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Title: The Impact Of State And Foreign Ownership On Banking Risk: Evidence From The Mena Countries

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THE IMPACT OF STATE AND FOREIGN OWNERSHIP ON BANKING RISK: EVIDENCE FROM THE MENA COUNTRIES

This paper investigates the impact of foreign and state ownership on banking risk. Panel data regression analysis is applied to a sample of 171 commercial banks from the MENA region during the 2006-2012 period. Two-stage least-squares analysis is conducted. Our results show that State ownership encourages banks to take more risks while foreign ownership reduces risk-taking. In addition, state-owned banks tend to increase capital adequacy ratio to hedge against high level of risk. Our finding also indicates that all categories of shareholders take a prudent attitude that influences risk reduction after the 2008 crisis.

1.1.1.1.1

1. Introduction

Banking risk is a major concern for policy makers since the banking system is a prerequisite for the proper functioning of the financial system as a whole and the stability of the entire economy in general. Excess risk-taking by banks may lead to financial crises and the collapse of the financial system. According to agency theory, risk taking is largely affected by ownership structure. In fact, controlling shareholders have incentives and power to affect corporate decisions in order to maximize profit by increasing risk-taking (Shleifer and Vishny, 1986) and they can compensate for losses by diversifying their portfolios.

Previous studies reached a consensus that ownership concentration is the main factor behind risk-taking differences between banks, but they failed to agree on the manner with which ownership concentration affects banking risk. For instance, Saunders et al. (1990), Laeven and Levine (2009) and Haw et al. (2010) showed that concentrated ownership is associated with greater risk. However, Burkart et al. (1997) and Iannotta et al. (2007) show that ownership concentration is associated with lower risk.

Theoretically, there is a conflict between agency managers and shareholders. On the one hand, managers are reluctant to undertake risky decisions because they may lose their titles (Jensen and Meckling, 1976). On the other hand, shareholders prefer increasing bank risk after collecting funds of depositors and bondholders to maximize their expected profit (Galais and Masulis, 1976). Ownership concentration seems to solve this conflict since majority holders have strong incentives to monitor managers, and even replace them in case of poor performance (Franks et al, 2001). Therefore, risk-taking is expected to be more prominent in firms with concentrated ownership than in firms with a dispersed ownership structure. However, when majority holders do not own diversified portfolios, they will not have the

incentive to increase banking risk. Thereby, controlling shareholders do not have the same motivations, objectives, means and effectiveness of control. It would be appropriate to study the identity of the controlling shareholder.

While a large body of literature has examined the impact of ownership structure on banking risk for US banks and for financial institutions in Europe and in large emerging markets (Brazil, China,..), empirical evidence on the MENA countries is scarce. This paper attempts to fill this gap, by assessing the impact of ownership structure on banking risk in the MENA countries. More specifically, we examine whether foreign ownership and state ownership affect risk-taking of banks.

Our study was initially motivated by the scarcity of studies on bank risk and ownership structure in MENA countries although the region presents itself as a favorable field of research for many reasons. *First*, banking sector plays an important role in financing MENA economies[1]. The majority of studies have analyzed the role of banking sector at a macroeconomic level. They pointed to the substantial role of banks in financing economies since they control most financial flows and own most financial assets (e.g. Creane et al. 2004; Ben Naceur et al., 2007; Ben Naceur and Omran, 2011 and Rejichi, and Aloui, 2012). Second and according to Ayadi et al., (2011), ownership structure is very important in developing countries where protection of shareholders' rights is weak like in the MENA countries.

Another motivation is the important reforms initiated in the region under the auspice of the International Monetary Fund (IMF). Indeed, after the adoption of financial repression policies during many decades, most of MENA countries governments have undertaken a comprehensive financial reform agenda, concentrated on banking reforms[2]. They privatized many state banks, gave commercial banks more freedom to expand their activities and alleviated entry barriers for foreign investors. Accordingly, within a short period of time, foreign participation became considerably present in the banking sector in many countries[3].

These latest developments in terms of privatization and foreign entry highlighted the need to examine their effect on bank risk in the MENA region, which is a main concern in policymakers' agendas.

Our empirical analysis uses a sample of 171 commercial banks from 13 MENA countries over the period 2006-2012. After controlling for endogeneity and simultaneity between owner's identity and risk-taking, we found that state ownership is positively related to risk-taking

[1]Banking assets account for 130% of GDP (Rocha et al. 2011).
[2]Involvement of these countries in these structural reforms varies from one country to another.
[3]According to Farazi et al. (2013) state banks accounted for 33 % of total assets in 2008 and foreign banks increased from 18 percent of total bank assets in 2001 to 20% in 2008.

while foreign ownership is negatively related to risk-taking. These results imply a divergence in the interests of different types of shareholders. Our results are robust to a series of tests which took into account the different proxies for risk-taking.

The remainder of this paper is organized as follows. Section 2 presents an overview of the banking systems in the MENA countries. Section 3summarizes some relevant illustrative theoretical contributions. Section 4 focuses on data and methodology. The empirical results are presented in section 5. The final section concludes.

2. Highlights of the banking sector

Although the MENA countries exhibit several similarities because of social and geographical proximities, they present several disparities at the level of the economic and institutional environments, including the banking systems.

Table 1 presents some banking sector indicators (average) between 2006 and 2011. First, the number of commercial banks varies substantially from one country to another. Bahrain has a large number of commercial banks compared to others (110) followed by UAE[4], Turkey, Lebanon, and Egypt (between 40 and 50). Algeria, Tunisia and Jordan have about 20 banks and the rest less than 20 banks.

Concerning the concentration of the banking sector (the share of the 3 largest banks' assets to the total banking sector's assets), the Jordanian banking sector is the most concentrated. Indeed, the three largest banks own more than 90% of the total banking asset. The three largest banks in Qatar, Bahrain and Kuwait control more than 80% of the banking assets. The Tunisian banking sector is the less concentrated (42%).

Bank deposits to GDP ratio is an indicator of resources available to the banking system to its lending activities. As shown in Table 1, there is a wide cross-country variation, with Saudi Arabia displaying the least ratio (22.97%) and Lebanon displaying the highest (206%).

The ratio of bank credit to dank deposits indicates the extent to which banks intermediate savings into private sector credits. According to Ben Naceur et al. (2011) a high credit-to deposit ratio reports high intermediation efficiency but a ratio higher than one suggests that private sector's lending is financed with non-deposit sources and this can result in funding instability. For the countries in our sample, this is valid for Saudi Arabia, UAE, Morocco, Tunisia and Qatar, while Algeria and Oman exhibit the lowest levels of intermediation efficiency.

[4] United ArabEmirates

Return on assets (ROA) varies substantially across countries but is positive in all countries, with strong performance for the banks in Qatar, Oman, Turkey and Saudi Arabia (more than 2%). However, the Tunisian banking sector shows the lowest ROA.

Insert Table 1 about here

Moving on to ownership structure, many banking systems are dominated by public ownership. For instance, the Saudi banking sector consists primarily of 12 domestic banks, 11 of which have major government shareholding while there is only one privately-owned bank. Turning to foreign participation, there are four joint venture banks where major foreign institutions hold significant stakes (around 40%).

