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The opinions expressed in this dissertation are those of the PhD candidate and do not necessarily reflect the views of the University of Limoges.

To the loving memory of my father, Dr. Hani Alraheb
I hope you will be smiling on this day

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General Introduction

The wide-spread effects of the Global Financial Crisis starting from 2007 has had severe consequences on banks and their intermediation function around the world. The crisis led to the failure of numerous financial intermediaries, credit crunches, and vast losses for depositors, investors, markets and governments. Ever since, bank reforms have been put in place by national and international regulatory authorities to increase banks' soundness, capital requirements, and to protect the economy, among others. Bank reforms should take into perspective the different effects of the global financial crisis on banks, how some banks were vulnerable to the crisis while other were more resilient. Also, implementing stricter, or higher, capital requirements, should take into account the institutional environment in the targeted countries, in addition to the financial sector environment to ensure the effectiveness of these capital requirements with regards to increasing banks' stability. Moreover, as the soundness of the financial sector depends, amongst other factors, on the outcome of the lending activities of banks, therefore having higher levels of creditors rights would decrease the losses related to the lending activities, which gives special importance to the other effects of these rights, and the financial consumer rights, on the cost of financial intermediation and the lending activity itself.

Given the above, this dissertation aims to answer several questions. First, what are the factors that lead banks to be affected differently by the Global Financial Crisis than by a domestic crisis? Why were some banks more resilient to these shocks than other? Second,

how does a country's institutional environment affect the regulatory-set and internally-set capital levels? Third, what are the effects of laws instituted to protect banks and financial consumers on the actual lending activity of banks?

Specifically, the first chapter attempts to evaluate the different impact of a global vs. domestic crisis on banks' stability and the role played by subsidiaries (owned by banks in the sample) in mitigating or transferring the shocks to the mother-bank. The second chapter sheds a light on how the institutional environment differently affects the internally-set and the externally-set capital ratios, and whether these effects differ between countries with high market capitalization to GDP vs. low market capitalization to GDP. Finally, the third chapter addresses the impact of financial consumer protection laws and creditors' rights on bank cost of intermediation and lending growth, and whether they affect banks' expansion of short-term and long-term loans.

To tackle the first two questions raised above, chapter (1) presents an investigation using the Middle East and North Africa (MENA) region as a laboratory to analyze the impact of the so-called 'Arab Spring' and the Global Financial Crisis of 2007-2008 on bank stability and whether these crises have had different effects, and why. We also investigate whether owning bank subsidiaries in foreign countries increases or decreases the 'mother'-bank stability during non-crisis periods, and during such shocks. The existing literature have documented the increased instability and failures of banks following the Global Financial Crisis of 2007 ((Vaugirard (2007) and Khandelwal & Roitman, (2013)), in addition to the wide-spread contagion from one country to the other (Mati, 2008). The bulk of research done on banks' international expansion has mainly focused on the subsidiaries

role in stabilizing and destabilizing the host-country banking sector, their effect on the access to credit, and their effect on banks' efficiency and competition (Claessens (2006), Wu et al. (2011), Jeon et al. (2011), Popov & Udell (2012), Jeon et al. (2013) and Bremus (2015)).

The choice of the MENA region is based on the fact that it suffered from two consecutive shocks; a local and an international shock. Banks in this region have higher capital ratios and are more profitable than banks in the U.S. and the Eurozone[1]. The MENA region bank assets to GDP places it second to East Asia, and ahead of Eastern Europe, South Asia, and Latin America (Anzoategui, et al., 2010). Additionally, Islamic banks in the region account for 72% of total Islamic bank assets in the world. Consequently, investigating the vulnerability of MENA banks to regional or global shocks is of high importance.

Using a sample of 336 banks from 21 MENA countries for the period between 2004 and 2012, we show that the 'Arab Spring' did not have a negative effect on banks' stability. Contrariwise, the banks' stability significantly decreased during the Global Financial Crisis. We find that owning subsidiaries outside banks' home country was a source of increased fragility during the non-crisis period, yet a source of higher stability during the local crisis but not during the Global Financial Crisis. Additionally, owning subsidiaries in specific world regions, including the MENA region, contributes to higher stability during the 'Arab Spring', while owning subsidiaries in Europe is found to negatively affect MENA region banks during the Global Financial Crisis. Lastly, owning subsidiaries in

[1] Own calculations based on data extracted from Bankscope.

three or more regions is more stabilizing during the 'Arab Spring' and more destabilizing during the Global Financial Crisis.

These findings have important implications. Banks' geographical diversification is only effective in improving stability during specific local shocks and has the opposite effect during international crises. The findings could be generalized to other regions as global banks are becoming more and more alike regardless of where they operate from. To monitor and manage bank stability, prudential regulation and bank supervision should closely account for the structure of banking groups and their international diversification when originating new regulations and policies, or implementing existing ones.

