measure of concentration the 3-bank concentration ratio to assess the level of concentration in the banking system. The importance of this concentration ratio comes from its ability to capture the structural characteristics of the market and is therefore often used in structural models explaining the performance of banking sector resulting from the market structure. However, several recent studies designed to explain banking market concentration used CR3 ratio as a concentration measure in regressions. The variable is taken from the survey conducted by Claessens and Laeven (2004) that the degree of concentration is measured on the basis of assets or deposits controlled by the three largest banks in banking sector. We therefore follow their approach to check the difference in the degree of concentration using CR3 ratio between the conventional and Islamic banks. In addition, we should verify if our results corroborate previous results estimated from the Herfindahl Hirshman index. We estimate the following equations:

$ROA_{it} = \alpha_0 + \beta1 CR3_{it} + \beta2 MS_{it} + \beta3\ EQTA_{it} + \beta4\ Z\text{-}score_{it} + \beta5\ CRISK_{it} + \beta6 X^{,}_{t} + \beta7\ (GOV*CR3)_{it} + \mu_t + \varepsilon_{it}$ **(4)**

Similarly, using the interaction term:

ROA $_{it}$= α_0+$\beta 1 CR3_{it}$+$\beta 2 MS_{it}$ +$\beta 3$ $EQTA_{it}$ +$\beta 4$ Z-score$_{it}$+ $\beta 5$ $CRISK_{it}$+ $\beta 6$ $X^{'}_{t}$ +$\beta 7$ $(GOV*CR3)_{it}$+ $\beta 8$ $(MS*CR3)_{it}$+ μ_t + ε_{it}**(5)**

The results of the model CR3 are presented in Table 3. We expect that the obtained results confirm our first estimations highlighting a positive relation between concentration and performance.

Table 3: Determinants of the Return on Assets

Variables	Dependant Variable ROA					
	Full Sample		Conventional Banks		Islamic Banks	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
CR3	-0,0025	-0.0009	0,0011	0,0062***	-0,0163*	-0.0085
	(0,161)	(0,698)	(0,531)	(0,009)	(0,088)	(0.574)
MS	0,0073 **	0.0310 ***	0,0052*	0.0304***	0,0193***	0.0399
	(0,002)	(0,002)	(0,010)	(0.000)	(0,003)	(0,126)
EQTA	0,0999***	0.0979***	0,0866 ***	0.0887***	0,1564***	0.1572***
	(0,000)	(0,000)	(0,000)	(0.000)	(0,000)	(0.000)
Z-score	0,0011	0.0013	0,0037	0.0033	0,0453	0.0432
	(0,784)	(0,742)	(0,369)	(0.421)	(0,188)	(0.213)
CRISK	-0,0807***	- 0.0811***	-0,0680***	- 0.0693***	-0,0558**	- 0.0563**
	(0,000)	(0,000)	(0,000)	(0.000)	(0,034)	(0.032)

GDPG	0,0003***	0.0003***	0,0002***	0.0002 ***	0,0002	0.0003
	(0,000)	(0,000)	(0,000)	(0.000)	(0,491)	(0.425)
INF	0,0229***	0.0226 ***	0,0181 ***	0.0181***	0,0280	0.0257
	(0,000)	(0,000)	(0,000)	(0.000)	(0,265)	(0.311)
CR3*GOV	-0,0012***	-0.0013***	-0,0014***	-0.0014***	-0,0038*	-0.0037 *
	(0,000)	(0,000)	(0,000)	(0.000)	(0,062)	(0.068)
MS*CR3		-0.0323*		-0.0338***		-0.0279
		(0,014)		(0.002)		(0.427)
Cst	0,0044***	0.0020	0,0026**	- 0.0010	-0,0085	-0.0142
	(0,000)	(0,203)	(0,037)	(0.480)	(0,449)	(0.310)
R-squared	0,1962	0,1964	0,1731	0,1733	0,4376	0,4376
Adjusted R2	0,1898	0,1891	0,1645	0,1636	0,4173	0,4147

Note. *p <0.01; **p <0.05; ***p <0.001

The results obtained are the same as for the HHI index, supporting a positive relationship between concentration and bank performance for the subsample of conventional banks. However, the sign of the relationship is similar to that expected under the SCP, where a higher concentration would lead to greater financial performance.

