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Capital adequacy implications on Islamic and non-Islamic bank's behavior: Does market power matter?

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Abstract

After each crisis, reforms are carried out to prevent a new episode of financial crises. In this context, our objective in this study is to examine and simultaneously compare the behavior of Islamic and conventional banks in relation to the ratio of the capital adequacy in different competitive circumstances. We used data from 12 MENA and South East Asian countries characterized by the coexistence of Islamic and conventional banks. We concluded that the funding ratio has a significant impact on the behavior of 70 conventional banks and 47 Islamic banks. However, competitive conditions have no significant effect on the relationship between the weighted assets ratio and Islamic bank behavior, which means that this type of banks is applying theoretical models based on the prohibition of the interest.

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1. Introduction

Since the early 80s, the number, frequency and size of financial crises have continued to rise. A large number of developed, developing and in transition countries have experienced severe banking crises during the eighties and nineties and recently the 2007/2008 global financial crisis. The interest in the bank failure is caused by the bankruptcy substantial costs. Actually, the consequences of a bank failure are usually very expensive; financial losses for the fund suppliers (shareholders, depositors, and insurers), loss of competitiveness of the banking industry and a destabilization of the financial system as a whole if several individual failures escalate into a banking crisis through contagion mechanisms. The resolution of this type of failure implies a waste of resources, which are

particularly scarce in the emerging economies (Honohan, 1997).

The excess risk is the major cause of bank failure. It is the result of inefficient management and control of the bank lending activity. The information asymmetry is the cause of two issues that can affect the level of the credit risk. The first is an ex-ante problem called adverse selection which occurs before the financial transaction takes place. Adverse selection is when the lender is subject to risk from the borrower because of the information he keeps for his own interest. The second is an ex-post problem and also known as moral hazard. This type of problem arises after the granting of the credit. Such problem arises after the credit is granted as a result of the lender's failure to observe the borrower's actions (shares) so as to ensure the proper use of the distributed funds, which, therefore, affects the probability of repayment. Obviously, the level of the information asymmetry, of the adverse selection and of the moral hazard depends on the quantity and the quality of the information flow circulating between the lender and the borrower. This increase of the banking problems on a large

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scale has stimulated the interest of the economists and regulators about the stability of the financial system. Supervisors are indeed led to make room for growing internal controls and strengthen their prudential information. This change is due to the fact that an appropriate supervision of institutions is a pre-condition for the understanding of their risks.

The main objective of this theoretical movement is to analyze the behavior of banks in terms of portfolio choice, which is risk-taking, when the regulator imposes a solvency standard on them. The main challenge of this approach is to provide the basics of an effective prudential regulation that keeps the bank failure risk below a given threshold, which is considered acceptable. Therefore, banks are thus treated as portfolio managers operating on incomplete markets and whose decisions are compelled by prudential regulations.

In this context, there are several studies which demonstrate the impact of the Basel agreements on the lending behavior of conventional banks, whereas the literature on this topic in the Islamic banking sector is still scarce. The study of the minimum capital requirements of Islamic banks is relevant due to the principle of risk and profit sharing that could, in turn, reduce the overall risk incurred by the bank (Pellegrina Dalla, 2007).

The Islamic banking system, mainly the investment loss and profit sharing, foster the investor's participation in equity, which promotes the assiduity in the investment management and proper monitoring. Furthermore, the other Islamic financial mechanisms (such as Murabaha, Ijara and Istisna) require the involvement of investors in the real economy; as a result, financial transactions are fully backed by real assets. This feature enables Islamic banks to have a clearer view on the allocation of funds and reduce their exposure to speculative behavior (Khediri, Charfeddine & Ben Youssef, 2015). Siddiqui (2006) argues that equity-based Islamic contracts will reduce adverse selection and moral hazard problems, which thereafter, downplays the credit risk of these Islamic financial institutions. Actually, Islamic finance requires information symmetry and transparency in their transactions since Islam prohibits excessive uncertainty (gharar). Moreover, gambling (maysir) is prohibited, which means that excessive risk taking is not allowed. Finally, Cihak and Hesse (2010) argue that more difficult access to liquidity for Islamic banks requires that they should be more selective so that they will not incur a greater risk of moral hazard.

The purpose of our study is to examine and simultaneously compare the performance of loans and deposits of Islamic and conventional banks in relation to the funding ratio and in different competitive conditions. In fact, we tried to identify the role of competitive conditions regarding the relationship between the adequacy of the equity ratio and the banking behavior.

In the literature, there are two opposing theories regarding the impact of competitiveness on banking behavior. The first shows that a competitive market may increase banks' risk-taking behavior in order to maintain their previous levels of profit (Allen & Gale, 2004; Hellman, Mudock & Stiglitz, 2000). This risky behavior can be noticed either through the

rise of the credit risk in the loan portfolio or through the fall of the capital level “buffer” or both simultaneously. These risky policies can lead to an increased level of non-performing loans and subsequently to a great probability of bank failure. However, the second theory postulates that a restricted competitiveness should encourage banks to protect their very high “franchise values” by pursuing security policies that contribute to the stability of the whole banking system. Therefore, according to the paradigm of the “franchise value”, banks limit their risk when they have pensions, i.e. when they have market power. This theory was theoretically and empirically supported in the banking literature.

The originality of our research is to apply the concept of the market power and its impact on the relationship between the capital regulation and the lending and deposit banking behavior. Most of the previous studies examined the effect of information asymmetry on the banking risk and operations in general. Since the competitiveness conditions exert great pressure on the choice of the banking portfolio, we contributed to the literature by highlighting the role of competitiveness in the banking behavior.

Our methodological approach includes, in a first stage, a measure of the market power of Islamic and conventional banks through the Lerner index. Actually, the use of the Lerner index in evaluating the competitiveness of Islamic banking conditions in the MENA and South East Asian region can be considered as a contribution to the Islamic banking literature. Next, we present an empirical analysis that deals with the relationship between capitalization and banking behavior, on the one hand, and the effect of competition on this relationship, on the other hand.

Our paper is organized as follows: Section 2 presents the literature review. Section 3 describes the data and the research methodology. Section 4 contains the results and interpretations. Section 5 includes a robustness check. Finally, Section 6 details our conclusion.

2. Review of literature

The academic literature on banking behavior, in accordance with the capital regulation, uses various modeling approaches and considers the regulation of capital in terms of the level of the required capital, the equity ratio, the required capital as a percentage of deposits and loans and specifically of the recent regulation based on the risk-weighted assets. In what follows, we organize this literature depending on the basic approaches of the banking modeling.