As mentioned before, the institutional environment could have an important role in the effective application of regulatory capital requirements. Demirgüç-Kunt & Maksimovic (1999) have stressed the importance of considering the legal and institutional framework affecting firms' capital structure decisions. Nonetheless, the existing literature on the effects of the institutional environment on capital structure mainly focuses on non-financial firms rather than financial firms (Booth et al. 2001; de Jong et al. 2008; Cho et al. 2014; Belkhir et al. 2016). To shed a light on this issue, we focus on a world region whose underdeveloped institutions can be considered as a major obstacle to its economic and financial development: the MENA region. The MENA is a fast-growing region which remains understudied when it comes to the capital structure of its financial institutions. Institutions in several countries in the MENA region suffer from a widespread corruption, weak governance, and limited creditors' rights (World Bank 2014). This region showed a resiliency towards the Global Financial Crisis due to factors mentioned above. Other

researchers have pointed out additional factors including the presence of a stable funding basis, prudent lending, and sound bank capitalization. Banks in the MENA region hold total regulatory capital and tier-1 capital ratios significantly above international standards and the Basel requirements.

Chapter (2), therefore, investigates the role played by the institutional environment in determining capital buffers set either by regulators or by banks internally. Using a sample of 183 banks from 14 MENA region countries covering the 2004–2014 period, we find that the effects of the institutional environment are momentous for the effectiveness of regulatory capital ratios. We also find that most of institutional variables affect the internally set capital for countries with developed stock markets. We show that higher corruption and political instability levels are associated with lower capital adequacy ratios, while creditors' rights, negatively affect capital adequacy ratios. We also find that the institutional environment effect is more pronounced for listed, conventional, and non-government owned banks compared to non-listed, Islamic, and privately-owned banks, respectively.

Chapter (2) contributes to the literature in several ways. We provide new insights on the financial benefits of developing the quality of the institutional environment. To our best of knowledge, no other study has explicitly focused on the link between institutions from one side and the regulatory-set and internally-set bank capital ratios from the other side. Moreover, we perform our study on a region that remains understudied when it comes to bank capital and solvency ratios. Our results are of special importance to regulators, shedding a light on the institutional environment role in banks choice of higher capital

levels regardless of the imposed regulatory capital, and how this environment contributes to the effectiveness of capital regulations.

Finally, chapter (3) is devoted to answer the question regarding the effects of laws instituted to protect banks (creditors' rights) and financial consumers (financial consumer protection) on the actual lending activity of banks. Some studies have found that higher creditor's rights (CR) increases banks' lending expansion (Jappelli, et al., 2005), loan maturity (Qian & Strahan (2007); Ge, et al. (2012)), and the cost of intermediation (Mathur & Marcelin, 2015). Others have found that higher creditor's rights lead to a decrease in the cost of financial intermediation (Laeven, et al. (2005); Ge, et al. (2012)). The literature on the effects of financial consumer protection (FCP) in the banking sector is rather scarce. Only Pasiouras (2016), to our best knowledge, has explicitly examined this area.

Chapter (3) evaluates the effects of both consumers' and creditors' rights on the cost of intermediation and loan growth, offering regulators an insight on the different effects of higher creditors', and borrowers', rights, and whether they complement each other in reaching higher access to credit at a lower price. We also investigate the effects on loan growth for loans with a maturity of less-than and more-than 1 year, to evaluate the change in the maturity mix of the loan portfolio. To do so, we use a sample of 852 commercial banks spread over 27 European countries, for a period ranging from 2010 to 2015. We find that higher levels of FCP is associated with an increase in the cost of lending, while higher creditors' rights decrease this cost. However, when both FCP and CR are at high levels, the two opposing effects cancel each other. As for banks' lending, we show that it increases when creditors' rights are high, but the relationship with financial

consumer protection is insignificant, unless accompanied by high levels of creditor's rights, where it leads to higher loan growth. Finally, when consumers' rights are high and banks' rights are low, banks tend to shift their lending towards short-term loans, while long-term loans increase when both rights are high.

These results are of special importance to regulators, showing that they should not apply stricter financial consumer protection laws independently from better creditors' rights, because it would increase the cost of intermediation. Also, applying more stringent financial consumer protection laws alongside better creditors' rights is key to increased credit disbursed by banks.

Chapter 1

Local versus International Crises and Bank Stability: Does bank foreign expansion make a difference?

Abstract

We investigate the impact of global and local crises on bank stability in the MENA region and examine the effect of owning bank subsidiaries in other countries. We consider banks that experienced both types of crises during our sample period. Our findings highlight a negative impact of the Global Financial Crisis of 2007-2008 on bank stability but, on the whole, no negative impact of the local crisis. A deeper investigation shows that owning bank subsidiaries outside the home country is a source of increased fragility during normal times, yet a source of higher stability during the local crisis but not during the international crisis. Moreover, owning foreign subsidiaries in one or two world regions is insufficient to neutralize both types of crises, while being present in three or more regions is more stabilizing during a local crisis but also more destabilizing during an international crisis. Our findings contribute to the literature examining bank stability and have several policy implications.

