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The impact of owner's identity on banks' capital adequacy, and liquidity risk

Andi Duqi^{*a}, Hussein Al-Tamimi^b

* Corresponding author,

^a Department of Finance and Economics, College of Business Administration, University of Sharjah, P.O. Box 27272, United Arab Emirates (UAE),

Aduqi@sharjah.ac.ae,

Tel. +971065053568.

^b Department of Finance and Economics, College of Business Administration, University of Sharjah, P.O. Box 27272, United Arab Emirates (UAE),

hussein@sharjah.ac.ae,

Tel. +971065053519

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Abstract

In this paper we test the potential impact of the owner's identity on banks' capital adequacy and liquidity risk as defined by the Basel III regulatory framework. Using a unique dataset on a sample of banks domiciled in the Middle East and North Africa region we find that the ownership structure is an important driver of banks' regulatory capital and liquidity risk. Private and foreign investors exhibit a stronger preference for higher levels of capital, whereas the impact of government ownership on banks' risk remains inconclusive. Moreover, privately-owned banks evidenced lower levels of liquidity risk compared to the other groups during the last financial crisis because of tighter budget constraints and more compelling liquidity needs.

Keywords: Basel III, bank ownership, capital adequacy, liquidity ratio, ownership structure

JEL Classification: G21, G28, G32, G34

1. Introduction

The recent financial crisis revealed, among other issues, that governance mechanisms inside banking firms are still insufficiently understood by practitioners, scholars and policy makers. Within this area, the ownership structure of banks has been identified as one of the main variables under scrutiny because of its effect on the performance of these intermediaries (Shehzad et al. 2010; Barry et al. 2011).

According to the extant literature, both theoretical and empirical, the performance and risk-taking behavior of firms depend on the type of the controlling shareholder (Claessens et al. 2001; Berger et al. 2005; Iannotta et al. 2013). For instance, when banks are controlled by the Government, they are considered to be less efficient than privately owned competitors because they pursue political rather than profit-maximizing goals (Iannotta et al. 2007). Besides this, most of the current studies agree that state-owned banks benefit from some kind of protection in the event of default, which should permit them to take more risk (Demirgüç-Hunt and Detriagiache, 2002).

The impact of foreign ownership on bank risk-taking is a controversial issue. According to the *general global advantage hypothesis*, foreign-owned banks should be more profitable due to comparative advantages over domestic-owned banks (Lensink and Naaborg, 2007). On the other hand, the *home field advantage* predicts that domestic-owned banks will be more profitable due to their ability to reduce their agency costs compared to foreign banks. Moreover, foreign investors are at an informational disadvantage relative to local investors (Berger et al. 2005; Choe et al. 2005).

Family-owned banks are perceived to be less prone to take high risks because the wealth of the main shareholders is not well-diversified. Private investors and families invest a large share of

their wealth in companies, meaning that they might be more risk-averse and suffer from greater credit constraints than other types of owners (Fama and Jensen, 1985).

The aforementioned studies concentrate mainly on banks' capital adequacy and overall risk-taking but not specifically on liquidity management. The subprime crisis revealed that liquidity transformation was the primary source of banks' vulnerability, even when they were formally complying with Basel rules on regulatory capital (BIS, 2009). In this regard, the extant literature has not provided conclusive results about how liquidity risk might be affected by the identity of banks' major owners. For instance, government ownership could be reflected in a propensity among state-owned banks to develop moral hazard behavior by taking more risk, given an implicit guarantee provided by the government (Dietrich et al. 2014).

Foreign-owned banks are generally part of large banking institutions; they have more access to international capital markets and benefit from the wholesale funding of the parent company, but they generally do not attract sufficiently large deposits in the countries in which they are established. The combined effect of these variables makes the outcome unclear. The presence of private investors / families should be associated with higher costs of liquidity for them, which should be reflected in lower liquidity ratios.

Risk-taking decisions in the banking industry are becoming increasingly important for many policy makers and regulators, given the need to adopt Basel III rules by January 2018¹. In complying with this framework, banks are required to increase their regulatory capital (Tier 1 and capital asset ratio) and to satisfy newly introduced liquidity requirements. In particular, the *liquidity coverage ratio* measures the sensitivity of the bank to short-term liquidity shocks, and the *net stable funding ratio* is designed to promote longer-term funding of the assets and

activities of banking organizations (Basel Committee on Banking Supervision, 2010a; Dietrich et al. 2014).

In this article we follow an intuition presented in recent studies (Dietrich et al. 2014; Chalermchavitchien et al. 2014). We try to understand how banks in a specific area would have complied with Basel III rules if they had been in place in the last decade. The answers to these questions can provide useful implications to the ongoing debate about the role of the state in the economy, the benefits of foreign entry to the banking sector of developing countries and the risk attitudes of banks' major owners.

We conduct an analysis of the effect of the owner's identity on the bank's capital and liquidity ratios for a sample of banks from the Middle East and North Africa (MENA) region. The reason for this choice is threefold. First, research on the banking sector has tended to be skewed towards developed economies and there is a scarcity of research looking at important issues such as compliance with Basel rules in other regions. Second, this area provides an interesting environment for testing the link between different owners, risk-taking behavior and liquidity requirements because of the prevalence of government entities, wealthy families and foreign organizations among local banks' owners. This is a consequence of the efforts of policy makers in these countries to open their economies to foreign investors, privatize many state-owned banks and create a friendly environment for economic growth (Farazi et al. 2011). Third, all countries in this region have shown convergence in recent years in implementing the Basel II regulations and they are gradually adopting Basel III rules (Chabanel, 2011).