2.1. Portfolio approach

One approach to analyze the effects of the bank capital requirements is to consider banks mainly as managers of asset portfolios. From this point of view, the main effect of any system of capital is to adjust the capital level regarding the risk in order to encourage banks to select the desired portfolio strategy.

The seminal work analyzing the impact of capital requirements on the choice of the portfolio are those of

Kahane (1977), Koehn and Santomero (1980) and Kim and Santomero (1988). The first two contributions consider a portfolio selection model based on the application of the mean-variance analysis under which the bank takes the asset prices and the returns as data and identifies its optimal portfolio so as to maximize the expected utility originating from the period-end capitalization, which in turn depends on the degree of the bank's risk aversion.

To examine the capital regulation implications on the strength and stability, Kahane, Koehn and Santomero evaluated the effect of equity requirements on the probability of default. Tightening the capital requirement ratio is a barrier limiting the efficiency frontiers of the banking investment assets, hence the bank, in this case, can react by changing the composition of its portfolio assets per unit of capital. However, the way the optimal portfolio is adjusted depends crucially on the coefficient of risk aversion. These authors show that a non risk-averse bank will respond to the increase of the equity requirements by choosing riskier assets that thereby increase the likelihood of bank failure. Consequently, Kahane and Koehn and Santomero indicate that the impact of the regulatory capital requirements on the overall stability depends on the level of the bank risk aversion.

Kahane (1977) suggests that the regulatory capital can reduce the overall portfolio risk if the banking portfolio asset composition is also subject to regulations. Actually, the regulator can reduce the excessive risk-taking in the banking portfolio by weighting the assets with risks as indicated in the system of Basel I. Kim and Santomero (1988) extended the portfolio approach by analyzing the weighting system of the risky assets.

Rochet (1992), following the same path as Koehn and Santomero (1980) and Kim and Santomero (1988) studied the consequences of capital regulation on the portfolio choices of commercial banks. He concluded that if the banks' goal is the maximization of the market value of their future profits, capital regulation cannot prevent banks from choosing very risky portfolios. However, if banks act as portfolio managers (they maximize their utility), capital regulation can be effective, but only if the weights used in the calculation of the ratio are proportional to the systematic risks of the assets. A more advanced theoretical literature shows that banks choose their portfolios with a maximum risk and a minimum diversification.

2.2. Incentives approach

The models of the incentives approach try to clear up the relationship between the capital ratio and risk-taking through the information asymmetry at several levels of the banking business. Two agency problems may occur in the bank's behavior towards risk (Besanko & Kanatas, 1996). First, the problem between the former shareholders "insiders" of the bank who maximize their well-being and the new shareholders 'outsiders' who have taken new share issuances in order to raise the proportion of the balance sheet equity. Second, the problem between the insiders and regulators lies in the

banking activity which consists in making investments in risky loans through the insiders whose funding comes from deposits and equity.

The surplus of insiders emerges from the loans and deposit insurance, which, in case of bankruptcy, incurs all the costs. Deposit insurance thus indirectly provides funding (deposits) at zero interest rate. The Basel I implementation requires that the bank raise the amount of its own funds. This means that, for the same amount of loans, the bank needs more capital, which reduces the surplus of insider. It is the outsiders who compensate this loss by paying a market price of the shares issued by the bank. In fact, if the proportion of the insiders' holdings is reduced, then, they will have less incentives to make greater efforts, which reduces the stock price equilibrium on the market (Besanko & Kanatas, 1996).

The regulators and insurers' exposure to risk would decrease if the bank's market value rose despite the decline of the stock prices. However, if the insiders' effort fell sharply, the equity market value would decline and the regulators would find themselves in front of an ailing bank. It is at this stage that the second agency problem comes in. The regulators and insurers' welfare would deteriorate if the increase in equity ratio had to be done. We can then quite imagine that the agreement rules would not be applied. If the bank anticipates this regulators' behavior, it may not reduce its risk taking. It therefore appears that depending on the expectations regarding the authorities' behavior, a bank may either reduce or raise the risk of its portfolio as well as its market value. The increase of the capital ratio may reduce the risk associated with some kind of an agency problem and simultaneously strengthen that of a different type. It would be better to hold equity depending on the characteristics of each bank (Besanko & Kanatas, 1996).

Other models proposed in literature, which contest the work of (Kim & Santomero, 1988; Koehn & Santomero, 1980), provide some explanations for some dynamic effects of prudential regulation. It is therefore shown that if the strengthening of prudential regulation effectively reduces the banks' profit variance (and thus the bankruptcy risk), it also causes at least two negative effects. The first one, which is direct, is due to the decrease of the bank's profitability brought about by the rise of the equity to asset ratio. This decline of the banks' profitability will weigh on the growth of their balance sheets and thus their medium and long-term growth. The second effect, which is an indirect one, results from the change of the banks' optimal investment policy caused by the decline of their profitability. Therefore, these banks are tempted to distribute a greater proportion of the profits to their shareholders to compensate, at least partially, the decline of their asset returns.

This profit reallocation will be at the expense of the capital accumulation and will intensify the consequences of the first direct effect. The taking account of these two effects in the risk assessment of bank failure leads us to balance the optimistic results (including those of Rochet, 1992) according to which it would be possible to define, at least theoretically, a prudential regulation perfectly effective.

2.3. Impact of prudential regulations on the banking behavior

Most of the contemporary theorists use the traditional banking system to explain the pattern of Islamic banks. Aggarwal and Yousef (2000) define the Islamic financial model as the prospect of risk and profit sharing and conclude that this model is not widely used because of agency and moral hazard problems.

The theoretical model of Islamic banks is different from that of the conventional banks. Specifically, the conventional banks' interest-based contracts are replaced, in their conventional counterparts, with earnings-based contracts in which profits and losses are shared between the Bank and the borrower. Moreover, Islamic banks are entitled to receive deposits mainly in the forms of current accounts, which have no interest but where the bank is liable to pay capital to holders at the request, and investment accounts (savings) defined as accounts that generate a return based on the rate of profit so that the rates may be adjusted depending on the realized profit and even on the loss that would be subsequently shared between the Islamic Bank and investment account holders (Iqbal, Ausaf & Khan, 1998).