Algeria's banking system is also characterized by a largely state banking sector. Most banks are public; those with private status are all foreigner owned. Public banks cover approximately 90% of the assets of the banking industry.

Other countries present a mixed ownership structure. Indeed, at the end of 2012, the Tunisian banking sector consists of 21 banks, divided into 7 state-owned banks, 8 foreign banks, 3 private domestically-owned banks and 4 mixed owned[5]. Similarly, in Morocco, there are 7 primarily foreigner owned banks, 6 state-owned and 6 private domestic banks from a total of 19 commercial banks.

In Qatar[6], there are branches of 7 foreign banks from a total of 17 banks. Ownership structure of the Qatari banking sector at the end of 2007 indicates a dominance of domestic owners. Indeed, the private domestic segment amasses 75% of total ownership, and public and quasi-public ownership is around 21%.Foreign participation is more important in the UAE banking sector. In fact there are 28 foreign banks and 23 domestic banks by the end of 2011[7]

In other countries, government ownership is very limited like the Turkish banking sector where the government owns 3 banks and there are 17 foreigner banks.

The banking sector in Oman consists of 16 commercial banks, divided into 7 local commercial banks and 9 foreign banks. All commercial banks are privately owned. The government is present in few banks with minority stakes by the end of 2013[8].

Regarding Lebanon, Jordan and Bahrain, there was no presence of state ownership. However, bank ownership is shared between private, foreign and domestic owners. For instance, there

[5] Central Bank of Tunisia «Rapport Annuel sur la Supervision Bancaire 2012 » September 2014
[6]Qatar Central Bank « Financial Stability Review » 2009
[7] Central Bank of The United Arab Emirates " Annual report" 2011
[8] Central Bank of Oman, «Annual report 2013» June 2014

are 30 Lebanese banks and 14 foreign banks[9]. In Jordan, there were 16 Jordanian banks and ten foreign banks by the end of 2013[10].

3. Literature revue and hypothesis development

3.1. Literature revue

Agency theory assumed that the first source of conflict between manager and shareholders comes from their different perception of risk. Shareholders with a diversified portfolio seem to take more risk for a higher expected profit but managers are risk averse in view of saving their position and personal benefits, and keeping their acquired human capital (Galai and Masulis, 1976; Jensen and Meckling, 1976)

Moreover, controlling shareholders enjoy significant shared control benefits; they have strong incentives to monitor managers, to collect information (Shleifer and Vishny, 1986, Grossman and Hart, 1980) and thereby to increase firm's profit by undertaking risky projects.

Concerning banking industry, many studies argue that agency conflicts that arise in banks are more complex than other firms because of the uniqueness of these organizations (eg. Ciancanelli and Reyes, 2001; Andres and Vallelado, 2008). Indeed, the bank has incentives to take even more risks by relying on depositors for their funding and by the presence of the central bank as a last resort lender. In addition, the complexity of banking businesses induces high information asymmetry that complicates the monitoring of managers' decision. Moreover, excessive risk-taking by banks can lead to serious consequences to the broader economy due to their unique positions in financial intermediation and payment system. For these reasons, banks are subject to more intense regulation. Andres and Vallelado (2008) argue that banking regulation seems to be an additional mechanism of corporate governance that may reduce the effectiveness of other mechanisms including ownership concentration, especially when regulation imposes bank ownership restrictions.

In addition, the objective of the regulator is to limit systemic risk, which is opposed to that of shareholders. This conflict of objectives creates a new agency problem.

Empirically, Saunders et al. (1990) are the first to examine the impact of banks' ownership structure on their risk-taking in the United States. They demonstrate that managerial stock ownership positively affects risk taking and that banks controlled by shareholders take more risk than their counterpart controlled by managers.

Following Saunders et al. (1990) a series of studies was purposed to test the effect of ownership concentration on risk-taking. For instance, Garcia-Marco and Robles-Fernandez

[9] Association of Banks in Lebanon «Annual report 2012»
[10] Central Bank of Jordan " Annual report2013"

(2008) found that ownership concentration in Spanish banks affected negatively risk-taking level. However, Haw et al. (2010) studying a sample of listed commercial banks in East Asia and Western Europe, found evidence indicating that banks with concentrated ownership exhibited higher risk measured by return volatility and insolvency risk.

These mixed results about the sign of such a relationship involve taking into account the identity of shareholders. Indeed attitude towards risk depends on the portfolio of these shareholders and their objective. Risk taking will be more prominent when controlling shareholders have opportunities to diversify their portfolio and inversely.

Accordingly, empirical studies have investigated several types of owners. For example, Barry, et al. (2011) highlight that higher equity stakes of either individuals/families or banking institutions was associated with a decrease in risk taking in European banks but institutional investors and non-financial companies seem to impose the riskiest strategies.

Other studies focused on managerial ownership like Chun et al. (2010) who found that managerial ownership alone does not affect risk levels of Korean banks but increases risk in Japanese banks.

The effect of state ownership has been examined in many economies like Argentina (Berger et al., 2005) Europe (Iannotta et al., 2007) and Asia (Cornett, et al. 2010). These studies conclude that state-owned banks exhibit more risk than private banks.

Laeven (1999) examined a panel of Asian banks before the Asian crisis of 1997. He found that family-owned banks and company-owned banks are more risky whereas foreigners-owned banks took little risk relatively to other banks.

All the above mentioned studies have focused on developed markets (US and Europe) or Asian markets; however emerging markets (especially the MENA region) have not received enough attention. The few studies that focused on this region examined a single market. For example, Bouaziz and Bouri (2012) focused on Tunisian quoted banks. They found that ownership concentration increases credit risk. However, state ownership and foreign ownership decrease credit risk. In addition, state ownership and institutional ownership are positively associated with liquidity risk.

Al-Tamimi and Jellali (2013) highlighted that ownership concentration of UAE conventional national banks is negatively associated with bank risk-taking. Private ownership of UAE national banks is negatively associated with bank risk-taking, yet government ownership is positively associated with bank risk-taking.

In this respect, our study follows this line of research. We focus on the impact of foreign and state ownership on risk taking in a set of MENA region countries.

3.2. hypothesis development

Given the importance of government and foreign owners in MENA countries, we examine the relationships between bank risk-taking and these forms of ownership.

- *The impact of State ownership on bank risk-taking*

Theoretically, government ownership is assessed from two different points of view. According to the *first*, state ownership is expected to preserve banks' financial soundness and enhance good governance. Moreover, in less developed countries, state ownership of firms is needed to revive both financial and economic development and eventually foster growth. Through its participation in banks, the government achieves its social and political objectives. In the case of state-owned banks, the government finances projects that create more jobs especially when its projects could not get private financing (La Porta, et al., 2002).

According to the *second* point of view, state ownership is considered a source of inefficiency due to government bureaucracy and lack of capital market monitoring. Indeed, managers are not sufficiently controlled compared to their counterparts in private firms. Thus, they deploy less effort than their private counterparts or divert resources for personal benefits (Lang and So, 2002). Political objectives may also alter the functioning of state banks since government finances, via this kind of banks, inefficient projects for political reasons (to win votes in elections) or sometimes as power abuse (via bribes) (Shleifer and Vishny, 1986).Indeed, Bonin et al.(2005) argue that government-owned banks are inefficient and considered as a burden for the banking sector.