The novel aspects of this paper are the following. First, we provide some useful insights into the link between owner type, capital adequacy and liquidity risk. This issue has not received adequate attention so far from researchers and policy makers, especially in terms of the factors

that have a decisive impact on banks' liquidity risk. Regarding the impact of owner identity on capital adequacy, some related studies compare the riskiness of private and state-owned banks without considering foreign ownership (Iannotta et al. 2013; Dong et al. 2014). Other studies analyze the ownership concentration without considering owner identity (Shehzad et al. 2010; Chalermchavitchien et al. 2014). Funding risk is not a new phenomenon in the banking industry. The reason lies in the bank's role as liquidity providers. Their assets (mostly long-term and illiquid) are usually financed with deposits withdrawable on demand which leaves them exposed to bank runs (Diamond and Dubvig, 1983)². However, given the recent creation of the new liquidity standards there are quite a few descriptive papers on this issue and, as far as we know only a paper by Dietrich et al. (2014) that looks into the drivers of the net stable funding ratio for a sample of European banks. Differently from them, we do not use dummies for different types of banks (private, state-owned or foreign). Instead, we adopt the proportion of equity held by the major bank owner. This gives us the possibility of checking whether the owner effect is linear or not. Another advantage of using the proportion of equity held is that it permits interactions between different owner types and other explanatory variables.

Second, this is one of the first studies aiming to explore the dynamics of banks' liquidity risk in the last few years, including those of the financial crisis. We think this is an important test that will help us to better understand its main drivers considering that it will be in the regulators' agenda for the next years.

Third, this is the first study of this type for the MENA region and one of the few that do not concentrate on developed economies. It could provide useful out-of-sample evidence of the importance of owner identity for banks' capital requirements in developing countries where there

are more concerns about the role of foreign entry to the credit market and state intervention in the economy.

The results suggest that owner identity plays an important role in banks' capital adequacy and liquidity. We find that private investors/families and foreign banks are less prone to take high risks as the banks in which they invest tend to have higher capital asset ratios. Private investors are also associated with lower levels of liquidity risk. A second important result is that we do not find any evidence supporting the link between state-owned banks and their risk attitude.

The paper is structured as follows. In the next section we provide some insights from the current literature on the link between ownership and capital adequacy for banks. Section 3 illustrates the institutional framework in the MENA region. In Section 4 we present the sample selection and some descriptive statistics. Section 5 comprises the research hypotheses, the model specification and the choice of dependent and independent variables. In Section 6 we exhibit the main empirical results. In Section 7 some robustness tests are applied to the main model, and these are followed by conclusions and final remarks.

2. Literature review

The importance of ownership structure for bank performance and risk taking has been at the center of the research debate in the last few years. Major attention has been dedicated to ownership concentration and its impact on firm performance and riskiness (Jensen and Meckling, 1976; Shleifer and Vishny, 1997; Haw et al. 2010; Dong et al. 2014; Busta et al. 2014).

Evidence on the role of the identity of the controlling owner in banks is still inconclusive and scant. Among the different ownership types, government ownership of financial institutions has

attracted major interest. A number of papers document that state-owned banks are less profitable than privately owned ones according to several theoretical approaches. First, governments are keener to pursue social goals for political purposes, such as providing credit to underserved sectors of the economy, reducing unemployment or financing special infrastructure projects (La Porta et al. 1999; Pedersen and Thomsen, 2003). Moreover, they do not suffer from soft budget constraints and do not pursue strictly profit-maximizing strategies (Shleifer and Vishny, 1997; Dong et al. 2014). The combined effect of these factors should result in a lower loan quality and higher default risk for government-owned banks than privately owned ones (Berger et al. 2005; Barry et al. 2011).

The empirical evidence so far has produced inconclusive outcomes on this topic. Angkinand and Wihlborg (2010), Iannotta et al. (2007; 2013) and Dong et al. (2014) associate government ownership of banks with higher risk taking. Other studies fail to show that this is true in developing countries such as Russia, India and Turkey (Bhattacharyaa et al. 1997; Isik and Hassan, 2002; Fungáčová and Solanko, 2009).

The presence of foreign banks in developing economies has been studied from different points of view as their investment in these countries has increased enormously in recent years. Existing studies are divided into those that support the *global advantage hypothesis* and others considering the *home field advantage hypothesis*. The former theoretical framework predicts that foreign banks will be more profitable and efficient than domestic institutions (Bonin et al. 2005; Brown et al. 2009; Havrylchuk and Jurzyk, 2011; Laidroo, 2015). This is deemed likely for a number of reasons, such as better access to capital markets, a greater ability to diversify risks, and superior technologies, especially for collecting and evaluating “hard information” (Berger et al. 2005).

However, other studies suggest that foreign ownership is associated with lower efficiency than domestic ownership because of the predominance of factors related to the second “theoretical approach”. Domestic banks have some advantages, especially in developing economies, such as access to “soft” information about the local environment (Berger et al. 2003; Lensink and Naaborg, 2007). Empirical evidence so far has not produced conclusive results about which framework fits better in the banking sector (Mian, 2003; Bonin et al. 2005). In particular, it is still not clear whether the risk taking and capital adequacy of foreign-owned banks are significantly different from those of domestic institutions.

The presence of families as major owners of financial institutions should have a negative impact on banks’ riskiness. Single owners and families invest a large share of their wealth in the firm, and are therefore more risk-averse and more likely to be capital-rationed than companies with diversified ownership (Pedersen and Thomsen, 2003). There is still a scarcity of research about this issue in the banking industry. Laeven (1999) finds that family-owned banks were the most risky before the Asian crisis in 1997. However, Barry et al. (2011) show that a higher stake of family/individual ownership is associated with a decrease in asset and default risk.