JEL classification: G21, G28, G01

Keywords: Financial crises, Bank stability, Bank foreign expansion, Subsidiaries.

- This chapter draws from the contribution of Alraheb and Tarazi (2017). Local versus International Crises and Bank Stability: Does bank foreign expansion make a difference? *Applied Economics* (Forthcoming).

1. Introduction

The literature has documented numerous cases where political instability or crisis has significantly increased financial market volatility (Goodell & Vähämaa, 2013). Moreover, such episodes are also known to severely affect the stability of the banking system leading to an increase in the probability of a banking crisis (Vaugirard, 2007) and (Khandelwal & Roitman, 2013). Several examples of contagion to other countries are also evident starting from 1994-1995 with the 'Tequila Crisis', the 'Asian Flu' of 1997-1998, the 'Russian Virus of 1998, the 1998-1999 'Brazilian Crisis', and ending with the 'Subprime Crisis' in 2007-2008. These prior incidents have shown that shocks from one country can overwhelm "within a matter of days countries having no apparent link with the crisis country" (Mati, 2008).

In this paper, we investigate possible differences between international and local shocks using the MENA[2] region as a laboratory to analyze both kinds of crises. Specifically, we examine the impact of the so-called 'Arab Spring' and the Global Financial Crisis of 2007-2008 on the stability of banks in the MENA region and whether stability is differently affected by such crises. Moreover, we investigate whether owning bank subsidiaries in foreign countries makes banks more or less vulnerable in their home country during normal times and during such shocks, either regional or international. Evaluating the effects of owning subsidiaries in foreign countries during shocks is important as banks

[2] The MENA region refers to the Middle East and North Africa region. It constitutes of the following countries: Algeria, Bahrain, Djibouti, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Malta, Morocco, Oman, Palestine, Qatar, Saudi Arabia, Syria, Tunisia, UAE, and Yemen.

worldwide are continuously expanding to other countries (geographical diversification) to pursue new opportunities in an attempt to increase profitability and/or reduce the risk.

Research on banks' international expansion has essentially focused on its effect on the host country banking industry, (Claessens (2006), Wu et al. (2011), Jeon et al. (2011), Popov & Udell (2012), Jeon et al. (2013) and Bremus (2015)). On the one hand, results show that being owned by a foreign bank (i.e. being a subsidiary) increases stability during host country crisis, provides higher access to finance, increases efficiency and competitiveness, and results in lower lending costs. On the other hand, international expansion can transmit shocks from home countries and destabilize host countries. Nonetheless, more work is needed on how the home country banking industry is affected by subsidiaries established abroad. Geographically diversified groups are likely to be less affected than non-diversified banks by local crises but more impacted by foreign crises occurring in countries they are present in.

MENA banks are, on average, better capitalized and more profitable than banks in the U.S. and the Eurozone[3] but their recent expansion might also make them more exposed to shocks as they tend to play a more important role at the regional and global level through the subsidiaries they own worldwide. MENA region ranks second after East Asia, in terms of bank assets to GDP ratio, and ahead of Eastern Europe, South Asia, and Latin America (Anzoategui, et al., 2010). Furthermore, Islamic banks in the region account for 72% of total Islamic bank assets in the world. Consequently, investigating the vulnerability of

[3] Equity to total assets is at an average of 11.4% in the MENA region compared to 11.2% and 6.9% in the U.S. and the Eurozone, respectively. On average, the return on equity of MENA banks is also higher: 13.5%, 12.2% and 5.9% in MENA, The U.S., and the Eurozone, respectively (source: Bankscope).

MENA banks to regional or global shocks is an important question. The so-called 'Arab Spring' started in Tunisia in December 2010 and spread to other countries in the MENA region. The political crisis unfolded to Egypt in January 2011, finding its way to Yemen in the same month and to Libya and Bahrain in the following February, and finally reaching Syria in March. The 'Arab Spring' led to political reforms and new policies and regulations in neighboring countries, to prevent the possibility of similar uprisings. As a consequence, financial markets negatively responded to the turbulences recording, for example, a 16% drop in Egypt to the lowest level in 2 years while the Tunisian stock exchange also significantly declined (Chau, et al., 2014). The MENA region has had a long history of political instability, violence, and war. Such turbulences have had a negative, and sometimes devastating, effect on economic growth in the region (Tang & Abosedra, 2014). The magnitude of the current political unrest, nonetheless, is unprecedented before.