Indeed, for Islamic banks, concentration ratio CR3 is negative at 10% significance level. This is in line with Boyd, De Nicolo and Jalal (2006) who highlight a similar relationship implying that increased concentration leads to reduces bank profitability. This negative correlation can be explained on the one hand, by the idea that the mega-banks resulting in concentrated banking and that benefit from the «Too big to fail» theory are likely to be involved in riskier activities the fact that they are insured and spared by regulatory authorities who may sometimes be obliged to act as lender of last resort. On the other hand, by increasing the moral problem between borrowers and savers that in turn reduces bank profitability.

However, it can suggest that concentration is less beneficial for Islamic banks in terms of profitability than competition. This result contradicts the study of Ben Khadiri, K and H. Ben Khadiri (2010) examined the determinant of Islamic bank profitability in the MENA region, which argues that banking concentration is the major determinant that increases the profitability of Islamic banks. According to this observation, a limited number of large banks having the major part of banking market are beneficial for the growth of Islamic bank profits.

Another argument in favor of this result advanced by Hicks (1935) with the postulate of **«Quiet life»** explaining that banks with great market power can realize profit from

uncompetitive pricing behavior in a more relaxed environment in which less effort is made to minimize costs. In addition, according to the **«Quiet life»** hypothesis, banks that enjoy market power are the more inefficient and were also the more profitable ones. However, Hicks (1935) suggested that reduces competition on concentrated markets is related to less manager's efforts to maximize operational efficiency. Theoretically, increased competition is attributed to efficient banks

Regarding the coefficient of market share, the positive sign in all models supports the argument that the level of profitability increases with a higher market share. The regression of the CR3 ratio even suggests the presence of a dominant position of Islamic banks on the MENA banking sector which has resulted in the expansion of their market share. This result corroborates the previous arguments highlighting the fact that market share contributes to greater bank performance such as Shepherd (1972) who obtains similar results suggesting that banks enjoying larger market shares can strengthen their market power and realize higher profits.

However, we observe as previously that the interaction term is negative and significant at the 10% and 1% significance level in both for the whole sample and for the subsample of conventional banks. In this perspective, the special interest arises from the fact that the connection between concentration and bank performance is lower, even declining, when the market share increases. We can then confirm the contribution of the interaction term to mitigate the effect of concentration on banks performance, allowing us to validate the precedent findings proving the moderator role of market share. This result confirms the SCP hypothesis related to the importance of the market structure as an explanatory factor of financial performance for conventional banks but also indicates that Islamic banking systems are generally biased in favor of RMP hypothesis which establishes a significant and positive relationship between market share and bank performance.

The sign of control variables remained unchanged before and after the introduction of interaction terms. In terms of capital adequacy, the results show a positive sign at a 1% significance level across all models. Furthermore, we also note that GDP growth enters with positive and significant coefficients at the 1% level in both for the whole and conventional sample, suggesting that banking profitability is positively correlated with the level of economic development. Inflation also has a positive and significant coefficient at the 1% level suggesting that banks tend to be more profitable in an inflationary environment.

As a second set of robustness checks, it is interesting to highlight the fact that bank size can be considered as a main factor for profit level in a highly concentrated market. Therefore, we split our sample into large and small banks using market share as an indicator of bank Size. The 1st Quartile classifies banks with a low market share against the 3rd Quartile whose banks have a large market share (Table A.8 in the appendix).

Table 4: Determinants of the Return on Assets(Large Banks versus Small Banks)

Variables	Dependant Variable ROA			
	Large Banks		Small Banks	
	Model 1	Model 2	Model 1	Model 2
HHI	0,005	0,067 ***	0,033	0,368
	(0,369)	(0,002)	(0,706)	(0,150)
MS	0,011**	0,055***	0,277*	1,379 *
	(0,010)	(0,001)	(0,096)	(0,099)
EQTA	0,046***	0,054***	0,135 ***	0,134 ***
	(0,000)	(0,000)	(0,002)	(0,002)
Z-score	0,008	0,004	0,032 *	0,307*
	(0,197)	(0,466)	(0,073)	(0,093)
CRISK	-0,017***	-0,016**	-0,017	-0,026
	(0,020)	(0,032)	(0,562)	(0,409)

GDPG	0,000	0,000	0,002*	0,002
	(0,168)	(0,158)	(0,088)	(0,117)
INF	0,011 *	0,012**	0,047	0,065
	(0,082)	(0,046)	(0,580)	(0,458)
HHI*GOV	0,002 **	0,004***	-0,001	-0,001
	(0,013)	(0,000)	(0,942)	(0,963)
MS*HHI		-0,133 ***		-6,279
		(0,004)		(0,177)
Cst	-0,001	-0,020 **	-0,084 **	-0,14**
	(0,546)	(0,007)	(0,013)	(0,008)
R-squared	0,669	0,682	0,286	0,310
Adjusted R2	0,643	0,653	0,229	0,247

Note. *p <0.01**p <0.05; ***p <0.001

The results presented in table 4 highlight several conclusions: It can be seen that all the variables, including the interaction term remained approximately unchanged both between the main regression and the first robustness test. However, only large banks with a high market share benefit from market concentration. As a result, higher bank concentration associated with

more market share tends to increase the level of profitability. By substitutability, an increase in concentration leads to a rise in market shares.