The aforementioned papers do not focus exclusively on the potential impact of ownership identity on capital adequacy or the implementation of Basel rules, although a number of studies address these issues indirectly by using as a proxy for banks’ risk taking, among other variables, banks’ capital asset ratio, which is the key indicator in the Basel requirements (Chou and Lin, 2011; Dong et al. 2014). Based on the aforementioned studies and assumptions we test the following hypothesis about the impact of owner identity on bank capital adequacy:

Hypothesis 1. Different ownership structures imply different levels of banks' overall capital adequacy.

The literature is less abundant on the impact of ownership identity on banks' liquidity risk. Andries and Billon (2010) develop a theoretical model and show that government-owned banks can benefit from a more stable deposit base, given that depositors perceive they are better protected during a financial crisis in a public bank. Therefore, liquidity risk is less likely to be a concern for state-owned banks. Brei and Schclarek (2015) examine from a theoretical perspective the lending behavior of private and public banks. They show that the lending of the former group decreases to a larger extent than that of the public banks, because public banks do not generally suffer deposit withdrawals and have better access to additional funding or capitalization. Similar results are reached by Bertay et al. (2012), De Haas et al. (2012), and Cull and Martínez-Pería (2013).

With regard to any differences between foreign-owned and local banks, Vazquez and Federico (2015) provide evidence that during the last financial crisis the smaller domestically owned banks were relatively more vulnerable to liquidity risk, while the large cross-border institutions were able to exploit their internal capital market and enjoy a more stable funding base which suggests that optimal choices about liquidity should be different among the two groups. However, Claessens and van Horen (2012) and De Haas and van Lelyveld (2014) assert that purely domestic banks were more isolated from the crisis and presented more stable lending patterns than multinational banks.

Dietrich et al. (2014) concentrate on the impact of several bank-specific characteristics on liquidity requirements for a sample of European banks. Among the explanatory variables they

include dummies for state-owned and foreign-owned banks. The results indicate that state-owned banks do not have any impact on liquidity requirements, but conversely, domestic banks have significantly higher net stable funding ratio than their foreign competitors. Based on the aforementioned assumptions, the second hypothesis we aim to test in the present study is the following:

Hypothesis 2. Different ownership structures imply a different exposure to liquidity risk.

3. Institutional background of the MENA region

The corporate governance of banking institutions in MENA is similar to that in other developing economies, with features such as underdeveloped financial markets, a high level of ownership concentration, a preponderance of family-owned firms and a strong presence of government ownership and control. The market for corporate control is still non-existent due to the rudimentary stage of development of the stock exchanges (Piesse et al. 2012).

Nevertheless, the past few years have witnessed a greater commitment to financial liberalization, the privatization of many state-owned banks, and a reduction in the entry barriers for foreign entrants (Turk-Ariss, 2008). The presence of foreign institutions has traditionally been higher in countries such as Bahrain, Qatar and the United Arab Emirates (Arouri et al. 2011).

The countries of the Gulf Cooperation Council (GCC)³ are part of the MENA region but they surpass the others in terms of the development of the financial sector (Chahine, 2007). This is a result of the boom in oil and natural gas revenues in the last few years and of a series of reforms

that have aimed to implement national financial systems and enhance competitiveness in the banking industry.

Farazi et al. (2011) show most MENA countries to have experienced a decline in the share of state banks during the last decade but the government's role to have remained fundamental in countries such as Algeria, Syria and Libya⁴. Foreign banks increased their average share in the region, except for a slight decrease in GCC countries. The share of foreign banks grew from 8% in 2001 to 20% in 2008.

Generally, the banking institutions in the region are smaller on average and disclose less information than banks in more developed economies. A large portion of their assets is invested locally and there is a low diversification of activities. This aspect may have been responsible for the reduced impact of the last financial crisis on the banking sector in the area. However, some countries, such as the United Arab Emirates (UAE), experienced real estate bubbles in 2008 followed by sharp falls in housing market prices and partial bailouts of banking institutions by the government.

MENA countries have strengthened banking supervision and regulation and taken significant steps towards the adoption of Basel rules (Creane et al. 2004; Ayadi and De Groen, 2014). At the moment, almost all jurisdictions object of this study have finalized the frameworks required to enforce the new standards, and implementation is being phased in (Prasad et al. 2016)⁵.

A few articles have attempted to investigate the performance of banks in the MENA region. Some of them are country-level studies (Bennaceur and Goaid, 2001; Isik et al. 2004; Omran, 2007). Naceur and Omran (2011) study the impact of financial development, institutional factors and competition on bank performance. Kobeissi and Sun (2010) and Farazi et al. (2011) focus on the impact of ownership structure on bank performance. These studies use dummies for state-,

foreign-, and domestic-owned banks, and bank performance is measured by common variables such as ROA, ROE, and net interest margin. The main findings are that private and foreign banks generally perform better than state-owned banks. There are no studies, to the best of our knowledge, looking at the impact of owner identity on bank capital requirements for this region.

4. Data and sample selection

We collect data from *Bureau van Dijk's Bankscope* database on the financial statements of all the listed and unlisted banks domiciled in the MENA region for the period 2000-2011. *Bankscope* also contains information about the ownership structures of the banks and the relative shares possessed by different shareholders. When this information was missing in *Bankscope* we tried to identify the owner type by searching among alternative sources such as the banks' websites, their audited financial statements, local directories for each country, or by asking the banking institutions directly via mail.