Political instability occurs when either planned or unplanned political events happen; elections are a good example of the first event, while uprisings are an example of the second. Other shocks that can have an effect on financial markets are terrorist attacks (9/11 attacks) or wars (Gulf Wars). In turn, such shocks could also affect the financial system as a whole and hence the banking sector. The main bulk of the political instability literature has focused on the effects of elections on different aspects of financial markets and banks. Białkowski, Gottschalk, and Wisniewski (2008) find an increase in market return volatility linked to election periods due to "narrow margin of victory, lack of compulsory voting laws, change in the political orientation of the government, or the failure to form a government with parliamentary majority". Julio & Yook (2012) document a decline in corporate investment expenditures during election years. Pástor & Veronesi

(2013) show that political uncertainty commands a risk premium in stock markets. Önder & Özyıldırım (2013) find that, during election years, state owned banks have significantly higher shares in the credit market, while the results obtained by Chen and Liu (2013) tell a different story, private banks showing higher loan growth and ROA. Francis, Hasan, and Zhu (2014) show that political uncertainty increases the cost of debt and tightens bank loan contracting. Considering long-term series, from 1928 to 2013, Charles and Olivier (2014) link large stock market volatility shocks to several events including elections, wars, and terrorist attacks, among others. Liu and Ngo (2014) show that bank failure is around 45% less likely to happen during the election year.

Few papers have examined the impact of the 'Arab Spring' on financial system stability. Chau et al. (2014) examine the volatility of major stock markets in the MENA region and find that the 'Arab Spring' is associated with an increase in volatility of all MENA stock markets. Their results also highlight that the observed market volatility is mainly driven by Islamic indices rather than commercial ones. Using a sample of 41 banks, Love and Ariss (2014) study the transmission of the macroeconomic shock of the 'Arab Spring' to banks in Egypt. Their findings confirm that macroeconomic shocks are actually transmitted to the banking sector. Moreover, the drop in capital inflows following the 'Arab Spring' events is found to be a key determinant of the loan portfolio quality in their sample. Ghosh (2015) investigates the effects of the 'Arab Spring' on the risk and returns of banks in 12 MENA countries encompassing three of the six countries directly affected by the political turmoil. His results show lower profitability and increased risk for banks in countries that were directly affected by the 'Arab Spring' compared to the remaining

countries in the sample. Moreover, Islamic banks showed an increase in risk compared to their conventional (commercial) counterparts.

Other risk and stability studies of the MENA region find a negative relationship between financial openness and bank risk taking and a positive relationship between disclosure and stability, (Bourgain, et al., 2012). Srairi (2013) finds a negative relationship between ownership concentration and risk taking. He also finds state-owned banks to be riskier than privately owned ones, Islamic banks being as stable as their conventional counterparts are. Larger banks that are less diversified and which operate in concentrated markets are also found to be more stable (Maghyereh & Awartani, 2014). Saeed & Izzeldin (2014) examine 106 Islamic and conventional banks in GCC[4] countries and three non-GCC countries in the MENA region. On the one hand, they find that a decrease in default risk for conventional banks is associated with a decrease in efficiency. Islamic banks, on the other hand, show no tradeoff between default risk and efficiency. In other words, lower default risk might only be achieved at the expense of lower profit efficiency for conventional banks but not for Islamic banks.

This paper extends the existing literature in several directions. First, we examine the influence of banks' foreign subsidiaries[5] on the stability of 'home' rather than 'host' banking sector during both regional and global shocks (political and financial[6]). Second, to our best knowledge, while earlier studies have mainly focused on the effect of the 'Arab

[4] The Gulf Cooperation Council (GCC) includes Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates.
[5] The term 'foreign subsidiaries' will be used throughout this paper to refer to bank subsidiaries owned by banks in the sample, and which are operating in countries other than the country of main operations.
[6] Although the two shocks examined in our study are of different natures, however, and as listed above, numerous studies have documented the effects of different kinds of shocks on the financial markets in general, and the banking sector in particular.

Spring' on stock market volatility in MENA countries (Chau, et al., 2014), we examine its implications on the safety and soundness of banks in all MENA region countries. Third, we compare the impact of the Global Financial Crisis of 2007-2008 and that of the regional political instability of 2011-2012 on the stability of the banking sector[7]. Finally, in the process, we also investigate the determinants of bank stability in the MENA region as a whole and provide insights for better risk monitoring and supervision by regulators.

We consider a sample of 336 banks from 21 MENA countries covering the 2004-2012 period and find that banks did not suffer from lower stability during the 'Arab Spring'. Conversely, the Global Financial Crisis had a greater effect on the region as a whole by significantly decreasing bank stability. We find that financial openness measured by banks' ability to own subsidiaries outside their home country was a source of increased fragility during the non-crisis period, yet a source of higher stability during the 'Arab Spring' but not during the Global Financial Crisis. This positive effect of owning foreign subsidiaries on stability during the 'Arab Spring' is mainly associated with a decrease in leverage risk, suggesting a possible transfer of funds during the regional crisis. Additionally, owning subsidiaries in South America, Europe, and the MENA region contributes to higher stability during the 'Arab Spring'. However, although banks with subsidiaries in South America exhibit higher stability during the 'Arab Spring', they suffer from lower stability during the remaining years of our sample. Subsidiaries located in Europe are found to negatively affect MENA region banks during the Global Financial Crisis. Lastly, owning foreign subsidiaries in one or two world regions does not hedge from the effects of the

[7] We evaluate in this paper two types of crisis, political and financial. Regardless of the nature of a crisis, numerous studies have documented their impact on financial systems worldwide.