However, some previous studies confirmed that Islamic banks diverge from their theoretical models by adopting conventional banks' strategies. In this context, Siddiqui (2006) argues that Islamic banks' activities are based on sales instruments rather than on partnership. Bourkis and Nabi (2013) find that Islamic banks are about to imitate conventional banks and therefore, there is no difference in the behavior of both types of banks. Ben Khediri et al. (2015) stipulate that, since both types of banks operate in the same competitive environment and are regulated in the same way in most countries, they are likely to have a similar behavior and thus similar strategies.

In the economy, Islamic banks play the same role as conventional banks. They enable savers and investors to make profits on their capital through credit allocation and funding management. Islamic banks are therefore subject to some risk categories, which are common with conventional banks, and to other risks that are specific to Islamic financial institutions. In this context, capital regulatory provides a better risk coverage and focuses on the supervisory practices and risk management.

Mastura, Kabir, Taufiq, and Shamsher (2014) argue that capital management must be done in a way that ensures an optimal combination of capital instruments. The banks are seen as the most important institutions that provide the markets with liquidity (Diamond & Rajan, 2000). The optimal level of the allocated banking capital should take into account the mandatory control imposed by the regulators since the banking sector is one of the most regulated industries in the world. Banking regulation is primarily based on the minimum capital requirements. Although the regulatory capital requirements are defined by the ratio of the minimum requirements, Berger (1995) sets out that banks must increase the capital ratio to ensure better stability conditions.

Several studies examined the relationship between capital and risk. Different results were reached on this matter. In the case of the US, some studies, such as those of Aggarwal and Jacques (2001) and Jacques and Nigro (1997), found that banks have responded to the new regulatory capital by excessive risk taking. Rime (2001) drew the same conclusions for the Swiss banks. Ghosh (2014) explores the relationship between capital and risk in 57 conventional banks and 46 Islamic banks during the 1996/2011 period. The results show that banks raise their levels of capitalization in response to a higher risk rather than the other way round. In this context, Mastura et al. (2014) argue that there is a significant and positive relationship between capital adequacy ratio and banking activity. Their study was conducted on a sample of 52 Islamic banks and 186 conventional banks in 14 countries during the period 1999–2009.

Cebenoyan and Strahan (2004) found that banks that use loan markets (securitization) for risk management purposes hold less capital and therefore are more profitable but, at the same time, riskier.

Although most previous studies support the positive relationship between the bank capital and the risk-taking behavior, other studies showed the opposite. For example, on examining the UK banks, Alfon, Argimon, and Bascunana-Ambros (2004) found a negative relationship between the capital and risk during the 1998/2003 period. Moreover, Das and Ghosh (2004) for the Indian banks and Stolz (2007) for the German banks found the same thing. Ghosh (2014) suggests that the lack of a consensus between these various studies could be due to the use of different risk measures as dependent variables. Francis and Osborne (2012) were induced by the financial crisis to develop a better understanding of how the capital regulations can affect the banks' behavior. Low levels of bank capitalization have been said to be the main reason for the decline of the credits.

However, this does not mean that the highly capitalized banks are exempt from the insolvency risk. The “Berhad Islamic Bank of Malaysia,” for example, became insolvent in 2006, although, in 2004, it had a high capitalization ratio of 31% (Chong & Liu, 2009). A high level of capital adequacy ratio means that banks have an additional capital for further investment. Nonetheless, if the banks are not selective in choosing their investments and not objective in assessing risks, they may be exposed to more risks that they cannot control. Ismail argues that the Malaysian Islamic banks have increased their capital ratios by reducing their lending volumes. He also concluded that Islamic banks have reduced their risk assets to raise their adequacy ratio in equity.

Watanabe (2004) analyzed the impact of prudential regulation on the slowing credit expansion and concluded that “credit crunch” or “capital crunch” is, by definition, due to regulations. Capital rationing is always a subject of research when a crisis affects the financial or economic stability at a national or international scale. The hypothesis of capital rationing is also frequently cited with the increase of the non-performing loan ratio, which is a possible explanation of the loan shrinkages (Ferri & Kang, 1999).

The impact of the regulatory capital requirements on the bank lending was debated by several studies. The recent global financial crisis has identified this relationship by showing that large losses on non-performing loans can lead to a loss of the banking capital and then to a restriction of the credit supply and, in return, the regulation community may require an increase of the equity ratio (Berrospide & Edge, 2010; Greenlaw, Hatzius, Kashyap, & Shin, 2008; Mora & Logan, 2010; Rice & Rose, 2010).

Theoretical and empirical studies on the banking sector showed that the credit supply has a significant impact on the real banking activities. Van den Heuvel and Gambacorta and Mistrulli (2004) suggest that a deficit in the funding ratio may cause the decline of the loans provided by the bank. Adrian and Shin (2008), state that a negative shock to capital leads to a decrease in the credit supply, which makes banks, adjust their balance sheet items. Peek and Rosengren (1995) argue that credit problems may arise when bank capital is declining, which also gives rise to difficulties in meeting the capital requirements. They describe this scenario as a capital crunch where the shrinkage of liabilities prompts banks to reduce their assets. During the Asian financial crisis, the Korean banks reduced their lending investments and raised their investments in risk-free assets so as to meet the requirements of the capital issued by regulators. Berger and Udell (1994) consider this scenario as a supply side of the credit rationing in which banks become unwilling to lend because of the reductions in the credit supply and the depletion of the bank capital.

Carlson, Shan, and Warusawitharana (2013) think that the separation between the supply and demand is a key issue that arises before dealing with the impact of capital on loan growth. For example, changes in the economic environment that affect the bank capital may probably affect the demand for loans. The damage to the economic environment may lead to banks losses that result in a reduction of the bank capital. The decline of bank capital could lead to increasingly robust regulatory requirements and encourage the bank to reduce its lending. At the same time, a change of the economic activity can also reduce the number of borrowers seeking loans.

3. Data and research methodology

3.1. Data presentation

Depending on the region, it is clear that Islamic financial assets are concentrated in the Middle East and Asia. A part from Iran and Sudan, which fully support Islamic financial systems, we find that the Gulf Cooperation Council (GCC) countries, Bangladesh and Malaysia are the major markets where Islamic finance is systemically important due to the growing market share of the Islamic financial institutions operating in these countries. Based on these data, we chose a sample of 117 banks, 47 Islamic and 70 conventional banks from 12 countries, namely, Bahrain, Bangladesh, Indonesia, Jordan, Kuwait, Malaysia, Pakistan, Qatar, Saudi Arabia, Turkey, UAE, and Yemen. The number of banks used in each

country and in each sector is shown in Table 1. Our study period, which goes from 2005 to 2012, makes us take into account the impact of the financial crisis.