We decided to exclude from the sample development banks and investment banks, and concentrate only on commercial ones. The asset and liability items of development and investment banks prevent comparison with commercial institutions. Development banks focus on providing credit to governments for specific infrastructure projects and they are financed through annual quotas based on the GDP of each country. Investment banks' core business is not lending to households or corporations and they are not financed through deposits but through the international financial markets.

We also opted to exclude banks that did not have at least three consecutive observations. Our final dataset consists of 188 banks from 13 countries, making a total of 1388 firm-year

observations for which we have accounting, capital and liquidity ratios, and ownership data. Table 1 (Panel A) reports the number of firm-year observations and the number of those that belong to listed institutions per country. Listed banks account for more than 50% of all observations.

In order to mitigate the problem of outliers, all accounting variables were winsorized at the 1st and 99th percentiles. In Table 1 (Panels B and C), we first present descriptive statistics for bank performance, capital adequacy and liquidity requirements, and then show the distribution of observations based on the equity stakes owned by the largest shareholders in our sample. For all variables in Panel B we display the mean values, together with the standard deviation, and the 5th and 95th percentiles.

4.1 Capital adequacy and liquidity variables

The capital adequacy ratios are given by the capital asset ratio (*CAR*) and the Tier 1 capital ratio (*Tier_1*). *CAR* is measured as Tier 1 plus Tier 2 capital over risk-weighted assets. The liquidity requirement variables are proxied by the net stable funding ratio (*NSFR*) and the Liquidity creation ratio (*LC_ratio*)⁶. The mean values of *CAR* and *Tier_1* are respectively 15.05% and 8.96%. These values are similar to those found by other studies such as Distinguin et al. (2013) for a sample of US and European commercial banks, and Kobeissi and Sun (2010) for MENA banks. *NSFR* has an average value of 1.77. This indicator is measured as the available amount of stable funding divided by the required amount of stable funding.

The LC ratio is a relatively recent variable to emerge. Banks are not required to meet a particular target for it under Basel III rules but we decided to include it as a robust alternative liquidity

indicator to *NSFR*. The ratio is suggested by Berger and Bowman (2009) as a valid proxy for the ability of banks to convert their assets into cash given the structure of their liabilities. We follow the procedure adopted by Distinguin et al. (2013) to calculate it. The LC ratio is measured as

$$\frac{0.5 * illiquid\ assets + 0 * semiliquid\ assets - 0.5 * liquid\ assets + 0.5 * liquid\ liabilities + 0 * semiliquid\ liabilities - 0.5 * illiquid\ liabilities}{Total\ assets}$$

Berger and Bowman (2009) assert that some of a bank's assets are more difficult to sell than others and similarly some of the liabilities can be withdrawn without paying penalties. The weights on banks' assets and liabilities are adopted accordingly. The higher the value of *LC_ratio*, the higher is the bank's illiquidity, as the bank invests liquid liabilities (i.e. transaction deposits) in illiquid assets (i.e. corporate loans). The mean value of *LC_ratio* for our sample is 5.83. This is much lower than the value found by Distinguin et al. (2013). We assume that the banks in the MENA region prefer not to hold a high proportion of assets classified as less liquid, in order to avoid suffering from their fire sale in the event of compelling liquidity needs. Descriptions of the items used to calculate *NSFR* and *LC_ratio* respectively⁷ are provided in Table A1 Panel A and B in the Appendix.

<insert Table 1 here>

4.2 Ownership variables

There are three ownership variables. All of them capture the direct or indirect equity stake held by the largest owner of the bank. Shareholders can include the government and its related agencies (*Gov*), private individuals and families (*Private*) and foreign banks (*Foreign*). We tried

to identify the ultimate owner for each bank. For example, when the largest owner is a government agency or another firm owned by the government, we consider the ultimate owner to be the government.

The shares held by the largest owners of the banks of the region are, on average, very different from one another (Panel C). Most of the banks in our sample are controlled by private investors. Of the firm-year observations for which the largest owner holds at least 30% of the shares, in 59% that owner is a private investor. This percentage increases to 69% of the observations with a controlling shareholder (i.e. one owning more than 50% of the shares). Governments are the controlling owners in 21% of the observations. This percentage falls to 10% for foreign investors.

4.3 Control variables

Following previous contributions, we include in the analysis a set of control variables. In Panel B of Table 1 we provide descriptive statistics for each one of them. Bank size is proxied by the natural log of total assets (*Ln_asset*). It is included in the regressions because small banks may behave differently from large banks (Laeven and Levine, 2009; Dietrich et al. 2014). *Growth* represents the annual percentage change in the gross loan portfolio of each bank and controls for banks' growth opportunities. Banks with a history of fast growth might have lower *CARs* and *NSFRs* due to being considered less risky by the market (Caprio et al. 2007). Operational leverage (*Op_lev*) is the ratio of fixed assets to total assets.

The standard deviation of banks' net income (*SD_Roa*) accounts for the volatility of banks' profits (Chalermchavitchien et al. 2014). The loan loss ratio (*LLR*) is measured as the provisions for loan losses divided by the loan portfolio (Laeven and Levine, 2009). The cost-income ratio

(*CI_ratio*) is an indicator of efficiency and is calculated as operating expenses over operating revenues.