'Arab Spring', while being present in three or more regions is more stabilizing during the 'Arab Spring' and more destabilizing during the Global Financial Crisis.

The paper unfolds as follows. Section 2 provides insight on the banking sector in the MENA region. Definitions of dependent and independent variables, in addition to the empirical model are presented in section 3. Section 4 documents the regression results, and additional robustness checks. Finally, section 5 concludes.

2. MENA banking sector background

The banking sector in the MENA region, and the entire financial environment, have undergone profound transformation and deregulation throughout the past two decades. Despite being relatively young (most banks established in the 1970s or later), banking sectors across the MENA region are considered among the "biggest and deepest" in the emerging and developing world (Anzoategui, et al., 2010). However, it should be noted that some of the region countries are still in "early stages of financial development and have a weak legal and supervisory environment" (Bourgain, et al., 2012). The importance of the MENA region stems from lying at the "cross-roads of major sea and trading routes with easy access to Europe, Africa, and the near East" (Malik & Awadallah, 2013), in addition to its fast-growing economies and financial sectors. It includes the rapidly expanding oil rich countries as well as a mixed banking sector of Islamic and conventional banks that encompasses the largest Islamic banks (Olson & Zoubi, 2011). Countries in the MENA region are considered homogeneous to some extent, "with a population of 350

Million people sharing a common language, culture, and rich trading civilization" (Malik & Awadallah, 2013). Nevertheless, differences such as in the size of the economy, financial development and per capita GDP are evident. As such, the World Bank classification distributed MENA countries into three income levels: High-income, Upper-middle-income, and Lower-middle-income (8, 6, and 7 countries, respectively). To shed light on the characteristics of the banking sector in the region, selected indicators are listed in table (1). Loans to deposits measure the ability of banks to transform costly deposits into profiting loans with a higher ratio indicating higher intermediation efficiency. However, a ratio exceeding one indicates that part of the lending is funded by sources other than deposits, which could lead to instability (Beck, et al., 2009). Overheads to total assets and net interest margin reflect the intermediation cost of banks, higher values signal an elevated level of cost inefficiency and intermediation cost (Soedarmono & Tarazi, 2013). Concentration is the ratio of the three largest banks' assets to total banking sector assets, while ROA is return on assets (profitability) and L.Z-Score is an indicator of bank stability. A higher value of L.Z-Score indicates a more stable banking sector[8]. As shown in table (1), banking sectors in the MENA region are more stable and more profitable than their counterparts in OECD countries. They are also less efficient and slightly more concentrated.

[8] All these figures are taken from the World Bank Financial Development and Structure Dataset.

Table 1: Financial Development Indicators (2011)

Country	Loans To Deposits	Overheads To Total Assets	Net Interest Margin	Concentration	ROA	L.Z-Score
United Arab Emirates	104,44	1,28	3,23	60,89	1,57	21,66
Bahrain	98,65	1,10	2,14	89,06	1,16	17,57
Djibouti	42,85	3,90	2,86		1,00	9,89
Algeria	31,80	1,18	2,24	75,50	1,63	21,49
Egypt	49,54	1,62	2,50	60,75	0,75	39,54
Iran	93,84					
Iraq	25,60	2,53	4,19	87,04	3,28	25,33
Israel	99,91	2,21	2,49	79,93	0,71	24,81
Jordan	73,25	1,70	3,15	88,22	1,14	44,58
Kuwait	96,72	1,16	3,07	88,95	1,48	19,10
Lebanon	36,24	1,37	2,02	51,30	0,94	50,01
Libya	21,19	0,16	0,03		-0,04	31,09
Morocco	80,06	1,96	2,62	71,19	1,19	30,59
Malta	87,98	1,62	2,65	87,12	0,54	13,79
Oman	120,25	1,99	3,39	72,95	1,39	12,07
Qatar	80,13	0,94	3,31	86,88	2,68	27,62
Saudi Arabia	133,75	1,38	2,84	55,33	1,99	14,68
Syria		1,44	2,53	75,45	0,45	8,54
Tunisia	131,26	2,12	2,80	41,07	0,41	21,89
Palestine	40,50	2,97	4,58		1,95	17,94
Yemen	27,02	2,06	4,20		1,34	30,01
MENA average	73,75	1,73	2,84	73,23	1,28	24,11
OECD average	117,45	1,43	1,99	70,91	0,38	13,47

Source: World Bank Financial Development and Structure Dataset (November 2013).