State ownership induces more aggressive risk-taking behavior in many ways. First, state-owned banks enjoy government protection. Indeed, bankers may take more risk as losses and excess costs, which are invariably covered by the government (Demirgüç-Kunt and Detragiache, 2002). In addition, the government can protect banks by either implicit or explicit financial and regulatory support (Faccio, Masulis, & McConnell, 2006). Second, lending policy of state-owned banks may pursue social than financial objectives. For example, they finance unprofitable projects because it has social objectives like those undertaken by state-owned enterprises (Dong et al., 2014). Third, state-owned banks are essentially controlled by politicians, who may follow their own goals rather than social ones. They can transfer resources to their supporters (Shleifer and Vishny, 1986 and Iannota et al., 2013). The two last arguments suggest that state-owned banks might be seen as vehicles for raising capital to finance projects with high social and political returns, but possibly with high-risk and low-profit financial returns. Fourth, "soft" budget constraints in state-owned banks create

an excessive risk taking and the misallocation of resources (Sheshinski and Lopez-Calva, 2003).

Empirically, state ownership, found in the most of previous studies, is associated with greater risk taking. For instance, Angkinand and Wihlborg (2010) examine a sample of banking system of 32 countries from 1997 to 2003. They found evidence indicating that a large state ownership in the banking system was associated with greater risk-taking as measured by non-performing loans, whereas foreign ownership was not associated with risk but with higher risk-taking as measured by Z-score.

Furthermore, Berger et al., (2005) highlight that state-owned banks accumulated high non-performing loan ratios in Argentinean banks in 1990s.

Iannota, Giacomo and Sironi (2007) examined 181 large banks in 15 European countries. They found that public sector banks were characterized by poorer loan quality and higher insolvency risk than other types of banks.

Cornett et al. (2010) examined banks of 16 Asian countries during the period 1989-2004 and found that state-owned banks had greater credit risk compared to privately-owned banks prior to 2001. This indicator deteriorated after the 4-year period, after the beginning of the Asian financial crisis for state-owned banks and privately-owned banks. However, state-owned banks caught up with privately-owned banks in the post-crisis period of 2001-2004.

Iannota, Giacomo and Sironi (2013) used a sample of 210 large Western European banks to examine the effect of government ownership on risk-taking. They found that government-owned banks (GOBs) have lower default risk but higher operating risk than private banks, indicating the presence of governmental protection that induces higher risk-taking. Moreover, operating risk and governmental protection tend to increase in election years. These results are consistent with the idea that governments use their bank participation to pursue political objectives.

Against the above findings and on the prominent role of state banks in most MENA countries, it is expected that state ownership stimulates banking risk.

Hypothesis 1: State ownership is positively related to bank risk-taking.

- *The impact of Foreign ownership on bank risk-taking*

Foreign shareholding in banks brings benefits at micro and macro levels. In terms of individual characteristics of banks, the entry of foreign banks in developing countries improves human capital, skills and may lead to more diverse products, better use of up-to-date technologies, and knowledge transfer. In this regard, Levine (1996) argues that foreign participation enhances financial services and allows for an easier access to international

financial markets. At country level, foreign presence may enhance competition in the host country (Claessens and Ohara, 2013). In addition, it puts pressure on governments to accelerate domestic reform by improving regulation and supervision, and increasing transparency, (Levine, 1996). Empirically, studies have shown that greater foreign presence is associated with lower overall costs of financial intermediation (Claessens, et. al 2001), better economic performance of borrowers (Martinez Peria and Mody, 2004) and well performance in developing economies (Sufian, 2009). Wu, Jeon, & Luca (2010) argue that foreign participation enhances GDP growth because of more productive and efficient allocation of capital and labor.

Regarding its impact on risk-taking, foreign ownership is perceived as a stimulator for risk-taking for several reasons. *First*, foreign owners may show higher preference for risk compared to domestic owners as they can better diversify risk. *Second*, foreign banks are more efficient and take more risk compared to their domestic counterparts. Indeed, they have better access to the capital market and are better able to serve the international clientele that is not easily served by domestic banks (Berger et al., 2005). In addition, in developing countries, they may have a comparative advantage in technology access, in collecting, evaluating and analyzing quantitative information on financial statements, and be less exposed to political pressure. However, foreign banks may also suffer from distance problems, and big banks are disadvantaged in terms of quality analysis of 'soft' information (Stein, 2002).

Many studies have focused on this issue and their findings are inconsistent. For instance, Laeven (1999) found that foreigner-owned banks take more risk than state-owned, company-owned and family-owned banks in Asian markets. Crystal et al (2002) show that foreigner-owned banks are more prudent than domestic banks in emerging markets.

Mian (2003) found that private domestic banks maintain riskier portfolios compared to foreign banks as the former have more assets like loans rather than liquid assets such as cash and government securities. Yeyati and Micco (2007) found that foreign banks, in a sample of Latin American banks, are associated with higher risk (measured by the Z-score) than domestic banks.

Rokhimand and Susantoa (2011) used a sample of 115 commercial banks from Indonesia to investigate the effect of the increase of foreign ownership on performance, competition and short-term risk in the Indonesian banking industry. They found that increasing foreign ownership reduces profitability, increases competition and risk.

Hypothesis 2: Foreign ownership is positively related to bank risk-taking.

4. Data, variables and methodology

4.1. Data

Financial data and ownership structure for banks are taken from the Bankscope database. In order to have a homogeneous sample, we included only commercial banks. Central, cooperative and offshore banks are excluded. We used a sample consisting of unbalanced panel of annual report data from 2002 to 2012 for a set of commercial banks operating in 13 MENA countries: Algeria, Saudi Arabia, Bahrain, Egypt, Jordan, Kuwait, Lebanon, Morocco, Oman, Qatar, Tunisia, Turkey and United Arab Emirates.

We use the method of Boyd *et al*., (1993) to measure banking risk (Z score). We compute standard deviation of earnings over a moving window of 4 years. By using data from years 2002 to 2012, we are able to compute standard deviation of earnings for the 6-year period from 2006 to 2012. Thus, the study period is reduced from 2002-2012 to 2006-2012.Then, we apply two selection criteria. First, we exclude banks with missing data for more than 4 years. This criterion allows us to calculate precisely the standard deviations of some variables that define risk indicators. Next, we delete banks in which the main shareholder has changed because change may alter the effect of ownership structure on risk.

We ended up with an unbalanced panel of 171 banks that correspond to 1,197 banks-year observations distributed in the 2006-2012 period.

4.2. Measurement of Variables

- **Risk variables**

The dependent variable in this study is banking risk. In the basic model, we use the Z score which is commonly used in the literature. Next, we compute three other measures of banking risk for each bank to test the robustness of our findings.

- Z-Score: It is often considered as a measure of firm stability or distance to default (Boyd et al., 1993). We compute a Z score for bank i at year t as follows:

$$Z_{it} = \frac{ROA_{i,(t-4,t)} + CAR_{it}}{\sigma(ROA)_{i,(t-4,t)}}$$

With CAR the capital asset ratio.

- Earnings Volatility (SD_ROA) is the measure of risk that consists of the standard deviation of the return on assets (Return on assets is the ratio of pre-tax profits to total assets) computed over a moving window of 4 years. By using data from the years 2002 to 2012, we were able to compute earnings volatility for the 7-year period from 2006 to 2012.