The deposits-to-assets ratio (*Deposit*) captures the banks' reluctance to rely heavily on money market instruments and wholesale funding. This variable conditions the riskiness and liquidity of banks as we expect institutions that are more deposit-oriented to have higher *NSFRs* but lower *CARs*, not being subject to runs (Gorton, 2010; Aebi et al. 2012). Listed banks can have different risk propensities from unlisted banks, regardless of the nature of the owner (Iannotta et al. 2013). Finally, the dummy for GCC banks aims to capture the different underlying conditions of the banks within that group of countries, which have higher GDPs per capita and more developed financial systems than other countries in MENA⁸.

We provide descriptions of all variables in Table A2 in the appendix.

5. Model specification

In this article, we investigate the impact of the owner's identity on banks' capital adequacy and liquidity ratios. Therefore we test two hypotheses by considering two specifications:

Hp.1: Different ownership structures imply different levels of banks' overall capital adequacy

Hp.2: Different ownership structures imply a different exposure to liquidity risk

The models are as follows:

$$CAR_{i,t}(Tier_1_{i,t}) = \beta_1 CAR_{i,t-1}(Tier_1_{i,t-1}) + \sum_{i=2}^n \beta_i * X_{i,t} + \sum_{j=1}^n \beta_j * Y_{i,t} + \varepsilon_{i,t}$$

(1)

$$NSFR_{i,t}(LC_{ratio}_{i,t}) = \beta_1 NSFR_{i,t-1}(LC_{ratio}_{i,t-1}) + \sum_{i=2}^n \beta_i * X_{i,t} + \sum_{j=1}^n \beta_j * Y_{i,t} + \varepsilon_{i,t}$$

(2)

We apply a GMM dynamic linear model similar to those of Arellano and Bover (1995) and Blundell and Bond (1998). The reason for choosing a GMM specification for testing both relationships is to mitigate potential endogeneity biases stemming from the fact that the capital and liquidity structures of banks can be persistent and do not change quickly. Moreover, some of the explanatory variables, such as bank size, the loan loss ratio, the deposit to total assets ratio and the growth of the loan portfolio, can suffer from cross-causality with the dependent variables. In these cases, we instrument these regressors with appropriate lagged values (Shehzad et al. 2010; Dietrich et al. 2014).

We first test Hp.1 by using as a dependent variable the capital asset ratio (*CAR*). Alternatively, we use the Tier 1 ratio (*Tier_1*) in order to produce more robust results. Both ratios have been adopted often as proxies for bank capitalization and bank risk taking behavior.

Second, we test Hp.2 by adopting as a dependent variable two indicators of liquidity risk. The first one is the net stable funding ratio (*NSFR*), as suggested by the Basel Committee. The second one is a liquidity creation indicator (*LC_ratio*), which is suggested by Berger and Bowman (2009) and Distinguin et al. (2013).

$X_{i,t}$ represents the proportion of shares held by the largest owner. Owners can be private individuals, families or corporations, foreign institutions, or national governments. Other studies have underlined the presence of alternative important blockholders in banks, such as managers or

institutional investors (Sierra et al. 2006; Elyasiani and Jia, 2008). This is not the case for the banks domiciled in the MENA region, where the proportion of shares owned by these two groups is irrelevant. The current literature (Faccio and Lang, 2002) considers the ownership stake held by the largest owners to be time-invariant but we decided to measure it in three different years in our sample in order to check for changes in ownership during the period under observation.

As previously mentioned, the ownership of the sample is concentrated (see Table 1, panel C). As an example, local private shareholders control more than 50% of the shares of the institutions where they are the largest owner. However, in some financial institutions these stockholders control less than 50% of the voting rights. Therefore, it might be possible that they cannot influence board decisions and as a consequence bank capital or liquidity requirements. We perform two different robustness checks, in order to assess whether this might alter our results. First, we re-run the regressions and include in the sample only the observations for which the main shareholder has more than 50% of the shares. Second, we include as a controlling variable, the stake of other owners if they can be identified⁹.

$Y_{i,t}$ comprises several important bank-specific characteristics, namely, the growth rate of loans, a measure of bank size, profit volatility, the loan loss ratio, a measure of operational leverage, the cost-income ratio, the deposits to assets ratio, a dummy for listed banks, and a dummy for banks domiciled in the GCC region.

As mentioned above, some of the independent variables are considered as endogenous. These include the lagged values of the dependent variables in each regression, but also the bank size (Ln_asset), the loan loss ratio (LLR), the deposit to total assets ratio ($Deposit$) and the growth of the loan portfolio ($Growth$). The lagged values of the dependent variables are instrumented with their second lag, whereas for the other regressors we use their first lag (Dietrich et al. 2014). For

each regression we check the validity of the instruments using the Hansen test of overidentifying restrictions and the *m2* test for null autocovariance in the residuals of second order.

6. Empirical results

6.1. Correlation matrix

In Table 2 we present the correlation coefficients between the main variables under investigation. Government ownership is negatively related to *NSFR* but shows no relation with *CAR*, *Tier_1* or *LC_ratio*. *Foreign* is positively and significantly related to *CAR* and *NSFR*. The correlations between *Private* and both *CAR/Tier_1* and *NSFR/LC_ratio* are not significant. Bank size (*Ln_assets*) shows a positive correlation with banks' regulatory capital but a negative one with their liquidity ratios. The deposit ratio is negatively correlated with *Tier_1* but positively with *NSFR/LC_ratio*. The loan loss ratio is negatively and significantly related to both *CAR* and *Tier_1* but positively to *NSFR* and *LC_ratio*. Listed firms evidence a propensity to have higher capital but lower liquidity ratios. The standard deviation of net income is positively correlated with *CAR*.