All stated figures are percentages.

Concentration: Assets of three largest banks as a share of assets of all commercial banks. ROA: Average Return on Assets (Net Income/Total Assets). L.Z-Score: estimated as the log of (ROA+equity/assets) /sd(ROA); sd(ROA) is the standard deviation of ROA.

The majority of the Gulf Cooperation Council (GCC) countries are above the region average with regards to loans to deposits, net interest margin, and ROA. On the contrary, these countries are below average when it comes to overheads to total assets and L.Z-Score. In other words, banks in GCC countries are more profitable, more cost-efficient, and riskier than other banks in the region.

Banks in the MENA region started as either state or family owned and are still the dominant financial institutions in essentially bank based economies even though some countries have active financial markets. During the past couple of decades, many state-owned banks were privatized, family banks were listed, Islamic banks gained higher market shares, and foreign banks entered the market due to reduced barriers of entry. The presence of international financial intermediaries led to domestic banks implementing major structural reforms to remain competitive (Turk-Ariss, 2009). Moreover, some of the region's banks have implemented pillars 1, 2, and 3 of the Basel II accord since 2005 and are gradually implementing Basel III recommendations[9] to comply with the international prudential standards.

3. Data, variables, and empirical models

In this section, before presenting our empirical model and our variables, we describe our sample.

[9] In the FSI-BIS (2012) and FSI-BIS (2014) surveys, Kuwait was the first country (2005) of their survey sample to start implementing the Basel II pillars, while Egypt was the last one (2011).

3.1 Sample

The sample considered in this study is an unbalanced panel of annual bank-level data ranging from 2004 to 2012. We eliminate outliers at 1% and 99% of all variables. After filtering, the sample includes 3024 bank-year observations, representing 336 banks (246 conventional and 90 Islamic banks) from the 21 countries that constitute the MENA region. The number of banks in each country is listed between brackets as follows: Algeria (16), Bahrain (32), Djibouti (2), Egypt (26), Iran (16), Iraq (16), Israel (11), Jordan (15), Kuwait (17), Lebanon (46), Libya (9), Malta (11), Morocco (14), Oman (8), Palestine (5), Qatar (10), Saudi Arabia (13), Syria (15), Tunisia (18), UAE (26), Yemen (10). The sample includes state-owned and privately-owned banks and both listed and non-listed banks. Bank level data are extracted from Bankscope - Bureau van Dijk Database. Data for ownership structure are double-checked against banks' annual reports. Classification of bank type (Islamic, conventional with Islamic window, and conventional) is crossed-checked with their respective websites for accuracy. Country-level variables are collected from the World Bank database.

3.2 Definition of variables

3.2.1 Dependent variables

The main dependent variable is the Z-Score, a widely used proxy of bank risk and stability in the literature (Beck & Laeven (2006), Boyd, et al. (2007), Laeven & Ross

(2007), Laeven & Levine (2009), Demirguc-Kunt & Huizinga (2010) and Fu, et al. (2014)). This index is defined as:

$$\text{Z-Score} = \frac{\text{ROA} + \text{ETA}}{\sigma\ \text{ROA}} \quad (1)$$

Where ROA is the return on assets, ETA is the ratio of total equity to total assets, and σROA is the standard deviation of ROA computed on a rolling window of three years.

This risk measure is associated with the probability of bank failure; it represents the number of standard deviations that banks' profitability can drop below its expected value before equity is washed-out leading the bank to insolvency. Higher levels of Z-Score are linked to higher levels of stability, as Z-Score is the inverse of the probability of insolvency (Boyd & Runkle (1993) and Boyd et al. (2006)).

To identify the driving components of the Z-Score, we follow Goyeau & Tarazi (1992), Lepetit, et al. (2008), Barry, et al. (2011), and Köhler (2014) in breaking the Z-Score into its two main components Z1 and Z2 and using them as alternative dependent variables:

$$Z1 = \frac{\text{average ROA}}{\sigma\ \text{ROA}} \quad (2)$$

$$Z2 = \frac{\text{average ETA}}{\sigma\ \text{ROA}} \quad (3)$$

Z1 is a proxy for asset risk, while Z2 denotes leverage risk. An increase in Z1 (Z2) is associated with a decrease in asset (leverage) risk.

Z-Score, Z1, and Z2 are highly skewed, however the natural logarithm of these variables is normally distributed and commonly used in the banking literature (Laeven and Levine, 2009). The logs of these variables, therefore, are used in the regressions (L.Z-Score, L.Z1, and L.Z2, respectively).