- The ratio of loan loss provisions to total assets (LLP) is adopted by Iannota et al. (2007) and which reflects the asset quality of banks. A higher value of LLP implies the worst asset quality.
- The capital adequacy ratio (CAP) proposed by Shehzad et al. (2010), defined as the ratio of equity to total assets. A higher value of CAP implies lower banking risk. Banks typically increase their risk-taking by borrowing to acquire more assets, with the goal of raising their return on equity.

- **Ownership structure variables**

The independent variables in this study are ownership structure. We create two ownership variables, which represent for each bank in our sample the proportion of equity held by State (STAT_OWN) and foreigners (FOREIGN_OWN).

- **Control variables**

We consider two types of control variables; bank characteristics and country level variables.

- SIZE is measured as the natural logarithm of the bank's total assets. We expect that bank size and risk would be negatively related.
- FIX_ASS: fixed asset to total asset ratio controls the effect of operating leverage. This ratio is expected to be positively related to banking risk.
- EFFEC: bank efficiency is provided by the cost to income ratio. Banks with lower managerial efficiency have higher risk because less efficient banks are likely to take more risk to generate profits (Boyd et al., 2006).
- LOAN_DEP: Loan to deposit assesses the extent to which customer deposits finance customer loans. This ratio reflects bank's liquidity.
- DIVE: we construct a revenue diversification index, based on a breakdown of net operating revenue into net interest income (Int_Inc) and non-interest income (Non_Int_Inc) (Deng et al. 2013 and Stiroh and Rumble, 2006),

$$DIVE = 1 - [(\frac{Int\_Inc}{Int\_Inc + Non\_Int\_Inc})^2 + (\frac{Non\_Int\_Inc}{Int\_Inc + Non\_Int\_Inc})^2]$$

At country level, we control for GDP growth, inflation rates, and deposit insurance coverage.

- GDP_GR: GDP Growth is measured as the real GDP growth rate (Angkinand and Wihlborg, 2010).
- INF: Inflation rate measured by the growth of the consumer price index. According to Angkinand and Wihlborg (2010) inflation rate will determine how banks behave and

will hence affect both their assets and liabilities. We expect that inflation rate will have a positive effect on banking risk.

- DEP_INS: Deposit insurance is a dummy variable that takes either 1 or 0 indicating whether the country has explicit deposit insurance or not (yes=1; no=0). Deposit insurance can limit the risk of bank runs. Many studies found that an explicit deposit insurance system is associated with a decline in bank risk-taking incentives (Gropp and Vesala, 2001). However, insured deposit may create a moral hazard problem caused by the limited liability of a bank's shareholders and the reduced incentives of insured depositors to evaluate the riskiness of the banks they deal with. Thus, bank managers may be encouraged to take more risk in order to generate higher profits, and insurance will cover a large part of the bank's debts in case of non-payment (Angkinand and Wihlborg, 2010).

4.3. Methodology

In order to examine whether ownership structure affects risk-taking of banks in MENA countries, we estimate the following pooled regression model using the following general form:

$$RISK_{it} = \alpha_{it} + \beta_{1it}\text{Ownership variable} + \beta_{2it}\text{Bank charactristics}_{it} + \beta_{3it}\text{Macro variable}_{jt} + \varepsilon_{it}$$

The regression model is employed separately for the two variables of ownership structure (STAT_OWN, and FOREIGN_OWN, where i denotes banks, t time period and j country.

Previous studies (e.g., Demsetz and Lehn, 1985; Gugler and Weigland, 2003) underline that ownership is endogenous because it is influenced by the bank's risk level. In such a case, OLS estimators, for instance, would be inadequate. To deal with this potential problem, we use an instrumental variable that is highly correlated with ownership structure but uncorrelated with error term.

In this study, we consider regulatory quality. In fact many studies indicate that a country's institutional environment is exogenous and closely related to ownership structure (e.g., La Porta et al., 1999) and might be considered as an external governance influence that acts at the banking industry level (Ciancanelli and Reyes; 2001). Against these arguments, we use the regulatory part of The Worldwide Governance Indicator developed by Kaufmann *et al*., (2010) which refers to the capacity of the government to effectively formulate and implement sound policies. The first index is Government Effectiveness (GE) that captures perceptions of the quality of public services, the quality of civil services and degree of its independence from

political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. The second is Regulatory Quality (RQ) which captures perceptions of the ability of the government to formulate and implement sound policies and regulations that allow for and promote private sector development.

After the choice of the instrument variables, we estimate our regression by using the two-stage-least squares (2SLS) regression. To control for endogeneity, we perform a Hausman test against the corresponding OLS estimates to show whether ownership variables are endogenous. Because we have two exogenous instruments for each endogenous ownership variable, we use the Sargan test to check the validity of our instrumental variables.

5. The results

5.1. Descriptive statistics

Table 2 reports the descriptive statistics for the whole sample of 171 banks and table 3 presents means of variables by country. Banks in MENA countries have on average a Z-score of 59.026, with banks in Morocco reaching on average the highest score(96.418) followed by Qatar (90.947). The lowest score is for Algeria (43.216), Saudi Arabia (46.089) and Kuwait (46.252). The highest value of SD_ROA and CAP are also obtained by Morocco. The lowest value of CAP is obtained by UAE and those of SD_ROA and LLP by Lebanon.

Regarding ownership structure, state and foreign ownership vary from 0 to 100%. On average, states own 14.49%. The highest state ownership is scored by Algerian banks (40%) and the lowest by Lebanon and Jordan.

Foreign ownership is on average 33.33%. The highest foreign ownership in banks is found for Egypt followed by Turkey and Algeria. Foreign participation is very little in Saudi Arabia, and Qatar.

Insert Table 2 about here

Insert Table 3 about here

5.2. The Baseline models

Table 4 reports the results of the baseline regressions examining the relationship between risk-taking and ownership structure. In each panel, we run a regression with the ownership variables[11].

First, the Hausman test of endogeneity validates that the instrumental variables' estimation of the coefficient on ownership structure are larger than the ordinary least square which may

[11] Results of the first stage are not reported for brevity reasons.

underestimate the true effect of ownership on risk-taking. Moreover, the Sargan test does not reject the hypothesis that the excluded instruments are uncorrelated with error term and confirms the assumption of the validity of instruments.

In model 1, the results indicate that STAT_OWN is positively associated with Z_SCORE. This association is statistically significant at the 5% level. This result supports hypothesis H1, which posits that governments in MENA countries encourage banks to take more risk. Therefore, managers might take decision to finance government enterprises or to undertake social projects dictated by political interests (Iannotta et al. 2007). Indeed, Farazi et al.(2013) find that state banks, in MENA bank, finance the government and the public sector more than private banks. Our results corroborate those of previous studies (Berger *et al.*, 2005; Iannota *et al.*, 2007; Angkinand and Wihlborg, 2010).