<insert Table 2 here>

6.2. Regression outcomes

Table 3 (columns 1-4) presents the regression results for which the dependent variables are, in turn, *CAR*, *Tier_1*, *NSFR* and *LC_ratio*. Higher values of *LC_ratio* should correspond to lower values of *NSFR*. All models are estimated using GMM dynamic panel models in order to control

for potential endogeneity biases. Endogenous variables are highlighted in italics in all regressions.

The hypotheses that we aim to address here regard the impact of the equity stake of different types of major owner on banks' regulatory capital (Hp.1) and liquidity risk (Hp.2). The models examine the link between owner identity and *CAR*, *Tier_1*, *NSFR*, and *LC_ratio*, respectively. Our main explanatory variables of interest are *Gov*, *Private* and *Foreign*, indicating the proportion of equity held by the largest shareholder, if that shareholder is a government agency, private entity or foreign entity respectively.

<insert Table 3 here>

It can be observed that the lagged values of our dependent variables are strongly significant and positive for all models, indicating that all are persistent across the years, and justifying the use of the GMM specification. Looking at the owner's identity variables, we find that the presence of the government as the largest shareholder does not have any effect on any of the dependent variables. The presence of a private main owner has a substantial impact on *CAR* and *Tier_1* (*Private* = 1.01 and 3.583 respectively) and a positive effect on *NSFR* (*Private* = 0.440). The estimated coefficients for *Foreign* are 9.906 for *CAR* and 8.001 for *Tier_1*, both strongly significant, unlike the coefficients for this variable for *NSFR* and *LC_ratio*.

If we concentrate on the other variables, we can deduce that the effect of bank size (*Ln_asset*) on *CAR* and *Tier_1* are negative and significant. Generally, larger banks rely more on debt funding, and as a consequence have lower capital ratios. A high proportion of loan losses corresponds to a lower Tier 1 ratio. The GCC dummy has a positive effect on *CAR* and *Tier_1* but a negative

impact on *NSFR*. Banks domiciled in this region of MENA present higher capital ratios but their liquidity requirements are lower than those of banks operating in the other MENA countries. The other control variables are not significant, except for *Op_lev* and *CI_ratio* that exhibit negative and significant effects on *Tier_1*.

Our results are partially consistent with Hp.1 and with Hp.2. We find that the equity stake of different types of owners can significantly impact on banks' capital adequacy. The outcomes of Model 1 indicate that, over the past decade, privately owned and foreign-owned banks have tended to give more importance to capital adequacy ratios than state-owned banks. The results for Model 2 indicate that liquidity ratios seem to have been a concern only for private investors. The combined results of these regressions for private-owned banks confirm previous empirical evidence which highlight that private banks are generally more risk-averse than state-owned ones (Iannotta et al. 2007; Dong et al. 2014).

The results for foreign banks indicate that, for them, capital adequacy has traditionally been more important than any liquidity thresholds. The reason for this is related to the fact that foreign-owned banks normally belong to large international holding groups. They benefit from lower costs of funding from their parent companies, making it less likely that they will suffer from liquidity emergencies (Havrylchyk and Jurzyk, 2011).

The non-significant effect on the capital and liquidity ratios of the ownership stake of government-related agencies, when they are the main shareholders, leaves room for different explanations. First of all, when banks are owned by governments they generally benefit from a low cost of funding and an implicit guarantee of a bailout in the case of default (Iannotta et al. 2013). This should induce state-owned banks not to pursue the maximization of their required capital adequacy ratios, as long as they are above the minimum required threshold. Second, state-

owned banks suffer political interference which forces them to pursue high risk and low return projects or to provide finance to state-owned enterprises. Our results are partially consistent with those evidenced by Dietrich et al. (2014). They show that the presence of state-owned banks does not have any explanatory effect on the *NSFRs* of a sample of European banks for the period 1996-2010.

7. Robustness checks

7.1. Regression estimates when the largest owner holds more than 50% of the shares

In the previous regressions we assessed the impact of the owner's identity on banks' capital ratios and liquidity risk under the sole condition that a government agency, a private or a foreign investor was the largest shareholder of the bank. In the following we consider a similar analysis but set the minimum proportion of equity held by the largest owner to be 50%. This choice aims to disentangle the effect of a controlling shareholder on bank ratios if that shareholder controls the majority of the voting rights and has the power to appoint board members and to change managers in the case of unsatisfactory performance. The results of the regressions are presented in Table 3 (columns 5-8).

The outcomes of the regressions are similar to those previously discussed. The impact of government ownership is not significant for *CAR*, *Tier_1*, *NSFR*, or *LC_ratio*. Privately owned banks exhibit higher capital asset and Tier 1 ratios. Both coefficients are positive and significant (0.815 and 2.252 respectively). Unlike in the previous results, both liquidity coefficients are now significant (0.230 for *NSFR* and -1.690 for *LC_ratio*). Foreign banks show a strong propensity for higher capital ratios. The coefficients of *CAR* and *Tier_1* are positive and significant (5.820

for *CAR* and 8.352 for *Tier_1*). The coefficients of the control variables are similar to those seen in Table 3.

The aforementioned results are partially consistent with Hp.1 and Hp.2. The most important outcome of this second set of regressions is the strong propensity of private investors to address liquidity requirements. As previous research has shown, families and single investors concentrate a large share of their wealth in the corporations in which they invest, making them relatively more risk-averse and capital-rationed (Fama and Jensen, 1985; Pedersen and Thomsen, 2003). Families are a unique type of investor with concerns over firm survival and strong incentives to monitor the management closely (Andres, 2008). This is the main reason why banks controlled by private local investors tend to have high capital ratios and also exhibit a reluctance to invest in highly illiquid assets.