The specific banking data extracted from the balance sheets and income statements of each bank are collected from the Bankscope database of the Van Dijk Bureau. These data are converted into United States dollars. The database of the Bankscope covers between 80 and 90% of the banking systems in terms of total assets.

3.2. Measurement of the Lerner index

In our paper, we chose the Lerner index as a direct measure of competition for the reason that it emphasizes the pricing power which can be seen in the difference between the price and the marginal cost, therefore capturing the extent to which a firm can raise its prices beyond its marginal cost (Berger, Klapper, & Turk Ariss, 2009; Jimenez, Lopez, & Saurina, 2007).

The value of the Lerner index varies between 0 and 1, such as a high Lerner value, i.e. close to 1, indicates a monopoly situation. However, when the Lerner index tends towards 0, the competition level is said to be very high. A Lerner index < 0 implies a price below the marginal cost that could occur due, for example, to a non optimal banking practice.

Algebraically, the Lerner index is measured as follows:

$$L = \frac{P - CM}{P} \quad (1)$$

With “L”, the Lerner index and “P” the output price. Due to the limited information regarding loans and deposits, we use total assets, which are an indicator of the banking activity, as an output measure in the same way suggested by Shaffer (1993) and Berg and Kim (1994). According to study of Carbo-Valverde, Humphrey, Maudos, and Molyneux (2009) and Ariss, 2010, the price of total assets is measured as follows:

$$P = \frac{\text{Total revenues (interest and non - interest income)}}{\text{Total Assets}}$$

Table 1
Number of banks per country and per specification.

Countries	Conventional banks	Islamic banks	Total
Bahrain	7	5	12
Bangladesh	5	4	9
Indonesia	5	3	8
Jordan	7	3	10
Kuwait	6	5	11
Malaysia	5	5	10
Pakistan	9	6	15
Qatar	5	2	7
Saudi Arabia	5	2	7
Turkey	6	4	10
UAE	8	5	13
Yemen	2	3	5
Total	70	47	117

CM is the marginal cost of total assets. Since a company's marginal cost cannot be directly observed, Schaeck and Cihák (2010) estimate it by the ratio of the average costs to the total revenues, while Leuvensteijn et al. (2011) calculate it using a translog cost function estimated for each country of their models.

In our approach, which is similar to that of Leuvensteijn et al. (2011), we assume that there is a global market for Islamic financial services different from that of conventional services. Therefore, estimating the translog-cost function of Islamic banks in each country of our sample is carried out separately from that of conventional banks. Then, the marginal costs obtained will be replaced in equation (1).

As a consequence, the translog cost function will have the following form:

$$\begin{aligned} \ln TC_{it} = & \alpha_0 + \sum_{j=1}^2 \alpha_j \ln W_{it}^j + \frac{1}{2} \sum_{j=1}^2 \sum_{k=1}^2 \alpha_{jk} \ln W_{it}^k \\ & + \beta_1 \ln TA_{it} + \frac{1}{2} \beta_2 (\ln TA_{it})^2 \\ & + \sum_{j=1}^2 \beta_{2j} \ln TA_{it} \ln W_{it}^j + \gamma_{1t} T + \frac{1}{2} \gamma_{2t} T^2 \\ & + \sum_{j=1}^2 \gamma_{3t} T \ln W_{it}^j + \gamma_{4t} T \ln TA_{it} + \varepsilon_i \end{aligned} \quad (2)$$

where TC is the total costs of bank *i* at time *t*, TA the total assets, and *W_i* the prices of the production factors defined as the following¹:

- W₁*: The price of funds which are equal to: interest expenses/total deposits and short-term funding
- W₂*: The labor and physical capital price defined as: non-interest/fixes assets

This equation also helps us reveal the chronological changes through a time-trend variable T. Consequently, the trend variable is a growing cyclical tendency measured by the annual cycle.

After estimating the cost function for each country of our sample and separating between the Islamic and conventional financial sector, we can now measure the marginal cost (MC) of each bank, which is equal to the first derivative of the cost function regarding the bank output measured here by the total assets.

The marginal cost is then calculated as:

$$\begin{aligned} MC_{TA_{it}} = & \frac{\partial CT_{it}}{\partial TA_{it}} \\ = & \left(\beta_1 + \beta_2 \ln TA_{it} + \sum_{j=1}^2 \beta_{2j} \ln W_{it}^j + \gamma_{4t} T \right) \frac{CT_{it}}{TA_{it}} \end{aligned} \quad (3)$$

¹ Based on the work of Hasan and Marton (2003), Soedarmon, Machrouh, and Tarazi (2011), Sun and Chang (2011), we use a cost function with two factor prices. We will also re-estimate the translog-cost function with-three input prices: price of work, price of financial costs and price of physical capital, as a robustness test for the measurement of the market power, however, the results support the function with two-factor prices.

The coefficients (β_1 , β_2 , β_{2j} , and γ_{4t}) are obtained by estimating the trans-log function of total cost.

By replacing the marginal cost obtained in Equation (1), we can get a measure of the Lerner index with which we can estimate the levels of banking competitiveness over time and across various countries in our sample.

3.3. Impact of the market power in the relationship between regulation and banking behavior

In a second step, we analyze the loan and credit behavior of Islamic and conventional banks regarding the regulations and the different levels of competitiveness. Since our study includes both the time and the individual dimensions, the estimation method based on econometric panel data seems to be the most appropriate. The panel estimation method helps multiply the number of observations and study both spatial and temporal trends. We conducted a Hausman test for each regression to determine if it is a fixed or random effect.

Following the model of Mastura et al. (2014), our estimate takes the following form:

$$Y_{it} = \alpha_0 + \beta_1 Lerner_{it} + \beta_2 C_{it} + \beta_3 Inflation + \beta_4 \Delta \ln GDP_{growth} \quad (4)$$

where *Y_{it}* refers to the changes of deposits and loans of bank *i* at time *t*. Lerner is an index of the banking competitiveness. *C_{it}* is a vector composed of specific banking variables as defined in Table 5. We have also included, in our regression, two macro-economic variables, such as the inflation rate and the change in the natural logarithm of the real GDP. The capitalization ratio used in this study is about the year (*t* – 1). This is due to the fact that the banking behavior in terms of deposits and credits in year (*t*) depends on the capitalization level in year (*t* – 1). Moreover, bank specific banking variables are delayed by one period to avoid endogeneity problems. Then, to obtain clearer and more robust results regarding the role played by the banking competitiveness in the relationship between the capitalization level and the Banking behavior, we followed the work of Tabak, Fazio, and Cajueiro (2012) to decompose the Lerner index in three dummy variables reflecting three levels of competitiveness, such as:

- High $\geq \overline{Lerner} + 0.5\sigma_{Lerner}$;
- Low $\leq \overline{Lerner} - 0.5\sigma_{Lerner}$;
- $\overline{Lerner} - 0.5\sigma_{Lerner} \leq Averte \leq \overline{Lerner} + 0.5\sigma_{Lerner}$,

3.4. Summary statistics

According to Fig. 1, we can point out that the CAR mean ratio of Islamic and conventional banks is between 15% and 27%. These rates are well above the minimum capitalization required by the Basel agreements.