Insert Table 4 about here

In model 2, we found that the coefficient for FOREIGN_OWN loads negatively at the 5% level, indicating that foreign participation reduced risk-taking. This finding rejects our *Hypothesis H2*. One possible explanation to foreign owners' aversion to risk is that they may face distance problems, which limit accessibility to information and deepen unfamiliarity with the MENA markets. Moreover, managers of these banks may have the opportunity to generate private benefits in the absence of efficient monitoring. Indeed, many previous studies found the same result in different markets. For instance, Crystal et al (2002) show that foreign banks are more prudent than domestic banks in emerging markets. In addition, Mian (2003) found that private domestic banks maintain riskier portfolios compared to foreign [12]banks.

Among the control variables, SIZE coefficients are negative and significant in models 1 and 2, whichsuggests that large banks can diversify their risk because they have more opportunities to pursue a wider variety of loans and other activities (Sullivan and Spong, 2007). The fixed assets coefficient (FIXE) is significantly positive in model 1 which is confirmed by Mandelker and Rhee (1984) who argued that operating leverage, like financial leverage, increases banking risk.The diversification coefficient is negative and significant at the 5% level.

5.1. Effect of ownership structure on risk before and after the financial crisis

In this sub-section, we try to examine whether the behavior of main shareholders was influenced by the financial crisis of 2008. To investigate this issue, we separately rerun the models before and after 2008. The results are reported in Table 5.

Insert Table 5 about here

Ours results before 2008 show that STAT_OWN (model 1) is statistically significant (at the 5% level) and have a positive coefficient. After the crisis, the coefficient became negative. This finding indicates that attitude to risk changed and became prudent. Our result corroborates those of Kowalewski and Rybinski (2011) who found that during the recent financial crisis of 2008, government-owned banks were seen as an important factor in stabilizing the credit level in CEE.

The coefficient of FOREIGN_OWN fails to gain significance (models2). After 2008, our results indicate that the coefficients of ownership indicators are all negative and significant at the 5% level (models 3 and 4). The important point here is that shareholders, whatever their nature, take a prudent attitude through influencing risk reduction after the crisis.

For the control variables, ROA has a positive significant effect on Z_score (at the 1% level in model3) suggesting that performing banks take more risk.

The SIZE coefficient is negative and significant at the 1% level in models 2 and 3. The fixed asset (FIXE) positively affects risk-taking just after the crisis at the 5% level (models 3 and 4).

Asset diversification decreases the negative effects on risk in model 1.The coefficient of loan to deposit ratio LOAN_DEPO is negative and significant (at the 5% level in model 1 and at the 10% level in model 3), suggesting that the important level of loans compared to deposits decreases banking risk. The coefficient of DEPO_INS is negative and significant at the 10% level in model3. Finally, inflation coefficient is negative but only significant in model 3.

5.3. Robustness checks

Table 6 presents additional tests to ensure the robustness of our results. We rely on three different measures to capture banking risk: earnings volatility (SD_ROA), the ratio of loan loss provisions to total assets (LLP) and the capital adequacy ratio (CAP).

Insert Table 6 about here

Columns 1 and 2 report the results for the regressions of earnings volatility. FOREIGN_OWN in model 2 is statistically significant (at the 10% level) and has a positive coefficient, while that of STAT_OWN fails to gain significance (model 1). Regarding control variables, SIZE has a negative effect on earnings volatility in two models. The coefficient of loan to deposit ratio LOAN_DEPO is negative and significant (at the 5% level in model 1 and 2), suggesting that banks with important level of loans compared to deposits take less risk. Finally, inflation

coefficient is positive but only marginally significant (at the 10% level in two models), suggesting that increased level of inflation increases risk exposition.

Columns 3 and 4 report the results for the regressions of asset quality measured by loss loan provision. In model 3, the coefficient of STAT_OWN is positive and statistically significant at the 1% level. In addition, the coefficient of FOREIGN_OWN (model 4) is negative and significant (at the 10% level) indicating that state- owned banks degrade asset quality by granting risky loans. In contrast, foreign ownership seems to improve asset quality. These findings can be attributed to corporate governance quality. Indeed, Jia (2009) argue that government-owned banks are less monitored and have worse corporate governance compared to other banks. For the control variables, ROA has a negative significant effect on LLP (at the 1%level) in two models suggesting that performing banks restrict their LLP. The fixed asset (FIXE) positively affects LLP in model 4 at the 1% level. Efficiency coefficient (EFFIC) is negative and significant (at the 1% level in two models), indicating that banks with lower managerial efficiency are exposed to more banking risk (Shehzad et al. 2010). Finally, diversification exhibits negative effects on LLP in model4.

Columns 5 and 6 detail the results for regressions of capital adequacy. In model 5, the coefficient of STAT_OWN is positive and statistically significant at the 5% level. The coefficient of FOREIGN_OWN (model 6) is both negative and significant (at the 5% level). According to previous results that found a positive effect of STAT_OWN on risk, these banks seem to keep higher capital adequacy ratio because of the prudence principle (Cheng et al., 2013). However, foreign owners do not need to keep a high capital adequacy ratio level because exposition of their banks to risk is limited.

As for the control variables, ROA has a negative significant effect on CAP (at 1%) in two models suggesting that performing banks reduce their capital adequacy ratio. SIZE coefficient is negative and significant at the 1% level in model6. The fixed asset (FIXE) negatively affects CAP in models 5 and 6 at respectively the 5% and 1% levels. Efficiency coefficient (EFFIC) is negative and significant at the 1% level in model6 indicating that banks with lower managerial efficiency keep a high level of CAP. Coefficient of diversification is negative and statistically significant (at the 10% level in model 5 and at the 1% level in model 6). Finally, the coefficient of DEPO_INS is positive and significant at the 1% level in two models.

6. Conclusion

In this paper, we used a unique database of 171banks from 13 MENA countries to examine the impact of ownership structure on risk-taking. Our choice is driven by the importance of risk for bank regulators who wish to keep a reasonable level of risk in order to avoid financial

crises (Deng et al., 2013). Owners' influence on risk has been shown in many studies examining different markets. However, this issue has not received the same attention in the MENA markets. In this study, we examined two types of owners: the state and foreigners. In fact, MENA banks have experienced in the last two decades a change in their ownership structure caused by privatization of many state-owned banks which brought about the decline of state ownership and the emergence of foreign owners.

In a pooled panel regression that controls for bank and country level variables associated with risk-taking together with endogeneity issues, we provide evidence that state ownership is positively related to risk-taking while foreign ownership is negatively related to bank risk-taking. These results are consistent with a series of measures of risk-taking including earning volatility, loss loan provision ratio and capital adequacy ratio. Moreover, we found that the relationship between state ownership and risk taking is positive before 2008, whereas after 2008 ownership effects on risk is negative whatever the owner.

Our findings may be useful for policy makers. Such results highlight again the need to first accelerate banks privatization process in the MENA countries. Second, loosening barriers to foreign investment may lead to a significant decrease in bank risk-taking, which is an important driver of a country's economic stability.

In conclusion, our study highlighted that ownership structure is one corporate governance mechanism that affects bank risk-taking in emerging markets. Further research could provide additional insights by examining the role of governance mechanism related to board of director and financial disclosure in banking risk.