On the whole, we find that different types of owners imply different levels of capital adequacy and liquidity risk. However, this assumption is not verified when the bank is government-owned. We do not observe any beneficial effect of the presence of government as the major owner in MENA banks, either for their risk-adjusted capital or liquidity risk. More careful capital management is exhibited in the privately-owned banking institutions. This assumption also holds for banks whose major investor is foreign-based. Private investors display lower exposure to liquidity risk as well.

7.2. Including a dummy for the period of the financial crisis

The most acute phase of the recent financial crisis was the period dating from the collapse of Lehman Brothers (September 2008) to mid-2009 (Aït-Sahalia et al., 2012; Forti and Schiozer, 2015). This crisis displayed its worst consequences around the world by the end of 2009.

Therefore, in this section we check whether the results obtained for the full sample are influenced by this event, by including in regressions (1) and (2) a dummy variable for the years 2009-2011, which we call *Crisis*¹⁰. We decided to interact this variable with *Gov*, *Private* and *Foreign* in order to assess whether the impacts of the ownership stakes of these categories were significantly different during the crisis than pre-crisis. The estimates of the models are presented in Table 4.

<insert Table 4 here>

The results show that the crisis did have an impact on *CAR* and *Tier_1*. Both coefficients are positive and strongly significant. This indicates that banks decided to improve these indicators, being aware that lower ratios could undermine investors' and other stakeholders' perceptions of their riskiness. Surprisingly, the crisis effect is only significant for capital and not for liquidity ratios.

If we look at the interactions between *Gov*, *Foreign*, *Private* and the crisis dummy, the only significant variable is *Private_crisis* for the *NSFR* model (0.941). As already mentioned, family-owned banks are more likely to suffer from liquidity constraints. Compared to state- or foreign-owned banks, they are more prone to face liquidity emergencies. During the crisis, it was important for all banks to respect the regulatory ratios set by the central banks of the region, but the pursuit of specific liquidity requirements was not in the agenda at that time. As soon as the crisis began to display its effects around the world, privately-held banks started to delve more closely into liquidity issues. Therefore, they decided to increase the liquidity ratios during the

years 2009-2011. This view can be corroborated by the coefficient of *Private* (0.019) in regression (3). It is positive and significant but lower than in Table 3, indicating that the impact of private owners on *NSFR* in the main sample (Table 3) is due mostly to their increasing efforts to lower liquidity risk in the last three years.

7.3. *Other tests*

In further robustness tests, we insert in the regressions the ownership stake of other owners, in case the main shareholder controls less than 50% of the bank's shares, but only if the owner type can be clearly identified (see note 9). The coefficients of the main variables do not present remarkable differences with those in Table 3. The impact of the other owners' equity stake on capital and liquidity risk indicators is never significant. This might be due the fact that these owners are generally banks, insurers or other private investors owning a low ownership stake. According to the definition given by Brickley et al. (1988) they can be classified as pressure-sensitive investors that act as passive investors because they do not want to risk losing their business relationships with the investee bank¹¹.

Furthermore, we exclude from the sample Iranian banks, considering that they have not started yet the implementation of Basel III standards. Even in this case, the outcomes of the regressions remain largely unchanged. We decide to not tabulate the results due to space constraints¹².

8. **Conclusions and final remarks**

In this study we investigate the potential impact of the owner's identity on banks' capital adequacy and liquidity requirements, for a sample of MENA banks. Since the last financial

crisis, new capital and liquidity rules have been formulated, that banks will have to comply with in order to improve their resiliency, especially to credit and liquidity risk.

In order to understand how different owners might address this issue, we look at the past performance of banks in the MENA region and assess how the presence of different large blockholders impacted on capital and liquidity ratios in the period 2000-2011. We think this analysis might be important because, by looking at whether owner identity has been an important driver of these variables in the past, we can understand better whether it might have any remarkable effects in the future.

The empirical results indicate that the impact of the owner's identity on a bank's capital and liquidity ratios is significant, but not in all. First, we find that capital asset and Tier 1 ratios are influenced by the presence of private and foreign investors but are not related to the holding of equity by government agencies. Second, liquidity requirements are not a priority for state-owned and foreign banks but only for private investors, who might suffer more from budget constraints should banks need to repay liabilities claimed on demand. Third, privately owned banks seem to have strengthened their liquidity ratios during the last financial crisis.

The results may have relevance and carry implications for policy makers and regulators in the MENA region. Privately owned banks seem to pay more attention to the careful management of capital and liquidity ratios. This holds for banks owned by foreign investors as well, but in that case only for capital asset ratios. When the largest owner is a government agency, banks seem to adopt riskier strategies. This may be a consequence of the fact that state-owned banks might benefit from an implicit guarantee of bailout from their major owners.

These outcomes suggest that regulators in this environment should encourage transfer of ownership to private investors, as this would help to improve the stability of the financial

systems in the region. As a matter of fact, the governments across the region have engaged increasingly in the past few years in opening their financial markets and privatizing many state-owned institutions. If we look at the MENA banks' performance only from a risk-taking perspective, we can conclude that this is the right choice as privately owned banks have displayed better management of their regulatory capital and lower liquidity risk than their state-owned competitors in the last decade.

Appendix

Table A1. In Panel A the summary of the balance sheet items used to calculate the net stable funding ratio (*NSFR*) is evidenced.