The stability report of the Islamic financial service industry (2013), indicates that Islamic banks in some GCC countries are more stable compared to their conventional counterparts,

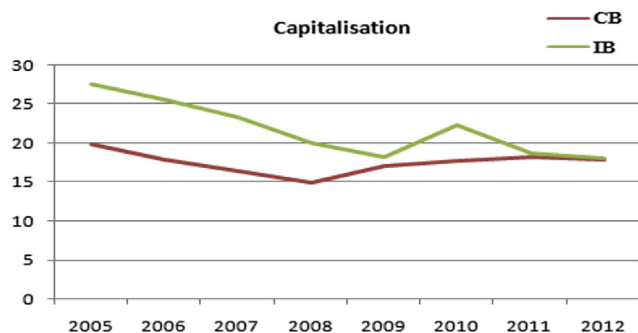


Fig. 1. Evolution of the capitalization ratio.

and this is due to strong capital ratios that were considerably higher than those of traditional bank. However, and according to Fig. 1, although the mean Islamic bank capitalization is higher, we notice a drop of the latter as soon as 2011, whereas conventional banks increased their capital ratio. Consequently, the chart shows that, since 2011, there has been a similarity in the capitalization level of both banks. Our results are in line with the work of Beck et al. (2013) and Bourkis and Nabi (2013) who showed that although the average capitalization ratio of Islamic banks is higher, there is no significant capitalization difference between both banking sectors. This result seems to inconsistent with the idea that suggests that CAR ratio of Islamic banks should be higher in order to reflect the additional risks assumed by the industry due to the nature of its investments.

The average capitalization of Islamic and conventional banks in each country of our sample is shown in Table 2. The nature and the economic situation of each country have an impact on the capitalization level. With the exception of Jordan, the difference in the average capitalization between the Islamic and conventional sector of the rest of the countries in our sample is not significant.

The descriptive statistics of the variables used in our model are presented in Table 3. For both banking sectors, it may be noted that the credit variation is higher than that of deposits. In the Islamic banks, the variation superiority of the credit compared to deposits can be explained by free investment. Although unrestrictive investments are made up by most of

Table 3
Descriptive statistics.

Banks	Conventional banks				Islamic banks			
Variables	Moy.	St.d	Min.	Max	Moy.	St.d	Min.	Max
Δ Deposit	0.147	0.222	-0.863	1.745	1.1554	7.663	-0.975	111.63
Δ Loan	0.161	0.243	-0.707	1.551	2.137	19.915	-0.999	276.79
CAR	17.504	7.531	0.65	89.7	19.547	17.565	-70.24	173.54
Size	16.205	1.499	11.021	18.618	14.489	1.839	9.026	18.128
Δ equity	0.185	0.498	-0.923	9.326	0.262	0.691	-0.648	6.646
Liquidity	0.211	0.128	0.016	0.845	0.195	0.128	0.002	0.672
Fee income	0.993	0.028	0.79	1.093	0.969	0.161	-1.199	1.582
Inflation	6.409	4.653	-4.863	20.286	6.568	4.667	-4.863	20.286
GDP gr	5.559	4.583	-12.72	26.17	5.139	4.448	-12.72	26.17

deposits in Islamic banks, there are no clear standards on how to deal with this account on the bank's balance sheet, for example, if it is to record them as balance-sheet or off-balance-sheet items.

Comparing Islamic banks to conventional banks, we notice that the credit variation of Islamic banks is higher. This is explained by the average capitalization level which is higher for the Islamic banking sector. Moreover, it can be concluded, from Table 3, that the equity change in the Islamic banks is higher than that of the conventional ones. This can be explained by the risk and profit sharing principle applied by the Islamic banks through equity securities, such as Mudarabah and Musharakah.

4. Results and interpretations

4.1. The market power of the Islamic banks

In Table 3, we display the results of the Lerner index obtained by estimating the translog cost function for each country. Thus, this table shows the changes in the levels of competition in each sector of Islamic and conventional banks operating in 12 countries in our sample during the period 2005–2012.

In the MENA zone, the competitive environment of conventional banks is more dynamic than that of the Islamic ones. The comparative analysis of the market power between Islamic and conventional banks is the subject of several studies, such as those of Petersen and Raghuram (1995), Ariss (2010), and Weill (2011). The importance of this comparison can be attributed to the significant impact of bank competitiveness on economic growth and development.

Furthermore, we find that Turkey is the only country where the Lerner index of the Islamic banking industry is low (0.276). Our results are consistent with those of Kuran (2004) who states that Islamic banks operating in Turkey managed in a short time to attract a high percentage of total deposits with a small number of branches.

Regarding the sector of conventional banks, excepting that of Saudi Arabia, we see, from Table 4, that the MENA countries have a higher level of competitiveness than the rest of the regions. In a study conducted in 2010 about the conditions of the bank competitiveness of MENA countries during the

Table 2
Average capitalization level of IB and CB for each country.

Country	Conventional banks	Islamic banks	Total
Bahrain	19.079	27.747	46.827
Bangladesh	11.229	11.713	22.736
Indonesia	16.382	13.475	29.857
Jordan	17.659	41.085	58.743
Kuwait	17.825	20.997	38.822
Malaysia	12.813	17.166	29.979
Pakistan	13.556	18.682	32.238
Qatar	16.652	20.78	37.432
Saudi Arabia	16.928	20.649	37.577
Turkey	17.453	15.332	32.785
UAE	19.893	19.677	39.569
Yemen	43.365	16.41	59.775

Table 4
Descriptive statistics of the Lerner index.