References

- Andres, P. and Vallelado, E. (2008), "Corporate governance in banking: The role of the board of directors". *Journal of Banking & Finance, Vol.* 32 No. 12, pp. 2570–2580
- Angkinand, A. and Wihlborg, C. (2010), "Deposit insurance coverage, ownership, and banks' risk-taking in emerging markets". *Journal of International Money and Finance*, Vol. 29 No 2, pp. 252-274
- *Ayadi, R., Arbak, E., Ben Naceur, S., &Casu, B. (2011). Convergence of banking sector regulations and its impact of bank performance and growth: The case of Algeria, Egypt, Morocco and Tunisia. Femise Report n° FEM 33-04*
- Barry, T.A. Lepetit, L. Tarazi, A. (2011), "Ownership structure and risk in publicly held and privately owned banks". *Journal of Banking and Finance,* Vol. 35 No. 5, pp. 1327–1340.
- Ben Naceur, S. and Ghazouani, S. (2007), "Stock markets, banks, and economic growth: Empirical evidence from the MENA region",*Research in International Business and Finance*, Vol. 21 No. 2 pp 297–315
- Ben Naceur, S. Ben-Khedhiri, H. and Casu, B. (2011), "What Drives the Performance of Selected MENA Banks? A Meta-Frontier Analysis", IMF Working Paper WP/11/34, International Monetary Fund, Washington, D.C.
- Berger, A. N. Clarke, G. R. Cull, R. Klapper, L. and Udell, G. (2005), "Corporate governance and bank performance: A joint analysis of the static, selection, and dynamic effects of domestic, foreign, and state ownership", *Journal of Banking and Finance*, Vol. 29 No. 8 pp. 2179-2221.
- Bonin, J.P. Hasan, I. and Wachtel, P. (2005), "Bank performance, efficiency and ownership in transition countries", *Journal of Banking and Finance*, Vol. 29 No. 1 pp. 31–53.
- Bouaziz, W. and Bouri, A. (2012), "Ownership structure and financial institutes risk taking: evidence from Tunisian quoted bank", *International Journal of Managerial and Financial Accounting*, Vol. 4 No. 1, pp.47-60.
- Boyd, J. H. Graham, S. Hewitt, S. (1993), "Bank Holding Company Mergers with Nonbank Financial Firms on the Risk of Failure". *Journal of Banking and Finance,* Vol. 17 No. 1 pp. 43-63.
- Boyd, J.H. Gianni, D. N. and Jalal, A. M. (2006), "Bank risk-taking and competition revisited: New theory and new evidence", IMF Working Papers 06/297, International Monetary Fund.
- Burkart, M. Gromb, K. and Panunzi, F. (1997), "Large shareholders, monitoring and fiduciary duty", *Quarterly Journal of Economics*, Vol. 112, No. 3, pp. 693-728.
- Cheng, M. Zhao, H. and Zhang, J. (2013), "The Effects Of Ownership Structure And Listed Status On Bank Risk In China", *The Journal of Applied Business Research*, Vol. 29 No. 3 pp. 695-709. .
- Ciancanelli, P. and Reyes, J. (2001), "Corporate Governance in Banking: A conceptual framework", Working Paper, SSRN. Available at: http://ssrn.com/abstract=253714
- Claessens, S. and Ohara, N. (2013), "Foreign banks: Trends and Impact", *Journal of Money, Credit and Banking*, Vol. 46 No. 1, pp. 295-326.
- Claessens, S. Demirguc-Kunt, A. and Huizinga, H. (2001), "How does foreign entry affect domestic banking markets?", *Journal of Banking & Finance*, Vol. 25 No. 5 pp. 891-911.

- Cornett, M. M. Guo, L. Khaksari S. Tehranian H. (2010), "The impact of state ownership on performance differences in privately-owned versus state-owned banks: An international comparison", *Journal of Financial Intermediation*, Vol. 19 No. 1 pp. 74-94.
- Creane, S. R. Goyal, A. M. Mobarak and Sab, R. (2004), "Financial sector development in the Middle East and North Africa", Working Paper n°04/102, IMF, Washington, DC.
- Crystal, J.S. Dages, B.G. and Goldberg, L.S. (2002), "Has Foreign Bank Entry Led to Sounder Banks in Latin America?". Current Issues in Economics and Finance, Vol. 8 No. 1 pp. 1-6.
- Demirgüç-Kunt, A and Detragiache, E. (2002), "Does deposit insurance increase banking system stability? An empirical investigation", *Journal of Monetary Economics*, Vol. 49 No. 7, pp. 1373–1406
- Demsetz, H. Lehn, K. (1985), "The structure of corporate ownership: causes and consequences", *Journal of Political Economics*, Vol. 93 No. 6, pp. 1155-1177.
- Deng, Elyasiani and Jia (2013), "Institutional Ownership, Diversification, and Riskiness of Bank Holding Companies",*Financial Review*, Vol. 48 No. 3 pp. 385–415.
- Dong, Y. Meng, C. Firth, M and Hou, W. (2014,) "Ownership structure and risk-taking: Comparative evidence from private and state-controlled banks in China", *International Review of Financial Analysis*. Vol. 36, pp. 120–130
- El-Tamimi, H. H. and Jellali, N. (2013), "The effects of ownership structure and competition on risk-taking behavior: Evidence from UAE conventional and islamic banks", *The International Journal of Business and Finance Research*, Vol. 7 No. 2, pp. 115-124
- Faccio, M. Masulis, R.W. and. McConnell, J.J. (2006), "Political Connections and Corporate Bailouts," *Journal of Finance*, Vol. 61 No. 6, pp. 2597-2635
- Farazi, S. Feyen, E Rocha, R. (2013), "Bank Ownership and Performance in the Middle East and North Africa Region", *Review of Middle East Economics and Finance*, Vol. 9, No. 2 pp. 159–196.
- Franks, J. Mayer, C.P. Renneboog, L. (2001), "Who disciplines management in poorly performing companies?", *Journal of Financial Intermediation*, Vol. 10 No. 3 pp. 209-248.
- Galais, D. and Masulis, R.W. (1976), "The option pricing model and the risk factor of stock", *Journal of Financial Economics*, Vol. 3 No. 1 pp. 53-81
- Garcia-Marco, T. and Robles-Fernandez, M.D. (2008), "Risk-taking behavior and ownership in the banking industry: The Spanish evidence", *Journal of Economics and Business*, Vol. 60 No. 4 pp. 332-354.
- Gropp, R. and Vesala, J. (2001), "Deposit insurance and moral hazard: Does the counterfactual Matter?", *European Central bank Working Paper*, 41.
- Grossman, S.J. and Hart, D.O. (1980), "Takeover Bids, the Free Rider Problem and the Theory of the Corporation", Bell *Journal of Economics* 11, Spring, 42-64
- Gugler, K. and Weigland, J. (2003), "Is ownership endogenous?", *Applied Economics Letters*, Vol. 10 No. 8, pp. 249-280.
- Haw, I.M. Ho, S. Hu, B. and Wu, D. (2010), "Concentrated control, institutions, and banking sector: An international study", *Journal of Banking and Finance*, Vol 34, No. 3, pp. 485-497.
- Iannota, G. Giacomo, N. and Sironi, A. (2013), "The impact of government ownership on bank risk", *Journal of Financial Intermediation*, Vol. 22 No. 2, pp. 152-176.