3.2.2 Independent variables

3.2.2.1 Main variables

To capture the effect of the 'Arab Spring' on the stability of the banking sector in the MENA region, two dummy variables are introduced (AS_DIRECT and AS_INDIRECT). AS_DIRECT takes the value of one if the year is 2011 or 2012 for the six countries directly hit by the 'Arab Spring'[10], or zero otherwise. AS_INDIRECT takes the value of one if the year is 2011 or 2012 for the neighboring countries, or zero otherwise. To account for the Global Financial Crisis of 2007-2008, we include a dummy variable, GFC, which takes the value of one if the year is 2008 or 2009, or zero for remaining years[11].

We introduce a variable, FS, to control for the effects of owning foreign bank subsidiaries. The term foreign subsidiaries is used here to express bank subsidiaries operating in a country other than the home country of the mother bank. The variable included in the main regression is a dummy variable that takes the value of one if the bank holds one or more

[10] The countries are: Tunisia, Egypt, Libya, Syria, Yemen and Bahrain, henceforward referred to as AS_DIRECT.
[11] Neaime (2012) shows that the crisis reached the MENA region stock markets in 2008, decreasing stock market capitalization from 1,189,187 (Mil USD) in 2007 to 645,211 (Mil USD) in 2008. Guyot et al. (2014) also document a sharp decrease in Egypt market capitalization in 2008, compared to 2007.

subsidiaries in a foreign country and zero otherwise, while a continuous variable reflecting the actual number of owned subsidiaries, FS_C, is used as a robustness check[12]. We also include interaction terms FS_AS and FS_GFC to account for the effects of owning foreign subsidiaries during the 'Arab Spring' and during the Global Financial Crisis of 2007-2008, respectively. Most of the research dedicated to subsidiaries has focused on their effect on the host country banking industry and found on the one hand that they provide increased stability during host country crisis, higher access to finance, increased efficiency and competitiveness, and lower lending costs (Claessens (2006), Wu et al. (2011), Jeon et al. (2011), and Bremus (2015)). On the other hand, they could transmit shocks from the home country and destabilize host countries, (Popov & Udell (2012) and Jeon et al. (2013)). In general, owning subsidiaries could be beneficial to the mother bank in terms of stability if they perform well. Specifically, the mother bank can channel funds and profits that could compensate for any shortage in funding and earnings in the home country. Nevertheless, subsidiaries could also be a source of increased instability if they were in need of constant liquidity injection.

To further examine the effects of owning foreign subsidiaries we group them into separate world regions and define six variables that indicate their location: Africa (FS_Africa), (South America (FS_S_America), Asia (FS_Asia), Australia (FS_Australia), Europe (FS_Europe), MENA (FS_MENA), and the U.S. (FS_USA)[13]. We also investigate the

[12] The size of these subsidiaries could not be obtained due to limited data availability.
[13] Regions are defined by continents, with two exceptions: the MENA region and North America. The North American region, given the low number of observations in Canada, is solely represented by the U.S..

possible effects of owning subsidiaries in only one region, two regions, and three or more regions.

3.2.2.2 Control variables

Throughout the years, governmentally owned and privately-owned banks have become somewhat identical in their service and product range, despite having different objectives. They also compete in the same markets and under the same regulations. Public and private banks became "virtually indistinguishable in terms of their range of activities" (Iannotta, et al., 2007). To account for ownership type, state-owned or private-owned, we follow Barry, et al. (2011) and Iannotta, et al. (2013) by introducing a continuous variable, GOBs, defined as the actual percentage of the bank's equity held by the local government.

We also identify three types of banks which are in theory of different nature: Islamic banks, conventional banks with Islamic window, and purely conventional (commercial) banks. Dummy variables Islamic, and Window take the value of one if the bank is Islamic or conventional with Islamic window, respectively, and zero otherwise. Islamic banks could be found to be less stable than conventional ones (Čihák & Hesse, 2010), more stable (Bourkhis & Nabi, 2013), or even equally stable/unstable (Abedifar, et al., 2013).

The variable 'OC' refers to ownership concentration, i.e. the largest share of equity held by a single shareholder. Although a noteworthy number of studies have evaluated the relationship between ownership concentration and risk taking, the sign is, however, ambiguous. On the one hand, banks with higher ownership concentration could exhibit

higher risk taking and insolvency risk (Haw, et al., 2010) (Laeven & Levine, 2009) as the increase in ownership concentration could result in an increase in the shareholders' power to engage in riskier activities based on their interests. On the other hand, an increase in ownership concentration is also found to be related to lower risk (Shehzad et al. (2010), and García-Marco & Robles-Fernández (2008)) due to increased corporate control and monitoring of management decisions and actions.

We also control for leverage by including the capital asset ratio, defined as the ratio of equity to total assets (ETA). Higher equity provides greater cushion against losses and financial distress. It also indicates higher risk aversion and is expected to decrease moral hazard incentives and improve monitoring (Diamond, 1984). Nevertheless, higher capital could also increase banks' risk-taking capacity and therefore the impact on bank stability as a whole is unclear (Abedifar, et al., 2013).