Pays	Banques Islamiques				Banques Conventionnelles			
	Obs.	Moy.	Min.	Max.	Obs.	Moy.	Min.	Max.
Bahrain	40	0.641	0.258	0.882	49	0.226	-0.906	0.692
Bangladesh	22	0.826	0.536	0.990	40	0.697	0.343	0.945
Indonesia	16	0.681	0.268	0.994	40	0.918	0.876	0.949
Jordan	23	0.656	0.027	0.848	56	0.540	0.331	0.739
Kuwait	24	0.710	0.364	0.964	44	0.498	-0.102	0.755
Malaysia	20	0.720	-0.168	0.999	29	0.953	0.928	0.968
Pakistan	35	0.505	0.178	0.779	40	0.339	-0.145	0.703
Qatar	12	0.707	0.605	0.809	40	0.496	-0.0171	0.849
Arabie Saoudite	14	0.836	0.697	0.983	40	0.847	0.717	0.998
Turquie	22	0.276	0.130	0.427	44	0.254	-0.122	0.518
UAE	38	0.481	-0.100	0.824	63	0.475	-0.248	0.749
Yemen	20	0.446	-0.513	0.763	13	0.536	-0.182	0.886

period 1994–2008, Anzoategui, Martinez and Roberto (2010) found that the information asymmetry and the entry barriers are the primary reasons for the differences in competitiveness across countries.

However, the literature about the comparison between the concentration in the Islamic and conventional banks is too limited. Muhamed-Zulhibri et al. studied the market structure of Islamic finance in Malaysia and assessed the degree of competition in the sector. In the same context, Ariss (2010) analyzed the competitive conditions prevailing in the Islamic and conventional global banking markets, and investigated the possible differences in concentration between these markets using a sample of banks from 13 countries for the 2000/2006 period. The results suggest that concentration of the global Islamic market is higher than that of their conventional counterparts.

In general, and for our entire sample, Fig. 1 shows that the Islamic and conventional banks in our study operate in markets with very low competitive level. According to the study of Fernandez de Guevara and Maudos, the Lerner index of the Spanish banks varies between 18.8% and 27,132%, whereas Carbo-Valverde et al. (2009) found an average Lerner index ranging from 11% to 22% for the banking industry of the European Union.

In our study, and up to the middle of 2008, we notice that the competitive level observed in the area of conventional banks is higher than that of the Islamic banks. This can be consistent because in most banking industries where both types of banks coexist, the number of Islamic banks is almost always lower than that of conventional banks. This reflects the embryonic phase of Islamic banking in our sample. From the end of 2008, the values of the Lerner index of both banking industries have become closer to each other.

Nevertheless, the study rejects the hypothesis that Islamic banks have a greater market power and therefore a greater ability to influence the prices. Our hypothesis is based on the fact that the customers of Islamic banks have religious motivations, i.e., they are less sensitive to prices, making the demand more inelastic than in conventional banks. Two possible explanations are given for this result (Fig. 2).

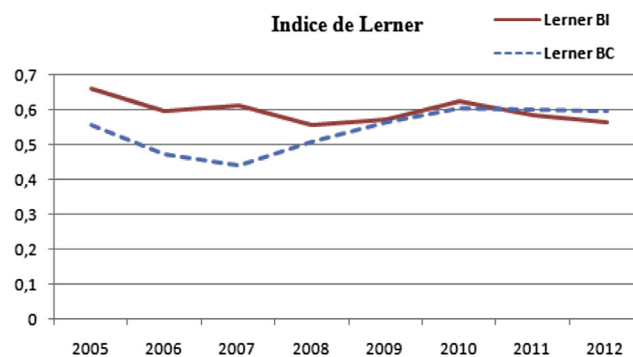


Fig. 2. Evolution of the Lerner index between 2005 and 2012.

Although Islamic banks are looked at as businesses with the goal of making profits, these profits must respect and be in line with their specific values. Moreover, some obligations that limit their activities, such as the principle of permissible investment (Hallel), the prohibition of speculation and the need to establish a fair price, can contribute to the minimization of their market power.

Furthermore, a second explanation is reflected through the principle of sharing losses and profits. According to this principle, an Islamic bank depositor can be considered as a shareholder in the way that he does not receive a fixed interest rate but shares the bank's profits and losses. Therefore, higher profits from the services offered and billed to the depositors imply that the latter are expected to pay higher prices paid. As a result, these depositors have incentives to limit the prices of the financial services of the Islamic banks for themselves.

4.2. Estimation results

In Table 5, we present the results of our model in order to analyze the impact of the market power of the Islamic and conventional banks on the relationship between the regulations and the banking behavior in terms of deposits and loans. In this context, Mastura et al. (2014) suggest that capital requirements have a significant impact on the behavior of loans and deposits of 52 Islamic banks and 186 conventional banks belonging to 14 different countries over the period 1999–2009. Their results show that capitalization is positively related to the deposit and loan variations of both Islamic and conventional banking sectors.

According to columns [1], [5], [9] and [13], there is a significant and negative relationship between the Lerner index of conventional banks and the deposit and loan variations. Since this indicator is inversely related to competitiveness, our results state that rising competition leads to an increase in deposits and loans. However, regarding Islamic banks, competitiveness has a significant effect only on the credit variation. Unlike in conventional banks, the Lerner index and Credit Δ are negatively related. We can deduce that Islamic banks are less sensitive to market conditions than their conventional counterparts which behave as risk takers in front of increased competitiveness. Our results are inconsistent with

Table 5
Results of the estimation model.