Source: *Bankscope* and Dietrich et al. (2014). In Panel B we indicate the balance sheet items used to calculate liquidity creation ratio

(*LC_ratio*). Source: Distinguin et al. (2013)

Panel A			Panel B		
	Available stable funding	ASF Factors	Assets	Liquidity level	Weights
Equity	Total equity	1	Cash	Liquid	-0.5
	Pref. shares and hybrid capital accounted as debt	1	Interbank assets	Semiliquid	0
	Pref. shares and hybrid capital accounted as equity	1	Short term marketable assets	Liquid	-0.5
	Non-controlling interest	-1	Commercial loans	Illiquid	0.5
Liabilities	Total customer deposits	0.9	Consumer loans	Semiliquid	0
	Deposits from banks	0	Other loans	Semiliquid	0
	Repos and cash collateral	0.5	Long-term marketable assets	Semiliquid	0
	Other deposits and short-term borrowing	0	Fixed assets	Illiquid	0.5
	Total long-term funding	0.6	Other assets	Illiquid	0.5
	Reserves for pensions and other	1	Customer acceptances	Semiliquid	0
	All other liabilities and equity	0			
	Required stable funding	RSF Factors	Liabilities		
Loans	Residential mortgage loans	0.65	Demand deposits	Liquid	0.5

	Other mortgage loans	0.65	Saving deposits	Liquid	0.5
	Other consumer retail loans	0.85	Time deposits	Semiliquid	0
	Corporate and commercial loans	0.85	Other term deposits	Semiliquid	0
	Other loans	1	Short-term borrowings	Liquid	0.5
			Other short-term liabilities	Liquid	0.5
			Long-term borrowings	Semiliquid	0
Other	Loans and advances to banks	0	Other long-term liabilities	Semiliquid	0
	Total securities	0.4	Subordinated debentures	Illiquid	-0.5
	Investments in property	1	Preferred equity	Illiquid	-0.5
	Insurance assets	1	Minority interests	Illiquid	-0.5
	Other earning assets	1	Shareholder common capital	Illiquid	-0.5
	Cash and due from banks	0	Retained earnings	Illiquid	-0.5
	All other non-earning assets	1			

Table A2. Definition of variables

Variable	Description
Capital asset ratio (<i>CAR</i>)	(Tier 1 + Tier 2 capital) / RWA (in %)
Tier_1	(Tier 1 capital) / RWA (in %)
Net stable funding ratio (<i>NSFR</i>)	ASF / RSF (as in Table A1)
Ln_asset	Log(total assets)
Growth	Annual change of the gross loan portfolio (in %)
ROA	Return on assets (in %)
Op_lev	Fixed assets / total assets
SD_Roa	Annual standard deviation of banks' net income
Loan loss ratio (<i>LLR</i>)	Provisions for loan losses / gross loan portfolio (in %)
CI_ratio	Operating expenses / operating revenues (%)
Deposit	Deposit / total assets (in %)
Listed	A dummy equal to 1 if the bank is listed during a particular year
GCC	A dummy equal to 1 if the bank is domiciled in the GCC countries
Gov	The total (direct or indirect) equity stake of the largest owner of the bank, if that owner represents any government entity
Private	The total (direct or indirect) equity stake of the largest owner, if that owner is a private local investor

Foreign The total (direct or indirect) equity stake of the largest owner, if
that owner is a foreign investor

Liquidity creation ratio (*LC_ratio*): The items used for its calculation are described in
Table A2 and the formula is presented in Section 5.

NOTES

¹ Although full implementation of Basel III is set for 2018, many financial institutions started to comply with the new rules in 2013.

² A review of the existing literature on the factors related to banks' liquidity stress can be found at: http://www.bis.org/publ/bcbs_wp25.pdf.

³ The countries that make up the GCC are Saudi Arabia, Bahrain, Kuwait, Oman, Qatar and the United Arab Emirates. The union aims to achieve various goals, such as the integration of the national financial systems and the adoption of a single currency in the long term.

⁴ The authors use IMF data for the year 2008.

⁵ Iran is a notable exception. Due to international sanctions, the country has not yet started the implementation of Basel III although, the Iranian Central Bank is expected to deliver guidelines in the next future on the adoption of the new rules. In non-tabulated robustness tests we remove Iranian banks from the sample but the results are substantially similar to those presented in the paper.

⁶ Our data do not permit the calculation of the Liquidity coverage ratio (LCR) which would require information about the daily cash flows of banking institutions.

⁷ The Basel Committee includes in the calculation of *NSFR* off-balance-sheet assets and liabilities as well. We considered the breakdown of on-balance-sheet items only, because standard datasets do not provide adequate coverage of off-balance-sheet items. Distinguin et al. (2013) face the same problem for European banks.

⁸ We could have used dummies for each country but doing so could have produced biased estimates as the number of observations for some countries is low.

⁹ We are grateful to one reviewer for pointing this out. We control for the stake of other owners, only if they can be identified. In listed firms, it is common to have a multitude of small investors, whose identity is not specified. In this case, we decide to not include them in the regression, insofar their influence on banks' board decisions cannot be determined clearly.

¹⁰ We believe that it is unlikely that the global financial crisis might have had an impact on the financial statements of MENA banks in 2008. It is more reasonable to assume that any adverse consequences were materialized in 2009-onwards.

¹¹ Brickely et al. (1988) classify institutional investors into three groups according to whether they have potential business relationships with the investee firms and, hence, their sensitivity to management pressure. These groups include: pressure insensitive (public pension funds, mutual funds), pressure-sensitive (banks, insurers), and pressure indeterminate (corporate pension funds, investment banks, brokerage houses). Non-controlling blockholders of the banks in our sample belong predominantly to the second group.

¹² These results are available from the authors upon request.

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