According to the reported results, when we used both concentration (HHI) and market share (MS) separately, the coefficients of the two variables increased and positively affect performance. Whereas, when they are introduced jointly, their interaction was shown to be negatively correlated to bank performance. Their effect is not therefore cumulative. Thus, concentration and market share, represents determinants of bank performance, having a partial substitutability effect. In addition, this can be explained by the fact that concentration can not completely substitute market shares and vice-versa.

Second, it can be suggested that concentration has two contradictory effects on small banks. On the one hand, market concentration may positively affect small banks through the pricing behavior of large banks in terms of fixing higher price and interest rates the fact that, there is there evidence to suggest that concentration in banking encourages monopoly practices and price-setting behavior. On the other hand, relative to large banks that become active player in a concentrated market, small banks are more risky because they have fewer opportunities for diversification which may cause higher profit volatility. However, the lower size of small bank is a limit for their expansion the fact that, they behaving dominated and crushed by large banks and they appears to have become in a lower competitive position then don't subsequently have the advantage of realizing profits. According to the presented results, concentration does not affect small banks, so there was a compensation of the two positive and negative effects.

After the introduction of control variables, we observe that the capital adequacy ratio is statistically positive at 1% significance for both large and small banks against a negative sign of inflation negative only for large banks. However, the sign of the interaction term between concentration and governance varies displaying a statistically positive coefficient only for large banks validating in this way the importance of institutional environment in a concentrated market in which evolve banks. Whereas, the coefficient of banking stability indicator (z-score) is statistically positive at 10% significance level only for small banks against a negative sign of credit-risk for large banks.

6. Conclusion:

This study examined the effect of concentration on profitability of Islamic banks against the conventional banks in MENA countries. We use the most currently concentration measure like the Herfindhal – Hirschman index (HHI) and the financial performance measure expressed in terms of return on assets. To make the study more robust, we includes a concentration ratio CR3 in the evaluation for the years from 2005-2015.

This article highlights some main findings, in particular the relevance of the concentration measures that statistically and positively affects the performance of banking system. Specifically within a correlational analysis framework, market shares, as a moderator variable, affect the correlation between concentration and bank performance. It also indicates that, in the

presence of an interaction term proving a moderator role of the market share, bank concentration has a positive and significant effect on financial performance. This vindicates that banks with high market shares benefit more from the market concentration, allowing them to achieve surplus revenue. The consistent results include that market share remains a major explanatory factor in bank profitability.

A last conclusion drawn from regressions carried out for large and small banks presented in the robustness checks suggests that the relationship between concentration and profitability tends to vary considerably according to the positioning of banks in a concentrated banking sector. Regression results show that larger banks generally turned out to be more efficient than the smaller ones. However, driving towards a concentrated system, through the presence of major banks, positively affects financial performance. We can therefore conclude that there is heterogeneity of reaction of the HHI index.

Appendix:

Table A.1: Definition and Source of variables

Variables	Proxy	Definition	Source
ROA	Return on Assets	Net income/ Total Assets	Bankscope
HHI	Herfindahl-Hirshman Index	The sum of the squares of the assets market shares of all banks in the sample	Bankscope
CR3	3-Concentration Ratio %	Sum of the assets market shares of the three largest banks in the market	Beck et al (2016)
MS	Market Shares	Total Assets of bank i / Total assets of the bank sector	Bankscope
EQTA	Capital Adequacy	Equity / Total Assets	Bankscope
CRISK	Credit Risk	Non-Performing Loans/ Total Loans	Bankscope
Z-score	Stability Banking	(ROA+Equity/Assets)/sd ROA	Bankscope
GOV	Governance	Indicators of Kaufman	Worldwide Governance Indicators
GDPG	GDP Growth (annual %)	Annual % growth rate of per capita GDP	World Development Indicators
INF	GDP deflator (annual %)	The ratio of nominal GDP / real GDP	World Development Indicators