	Conventional banks								Islamic banks							
	Δ Deposit				Δ Loan				Δ Deposit				Δ Loan			
Lerner	−0.191*** (0.000)	−0.181*** (0.000)	−0.182*** (0.000)	−0.191*** (0.000)	−0.195*** (0.000)	−0.223*** (0.000)	−0.179*** (0.000)	−0.227*** (0.000)	0.471 (0.690)	0.006 (0.997)	0.503 (0.680)	−1.561 (0.394)	33.18** (0.023)	36.168** (0.030)	31.078** (0.045)	36.431** (0.042)
CAR (−1)	0.006*** (0.006)	0.006** (0.015)	0.005** (0.014)	0.006** (0.018)	0.005* (0.064)	0.005** (0.038)	0.004* (0.064)	0.006** (0.022)	0.009 (0.701)	0.0005 (0.986)	0.0112 (0.668)	0.009 (0.699)	0.733** (0.010)	0.796*** (0.008)	0.748** (0.014)	0.794*** (0.009)
High.comp*CAR		−0.002 (0.427)				0.003** (0.049)				0.016 (0.612)				−0.088 (0.669)		
Averg.comp*CAR			−0.006 (0.561)				−0.003** (0.010)					−0.018 (0.322)			−0.119 (0.289)	
Low.comp*CAR				−0.001 (0.798)				−0.002 (0.196)				−0.086 (0.142)				0.124 (0.749)
Size (−1)	−0.075** (0.029)	−0.079** (0.022)	−0.079** (0.023)	−0.079** (0.023)	−0.126*** (0.001)	−0.122*** (0.001)	−0.123*** (0.001)	−0.123*** (0.001)	−0.577*** (0.005)	−0.598*** (0.006)	−0.647*** (0.003)	−0.603*** (0.005)	1.1795 (0.808)	1.5474 (0.761)	1.5352 (0.762)	1.7131 (0.737)
Δ equity	0.054*** (0.001)	0.052*** (0.001)	0.052*** (0.001)	0.057*** (0.001)	0.069*** (0.000)	0.069*** (0.000)	0.071*** (0.000)	0.073*** (0.000)	0.538 (0.278)	0.578 (0.260)	0.594 (0.243)	0.473 (0.344)	24.60*** (0.000)	24.57*** (0.000)	26.04*** (0.000)	24.86*** (0.000)
Liquidity (−1)	−1.035*** (0.000)	−1.079*** (0.000)	−1.071*** (0.000)	−1.060*** (0.000)	−0.5285*** (0.001)	−0.5169*** (0.001)	−0.57*** (0.000)	−0.51*** (0.002)	−5.037* (0.055)	−4.944* (0.073)	−5.611** (0.044)	−5.268* (0.055)	15.918 (0.486)	18.680 (0.458)	15.808 (0.529)	18.851 (0.454)
Fee income (−1)	−1.097 (0.183)	−1.085 (0.186)	−1.071 (0.192)	−1.095 (0.183)	−1.302 (0.153)	−1.390 (0.122)	−1.315 (0.142)	−1.437 (0.112)	1.0627 (0.722)	1.1164 (0.716)	1.1243 (0.713)	1.1574 (0.704)	−0.3034 (0.990)	−1.323 (0.956)	3.9568 (0.870)	0.41684 (0.986)
Inflation	0.009*** (0.000)	0.008*** (0.000)	0.009*** (0.000)	0.009*** (0.000)	0.012*** (0.000)	0.013*** (0.000)	0.012*** (0.000)	0.012*** (0.000)	−0.008 (0.895)	−0.015 (0.830)	−0.008 (0.910)	−0.007 (0.920)	−0.773* (0.085)	−0.698 (0.137)	−0.655 (0.167)	−0.7243 (0.120)
GDP	0.012*** (0.000)	0.012*** (0.000)	0.012*** (0.000)	0.012*** (0.000)	0.014*** (0.000)	0.014*** (0.000)	0.015*** (0.000)	0.013*** (0.000)	−0.009 (0.876)	−0.011 (0.856)	−0.013 (0.825)	−0.011 (0.848)	−0.179 (0.662)	−0.158 (0.706)	−0.218 (0.601)	−0.172 (0.681)
Constant	2.5403** (0.011)	2.616*** (0.009)	2.590** (0.010)	2.607*** (0.009)	3.478*** (0.002)	3.488*** (0.001)	3.474*** (0.001)	3.563*** (0.001)	8.774* (0.061)	9.394* (0.057)	10.003** (0.040)	10.684** (0.031)	−52.36 (0.517)	−60.63 (0.474)	−61.37 (0.467)	−66.10 (0.440)
Hausman	0.0000	0.0000	0.0124	0.0073	0.0000	0.0000	0.0000	0.0000	0.9047	0.9520	0.9436	0.9391	0.0049	0.0166	0.0101	0.0025
R ²	0.3677	0.3754	0.3747	0.3596	0.3841	0.4054	0.4108	0.3742	0.412	0.732	0.381	0.567	0.548	0.687	0.472	0.614

*, **, *** Respectively significant to 10%, 5% and 1%. The coefficient is indicated by the digits displayed above. The probability is put between brackets.

Notes: Δ Deposit, Δ Loan, CAR, High.comp*CAR, Averg.comp*CAR, Low.comp*CAR, Size, Δ equity, Liquidity, Fee income, Inflation, GDP refer to change in deposits, change in loans, capital adequacy ratio (using risk-weighted assets), interactive terms, size (ln total assets), change in equity, liquidity ratio (liquid assets/total assets), Fee income (non-interest operating income/net interest revenue + other operating income), inflation rate, change in real GDP.

those of Bourkis and Nabi (2013) who reveal that Islamic banks differ in their theoretical model but the behavior of Islamic and conventional banks is the same.

Kim, Lee, and Park (2002) studied the capitalization effect on the behavior of the banking loans through the assumption of capital rationing, which they defined as a lack of liquidity in the market due to the restriction of the banking credits to meet their capital requirements. By looking at Table 5, we can say that the deposits and loans of Islamic and conventional banks positively react to the evolution of the funding ratio. The significant and positive CAR coefficients compared to Deposit Δ and Credit Δ prove that banking loans react the same way as the capital increase, which confirms the theory of supply according to which the credit behavior is particularly influenced by the level of bank capitalization. The significant and positive coefficient of the deposit change suggests that the increase in deposits is influenced by the changes in the CAR ratio. This result means that the bank capital is mainly made up of deposits. Our results are consistent with those of Peek and Rosengren (1995), Chiuri, Ferri, and Majnoni (2002), Yudistira (2002), and Schmitz (2007).

The coefficients of the interactions between the levels of competitiveness and the RAC ratio are significant only in the case of Credit Δ of conventional banks. For the conventional banking sector, the increase of the funding level is positively linked to the credit changes only when the level of banking competitiveness is high. However, concerning the medium and low level of competition, an increase in the CAR is followed by a shrinking of the credit supply. This result is relevant to the banking regulations since a minimum increase in the requirement ratio, in a highly competitive condition, can make banks take more risk to achieve higher returns.

We have also introduced, in our estimation, other control variables that can affect the behavior of the Islamic and conventional bank loans. The results of columns [1] and [5] show that, for the conventional banking sector, there is a significant negative relationship between the bank size, as measured by the natural logarithm of the total assets, and the change in the deposits and credits of conventional banks.

Our results are consistent with those of Peek and Rosengren (1995), Schmitz (2007); Kunt and Huizinga (2011) and Mastura who concluded that the increase of deposits and loans is lower for larger banks. However, for Islamic banks, the size is significantly negative for the deposit change but positive for that of the credits.