- Iannotta, G. Nocera, G. and Sironi, A. (2007), "Ownership structure, risk and performance in the European banking industry", *Journal of Banking and Finance* Vol. 31 No. 9, pp. 2127- 2149.
- Jensen, M. and Meckling, W. (1976), "Theory of the firm: Managerial behavior, agency costs and ownership structure", *Journal of Financial Economics*, Vol. 3 No. 4, pp. 305-360.
- Jia, C.H. (2009), "The Effect of Ownership on the Prudential Behavior of Banks—The Case of China", *Journal of Banking and Finance*, Vol. 33 No. 1, pp. 77–87.
- Kaufmann, D. Kraay, A. and Mastruzzi, M. (2010), "The Worldwide Governance Indicator: A summary of methodology, data, and analytical issues". World Bank Policy Research Working Paper No. 5430.
- Kobeissi, N. and Sun, X. (2010), "Ownership Structure and Bank Performance: Evidence from the Middle East and North Africa Region" *Comparative Economic Studies*, Vol.52 No. 3, pp. 287-323
- Kowalewski, O. and Rybinski, K. (2011), "The hidden transformation: the changing role of the state after the collapse of communism in Central and Eastern Europe", *Oxford Review of Economic Policy*, Vol. 27 No 4, pp. 634–657.
- La Porta, R. Florencio L. Andrei, S. and Robert, W. (2002), "Government ownership of banks", *The Journal of Finance*, Vol. 57 No. 1, pp. 256-301.
- La Porta, R. Lopez-de-Silanes, F. and Shleifer, A. (1999), "Corporate ownership around the world", *Journal of Finance*, Vol. 54 No. 2, pp. 471-517.
- Laeven, L. (1999), "Risk and efficiency in East Asian banks", World Bank Discussion, Paper n°2255.
- Lang, L., and So, R. (2002), "Bank ownership structure and economic performance". SSRN Working Paper
- Levine, R. (1996), "Foreign Banks, Financial Development and Economic Growth", in: C.E. Barfield (ed.), International Financial Markets: Harmonization versus Competition, Washington DC, A EI Press.
- Mandelker, G. N. and Rhee, S. G. (1984), "The impact of degrees of operating and financial leverage on systematic risk of common stock", *Journal of Financial and Quantitative Analysis*, Vol. 19 No. 1, pp. 45-57.
- Martinez Peria, M. S. and Mody, A. (2004), "How Foreign Participation and Market Concentration Impact Bank Spreads: Evidence from Latin America." *Journal of Money, Credit, and Banking*, Vol. 36 No. 3, pp. 511-537.
- Mian, A. (2003), "Foreign, Private Domestic, And Government Banks: New Evidence from Emerging Markets" Mimeo, University of Chicago.
- Rejichi, I. Z. and Aloui, C. (2012) "Hurst exponent behavior and assessment of the MENA stock markets efficiency", *Research in International Business and Finance*, Vol. 26 No. 3, pp. 353-370.
- Rocha, R. Arvai, Z. and Farazi, S. (2011), "Financial Access and Stability: A Road Map for the Middle East and North Africa" World Bank, Washington D.C.
- Rokhim, R. And Susanto, A.P. (2011), " The increase of foreign ownership and its impact to performance, competition and risk in Indonesian banking industry ", available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1915234
- Saunders, A. Strock, E. and Travlos, N. (1990) "Ownership Structure, Deregulation, and Bank Risk Taking", *Journal of Finance*, Vol. 45 No. 2, pp. 643-654.

- Shehzad, C. T. De Haan, J. and Scholtens, B. (2010), "The impact of ownership concentration on impaired loans and capital adequacy", *Journal of Banking and Finance*, Vol. 34 No. 2, pp.399-408.
- Sheshinski, E. and Lopez-Calva, L.F. (2003), "Privatization and its benefits: Theory and evidence", *CESinfo Economic Studies*, Vol. 49 No. 3, pp. 429–459
- Shleifer, A. and Vishny, R. (1986), "Large shareholders and corporate control". *The Journal of Political Economy*, Vol. 94 No. 3, pp. 461-488.
- Stein, J. C. (2002), "Information Production and Capital Allocation: Decentralized versus Hierarchical Firms," *Journal of Finance*, Vol. 57 No. 5, pp. 1891–1921.
- Stiroh, K. J. and Rumble, A. (2006), "The dark side of diversification: The case of US financial holding companies". *Journal of Banking and Finance*, Vol. 30 No. 8, pp. 2131-2161
- Sufian, F. (2009), "Determinants of bank efficiency during unstable macroeconomic environment: Empirical evidence from Malaysia", *Research in International Business and Finance*, Vol. 23 No.1, pp. 54–77.
- Sullivan, R.J. and Spong K.R. (2007), "Manager wealth concentration, ownership structure, and risk in commercial banks", *Journal of Financial Intermediation*, Vol. 16 No. 2, pp. 229-248.
- Wu, J. Jeon B.N., & Luca, A.C. (2010), "Foreign bank penetration, resource allocation and economic growth: Evidence from emerging economies", *Journal of Economic Integration*, Vol. 25 No. 1, pp. 167-193.
- Yeyati, E.L. and Micco, A. (2007), "Concentration and Foreign Penetration in Latin American Banking Sectors: Impact on Competition and Risk". *Journal of Banking and Finance*, Vol. 31 No. 6, pp. 1633-1647.

Table 1 Banking Sector Figures in MENA countries. 2006-2011

	Number of Commercial Banks [a]	Bank concentration	Bank deposit to GDP	Bank credit to bank deposits	Bank return on assets
Algeria	20	75.273%	42.175%	30.85%	1.169%
Bahrain	110	81.911%	66.280%	90.26%	0.945%
Egypt	40	57.716%	71.189%	53.06%	0.758%
Jordan	23	91.807%	97.226%	83.11%	1.373%
Kuwait	16	81.769%	57.103%	82.39%	1.789%
Lebanon	46	49.371%	206.219%	78.37%	0.912%
Morocco	15	71.139%	80.892%	115.48%	1.287%
Oman	16	74.091%	30.542%	32.26%	2.166%
Qatar	17	85.049%	45.580%	174.06%	2.776%
SaudiArabia	12	54.224%	22.970%	102.85%	2.428%
Tunisia	21	42.417%	47.340%	120.99%	0.535%
Turkey	49	47.696%	42.996%	77.70%	2.666%
UAE	52	53.900%	61.120%	107.44%	1.862%

Source: Global Financial Development GFDD (2013)

[a] World Bank. Bank Regulation and Supervision Database (2012)

Table 2 Descriptive statistics

	Minimum	Maximum	Mean	Std. Deviation
Z_SCORE	0.02	591.25	59.026	67.2894
SD_ROA	0	0.14	0.0066	0.0110
LLP	-0.03	0.1	0.0061	0.0089
CAP	0.41	130.19	9.9095	7.7768
STAT_OWN	0	1	0.1449	0.2893
FOREIGN_OWN	0	1	0.333	0.3831
ROA	-0.1	0.13	0.0153	0.0155
SIZE	5.76	11.04	9.6659	0.7705
FIX_ASS	0	0.21	0.0152	0.0170
EFFIC	-8.61	140.91	46.0172	18.090
DIVE	0.0070	0.5	0.4083	0.0840
LOAN_DEP	0.01	5.43	0.6986	0.4068