Source: By Author

Table A.2: Eigenvalues and explanatory power of the main components

Composantes	Eigenvalues	Différence	Percentage	Cumulative percentage
Comp 1	3.75721	2.38531	0.6262	0.6262
Comp 2	1.3719	0.895035	0.2287	0.8549
Comp 3	0.476869	0.271394	0.0795	0.9343
Comp 4	0.205475	0.0856514	0.0342	0.9686
Comp 5	0.119823	0.0511044	0.0200	0.9885
Comp 6	0.0687188		0.0115	1.0000

Source: Constructed by STATA, data from Worldwide Governance Indicators compiled by Kaufman et al (2010)

Table A.3: eigenvectors of correlation matrix R

Variables	Component 1	Component 2
Citizen's voice	0.1295	0.7547
Political stability	0.2872	-0.6096
Effectiveness of public action	0.4931	0.1211
Regulation quality	0.4698	0.1798
Rule of law	0.4486	-0.0392
Control of corruption	0.4854	-0.1014

Source: Constructed by STATA, data from Worldwide Governance Indicators compiled by Kaufman et al (2010)

Table A.4: Hausman Test (Herfindhal Hirshman Index)

	All Banks		Conventional Banks		Islamic Banks	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Chi 2(8)	70,26		22,87		12,90	
Chi2(9)		69,22		22,41		14,20
Prob>chi2	0,0000	0,0000	0,0035	0,0077	0,1153	0,1152

Constructed by STATA, data from Bankscop

Table A.5: Hausman Test (3-concentration ratio)

	All Banks		Conventional Banks		Islamic Banks	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Chi 2(8)	75,03		25,55		13,42	
Chi2(9)		76,98		25,54		14,71
Prob>chi2	0,0000	0,0000	0,0013	0,0024	0,0981	0,0993

Constructed by STATA, data from Bankscop

Table A.6: Summary statistics of the variables

	Conventional Banks	Islamic Banks

Variables	Obs	Mean	Std.Dev.	Min	Max	Obs	Mean	Std.Dev.	Min	Max
ROA	781	0.012	0.03	-0.44	0.15	231	0.015	0.05	-0.44	0.26
HHI	781	0.27	0.10	0.13	0.83	231	0.46	0.12	0.29	0.86
MS	781	0.15	0.15	0.00	0.92	231	0.24	0.24	0.00	0.80
EQTA	781	0.13	0.09	-0.01	0.80	231	0.19	0.14	0.03	0.90
Z-score	781	0.20	0.07	0.09	0.37	231	0.17	0.04	0.10	0.32
CRISK	781	0.06	0.15	-0.00	3.00	231	0.08	0.13	0.00	1
GDPG	781	4.73	3.88	-5.24	26.17	231	4.24	3.35	-5.24	10.6
INF	781	0.02	0.04	-0.13	0.12	231	0.01	0.05	-0.13	0.08
HHI*GOV	781	0.01	0.41	-1.02	0.92	231	-0.11	0.58	-1.62	1.11
MS*HHI	781	0.04	0.06	0.00	0.77	231	0.11	0.14	0.00	0.69

Note: This table reports the descriptive statistics of the variables used in the empirical analysis across 92banks for the period from 2005to 2015 based on Bank's annual data, Bankscope

Table A.7: Correlation Matrix

Variables	ROA	HHI	MS	EQTA	Z-score	CRISK	GDPG	INF	GOV*HHI	MS*HHI
ROA	1.0000									
HHI	0.0073	1.0000								
MS	0.0275	0.3419	1.0000							
EQTA	0.1310	-0.2015	-0.2731	1.0000						
Z-score	0.0582	0.4579	0.1481	-0.0391	1.0000					
CRISK	-0.3536	-0.0292	-0.1151	0.1439	-0.1816	1.0000				
GDPG	0.1537	0.2152	0.0865	0.0104	0.1669	-0.0255	1.0000			
INF	0.1583	0.0480	0.0195	0.0060	0.0466	0.0032	0.4053	1.0000		
HHI*GOV	0.0232	-0.1242	-0.0390	0.0874	0.2305	-0.1315	0.1410	- 0.1270	1.0000	
MS*HHI	0.0192	0.5453	0.9062	-0.1792	0.2754	-0.0807	0.1230	0.0322	-0.0400	1.0000

Table A.8: Measures of concentration and Market share 2005-2015

Items	1st Quartile	2nd Quartile	3rd Quartile	4th Quartile
HHI	0,159	0.18	0.32	0.83
CR3	0.54	0.69	0.86	1
MS	0,02	0,07	0,17	0,74

Source: Author Calculation

Acknowledgement

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