It can be concluded that the funding of Islamic banking is not based on deposits. The positive and significant sign between the size and Credit Δ of Islamic banks confirms the results of Cihak and Hesse (2010) who expect the major Islamic banks to be riskier and less stable. This can also be explained by the hypothesis of “too big to fail” according to which highly capitalized large Islamic banks can engage in an excessive risk-taking behavior. For both banks, the positive and significant coefficient of equity Δ suggests that the credit activities are in line with equity increase.

It is proven, through variable liquidity as measured by the ratio of the liquid assets to total assets, that the behavior of

Islamic banks is influenced by the level of capitalization and not by that of liquidity. The liquidity negative sign compared to Deposit Δ for both types of banks, indicates that banks prefer liquidity to deposits in order to meet the required capitalization level. The variable “Fee income”, which is used in our regression to examine the impact of the off-balance-sheet earnings on the banking behavior, does not appear to be significant throughout the model.

If we take into account, in our results, the effect of the macro-economic conditions in each country, we integrate two control variables, namely, the real GDP changes and inflation. Goodhart, Hofmann, and Segoviano (2004) show that bank loans are considered to be a pro-cyclical behavior that could be correlated with economic activities. The real GDP Δ positive sign means that economic growth plays a role in the increase of the supply and demand for bank loans. During the economic growth downturns, banks will be exposed to a slowdown in loan growth due to low interest rates and capitalization constraints. The second macro-economic variable used in our model is the monetary policy, as measured by the rate of inflation. High inflation is usually caused by an excessive money supply on the market as well as by decline of the interest rates Revell (1979) suggests that the impact of inflation on the changes of loans and deposits depends on the anticipation and the quick reaction of the bank in relation to the inflation rate. Under conditions of a good anticipation, banks will adjust the prices and the interest rates to compensate for the declining purchasing power. At the same time, depositors will reduce their savings. Therefore, a positive relationship is expected between the inflation rate and the credit change and a negative relationship with deposit change. However, the Islamic banking behavior, unlike that of conventional banks, is no longer affected by both the GDP changes and the inflation rate, which suggests that Islamic banks are less vulnerable to any changes in the macro-economic situation.

5. Robustness check

To assess the robustness of our results, we used a second measure of competitiveness other than the Lerner index. At this stage, the results are presented in Table 6 by using HHI as an alternative measure of banking competition.

In a study about bank risk-taking behavior applied to Islamic banks in the MENA region, Srairi (2013) shows that the concentration of the banking market is negatively related to risk. His results are consistent with those of Sullivan and Spong, according to which banks operating in a concentrated market and benefiting from a higher franchise value deductible are less prompted to take risk.

According to Table 6, HHI has a significant impact only on the loan and deposit behavior of conventional banks. The positive and significant sign between HHI and Δ Deposit, Loan Δ indicates that a concentration increase is followed by an increase of the deposit and loan variation in conventional banks. However Islamic banks' behavior shows a complete independence from the market competitiveness conditions.

Table 6
The Herfindhal–Hirschman index (HHI).

	Conventional banks		Islamic banks	
	Δ Deposit	Δ Loan	Δ Deposit	Δ Loan
HHI	1.029 (0.008)	2.274 (0.000)	1.934 (0.394)	4.315 (0.571)
CAR (−1)	0.009 (0.000)	0.011 (0.000)	0.112 (0.000)	−0.050 (0.535)
HHI*CAR	−0.044 (0.000)	−0.054 (0.000)	−0.091 (0.444)	−0.125 (0.467)
Size (−1)	−0.025 (0.483)	−0.038 (0.338)	−0.546 (0.016)	−2.447 (0.001)
Δ equity	0.058 (0.000)	0.079 (0.000)	−0.164 (0.856)	−1.55 (0.610)
Liquidity (−1)	−0.939 (0.000)	−0.344 (0.030)	−3.644 (0.191)	−15.739 (0.092)
Fee income (−1)	−1.341 (0.091)	−1.767 (0.041)	1.640 (0.609)	1.805 (0.867)
Inflation	0.010 (0.000)	0.014 (0.000)	−0.013 (0.857)	−0.354 (0.151)
GDP	0.012 (0.000)	0.014 (0.000)	−0.013 (0.829)	0.076 (0.724)
Constant	1.736 (0.083)	1.966 (0.072)	5.801 (0.237)	41.799 (0.011)
Hausman	0.0000	0.0000	0.3117	0.9244
R ²	0.3660	0.4276	0.4262	0.3841

Since competitiveness in the banking market primarily affects the interest rate, it can be concluded that Islamic banks are about to apply their theoretical model based essentially on the prohibition of interest. Moreover, it can be deduced from Table 6 that IHH can be a moderating variable of the banking relationship-capitalization behavior only in conventional banks.

6. Conclusion

The recent global financial crisis has increased the interest of the banking regulations to identify the relationship between the leverage effect, the market structure and the bank size (Basel Committee on Banking Supervision, 2010). Islamic finance is an ethical banking system based on the principle of risk and profit sharing. Theoretically, this principle should reduce the risk incurred by the Islamic bank. However, the problems of the market imperfections, such as the information asymmetry, can be a barrier for the transformation of this theory into a reality. These problems can make leaders react in an inadequate way, which could affect the strength, the stability and the efficiency of the bank. In this context, the objective of this chapter is to study the impact of the capitalization ratio on the loan and deposit change of the Islamic banks compared with their conventional counterparts. To meet this goal, we have chosen a sample of 70 conventional banks and 47 Islamic banks belonging to 12 different countries where both types of banks coexist during the period 2005–2012. Taking into account both the individual and time effect, our methodology is based on the panel econometrics.

Our results show that capital regulatory requirements have a significant impact on the credit behavior of the Islamic and conventional banks. However, the deposit change for the Islamic banks is no longer affected by the level of the capital adequacy. This could be explained by the fact that Islamic banks are based on assets and not on deposits to meet the regulatory requirements. Moreover, and through the interactions between the different levels of competitiveness and the ratio of capitalization, we were able to conclude that the

market power of the Islamic banks, unlike that of the conventional banks, has no significant effect on the relationship between the capitalization level and the banking behavior, which means that the operating Islamic banks of our sample are applying their theoretical model based on the prohibition of interest. This result shows that Islamic banks are less sensitive to the conditions of the market competitiveness. Moreover, it turned out that the behavior of Islamic banks is independent from the level of the market competitiveness and therefore from the interest rate. Hence, both banking sectors have different behavior showing that Islamic banks are applying their theoretical models.

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