Table 3 Average by country

	Z_SCORE	S_ROA	LLP	CAP	STAT_OWN	FOREIGN_OWN	ROA	SIZ
ALGERIA	43.216	0.006	0.007	10.591	0.400	0.401	0.017	20.2
SAUDiARABI	46.089	0.009	0.004	7.828	0.114	0.026	0.022	23.9
BAHRAIN	68.598	0.009	0.005	8.069	0.152	0.375	0.019	22.2
EGYPT	56.776	0.009	0.008	14.227	0.207	0.516	0.009	22.1
UAE	52.435	0.008	0.007	6.935	0.273	0.202	0.021	23.0
JORDAN	57.315	0.004	0.004	7.277	0.044	0.205	0.015	21.4
KUWAIT	46.252	0.010	0.006	11.587	0.065	0.181	0.012	23.4
LEBANON	77.744	0.003	0.001	12.448	0.000	0.239	0.010	21.6
MOROCCO	96.418	0.011	0.006	15.421	0.151	0.247	0.010	23.2
OMAN	51.484	0.006	0.002	7.024	0.054	0.173	0.021	22.6
QATAR	90.947	0.004	0.002	6.984	0.144	0.050	0.022	23.0
TUNISIA	56.102	0.010	0.012	8.410	0.141	0.384	0.008	21.2
TURKEY	48.735	0.005	0.007	8.053	0.164	0.469	0.017	22.8

Table 4 Impact of ownership structure on banking risk

	(1)	(2)
STAT_OWN	0.762	
	(1.98)**	
FOREIGN_OWN		-3.875
		(-2.185)**
ROA	1.304	0.189
	(0.870)	(0.574)
SIZE	-0.124	-0.022
	(-2.551)**	(-2.180)**
FIXED	4.889	0.774
	(1.691)*	(1.563)
EFFIC	-0.003	-0.0004
	(-1.480)	(-1.334)

DIVE	0.094	-0.020
	(0.865)	(-0.857)
LOAN_DEPO	0.034	0.004
	(0.406)	(0.218)
DEPO_INS	-0.043	-0.065
	(-0.128)	(-0.925)
GDP_GR	0.064	0.005
	(0.651)	(0.275)
INF	-0.004	-0.0008
	(-1.309)	(-1.168)
_cons	4.046	0.836
	(1.159)	(3.660)***
P-value	0.000	0.000
R square	0.152	0.244
Sargan-test	1.064	0.897
Hausman-test	16.46*	18.44**

*** Significant in 1 percent level
** Significant in 5 percent level;
* Significant in 10 percent level

Table 5 Impact of ownership structure on banking risk before and after the crisis

	[0,2-3]Before 2008		[0,4-5]After 2008	
	(1)	(2)	(3)	(4)
STAT_OWN	3.0688		-0.3033	
	(1.978)**		(-2.084)**	
FOREIGN_		-0.0336		-0.0487
OWN		(-0.485)		(-1.963)**
ROA	-0.1909	0.042	0.9466	0.107
	(-0.409)	(0.089)	(3.709)***	(0.154)
SIZE	0.0065	-0.127	-0.0148	-0.012
	(0.480)	(-2.960)***	(-2.881)***	(-0.188)
FIXE	-0.3002	0.840	0.4585	3.186
	(-0.375)	(1.193)	(2.402)**	(2.214)**
EFFIC	-0.0001	0.001	-0.0002	0.001
	(-0.252)	(0.663)	(-1.022)	(1.491)
DIVE	-0.0615	0.013	-0.0013	0.026
	(-2.184)**	(0.453)	(-0.060)	(0.566)
LOAN_DEP	-0.0692	-0.032	-0.0111	0.001
O	(-2.018)**	(-0.643)	(-1.649)*	(0.024)
DEPO_INS	-0.0183	0.060	-0.0334	-0.186
	(-0.212)	(0.413)	(-1.771)*	(-1.315)
GDP_GR	-0.0821	-0.016	-0.0109	0.023
	(-0.472)	(-0.549)	(-0.561)	(0.692)
INF	-0.0017	-0.001	-0.0017	-0.001
	(-0.729)	(-0.813)	(-2.915)***	(-0.904)
_cons	0.1555	0.380	0.0155	0.779
	(1.480)	(1.791)*	(0.383)	(1.812)*
R square	0.1808	0.1430	0.2891	0.2231
Sargan test	0.288	0.314	0.88	1.314
Hausman test	22.34**	13.65	16.72*	40.64***

*** Significant in 1 percent level
** Significant in 5 percent level
* Significant in 10 percent level

Table 6 Robustness Tests

	[0,2-3]SD_ROA		[0,4-5]LLP		[0,6-7]CAP	
	(1)	(2)	(3)	(4)	(5)	(6)
STAT_OWN	0.034		0.155		21.427	
	0.640		(2.574)***		(02.150)**	
FOREIGN_OWN		-0.106		-0.0798		-37.542
		(-1.835)*		(-1.666)*		(-2.228)**
ROA	-0.056	-0.072	-0.522	-0.556	-160.618	-60.849
	(-1.194)	(-1.456)	(-9.656)***	(-16.699)***	(-6.375)***	(-4.849)***
SIZE	-0.005	-0.005	-0.001	0.0047	-0.035	-1.788
	(-2.943)***	(-3.472)***	(-0.531)	(0.176)	(-0.033)	(-4.575)***
FIXED	-0.059	0.021	0.059	0.174	-74.370	-51.827
	(-0.960)	(0.289)	(0.830)	(3.106)***	(-1.930)**	(-2.756)***
EFFIC	0.0001	0.0006	-0.0003	-0.0003	-0.027	-0.050
	(0.69)	(1.386)	(-7.047)***	(-10.226)***	(-1.149)	(-4.152)***
DIVE	-0.003	-0.004	0.003	-0.005	-3.352	-2.537
	(-0.863)	(-1.080)	(0.644)	(-4.325)***	(-1.684)*	(-2.796)***
LOAN_DEPO	-0.006	-0.006	0.002	0.001	1.689	1.191
	(-2.404)**	(-2.479)**	(0.735)	(0.364)	(1.133)	(1.587)
DEPO_ASSET	-0.006	-0.005	-0.016	-0.007	17.102	19.624
	(-0.601)	(-0.487)	(-1.404)	(-0.924)	(2.955)***	(7.343)***
GDP_GR	-0.005	-0.004	-0.005	-0.001	-0.539	0.480
	(-1.588)	(-1.493)	(-1.301)	(-0.556)	(-0.288)	(0.634)
INF	0.0002	0.0002	-0.0001	-0.0001	0.007	0.016
	(1.820)*	(1.843)*	(-1.158)	(-1.429)	(0.122)	(0.607)
cons	0.122	0.159	0.040	0.165	-6.132	41.879
	(2.816)**	(4.661)	(0.785)	(5.478)***	(-0.228)	(4.826)***
F	4.54***	3.83***	1.55***	3.76***	4.44***	16.25***
R	0.219	0.0138	0.1222	0.2043	0.1272	0.139
Sargan	2.699	1.723	1.468	2.4873	0.152	0.4712
Hausman	17.78*	28.36***	20.01**	46.35***	12.96	16.4*

*** Significant in 1 percent level, ** Significant in 5 percent level