We include the ratio of non-performing loans to total loans, NPL, to reflect the quality of assets (Uhde & Heimeshoff, 2009). This variable is expected to negatively affect bank stability. To capture the effect of bank size on stability, we introduce the logarithm of bank total assets, SIZE. Larger banks have a better ability to diversify their risk and therefore are expected to be more stable. However, large banks might also have incentives to take on higher risk because of Too-Big-To-Fail policies and the presence of governmental bailouts (Demirgüç-Kunt & Huizinga, 2013). Bhagat et al. (2015), find a negative relationship between bank size and stability, i.e. smaller banks being more stable than large banks. Their finding supports the moral hazard approach of Too-Big-To-Fail banks as these banks might be taking excessive risk knowing that their losses will be

partially covered by the regulators and hence taxpayers (Tabak, et al., 2013). Beck et al. (2013), however, find that large banks are more stable than small banks.

Risk is also affected by bank diversification into non-interest generating activities. Diversification is found to generate higher earnings volatility and lower stability (Stiroh & Rumble (2006), Stiroh (2006), Lepetit et al. (2008), and De Jonghe (2010)). However, some studies provide evidence of higher risk adjusted returns, lower cost of debt and increased stability (Gallo et al. (1996), Deng et al. (2007), Chiorazzo et al. (2008), and Sanya & Wolfe (2011)). This diversification benefit, however, depends on the type of the activities undertaken by banks. For instance, insurance activities are found to reduce the probability of bank failure whereas market activities have the opposite effect (Kwan & Laderman (1999) and DeYoung & Torna (2013)).

In our study, reliance on nontraditional banking activities is captured by a variable named DIVERS defined as:

$$DIVERS = 1 - \left| \frac{\text{net interest revenue} - \text{other operating income}}{\text{operating income}} \right|$$

We also control for yearly country market concentration by considering the sum of the squared weights of banks assets, HHI. A higher value indicates higher concentration in the banking industry. Higher concentration is expected to either increase or lower bank stability. Higher market share and franchise value positively affect profitability and provide incentives to take lower risk because of higher bankruptcy costs. This, in turn, is expected

to enhance bank stability (Keeley (1990), Matutes & Vives (2000), Hellman et al. (2000) and Allen & Gale (2004)). Other studies, nonetheless, find the opposite impact because higher market power enables banks to charge higher rates possibly increasing borrowers' default risk which could in turn negatively affect bank stability (De Nicoló & Loukoianova, 2007). Higher market concentration levels could also induce moral hazard, especially in the presence of governmental support (Boyd et al. (2006), Fu et al. (2014) and De Nicoló & Loukoianova (2007)).

We also account for loan growth, which is also expected to affect bank stability, by introducing the yearly growth rate of gross loans, GGL. Foos et al. (2010) find evidence that loan growth is associated with higher risk taking and lower bank stability, as higher loan growth could be attributed to poorer screening process or more aggressive expansion strategies. Finally, several variables are included to control for the level and growth of a given country's income, and the impact of foreign direct investment. Specifically, we introduce the natural logarithm of GDP per capita, GDP, its growth rate, GDP_Growth, and the percentage of change in direct foreign investment (FI_Growth).

3.3 Econometric specification

To test the impact of the 'Arab Spring' on bank stability in the region as a whole, and to compare it to the impact of the Global Financial Crisis, we consider the following model:

$$L.Z\text{-}Score_{ij,t} = \alpha_i + \beta_1 AS\_DIRECT_t + \beta_2 AS\_INDIRECT_t + \beta_3 GFC_t + \beta_4 FS_{ij,t} + \beta_5 GOBs_{ij,t} + \beta_6 Islamic_{ij,t} + \beta_7 Window_{ij,t} + \sum_{k=1}^{7} \beta_8 Controls_{ij,t} + \sum_{k=1}^{3} Country\ Level_{j,t} + \varphi_j + \varepsilon_{ij,t}$$

Controls represent the vector of control variables. Country Level is the vector of variables representing country control variables. φ is the country fixed effects.

L.Z-Score is also replaced by its two components, L.Z1 (asset risk) and L.Z2 (leverage risk) in equations (2) and (3) to further investigate the sources of stability.

4. Results

4.1 Descriptive statistics

Table (2) presents descriptive statistics of the variables used in this study. The maximum L.Z-Score value (7.74) is recorded in Malta in 2010. The average L.Z-Score for the whole region is 3.59 with Djibouti exhibiting the lowest L.Z-Score average of 2.89 while Morocco and Lebanon show the highest average of 4.14. Year 2009 recorded the lowest average L.Z-Score (3.28) while 2012 recorded the highest (3.93).

The highest number of foreign subsidiaries owned by a MENA bank is witnessed in Bahrain (74). The latter also records the highest number of banks that own one or more subsidiaries (20).

27% of the sample banks are Islamic, 11% are conventional banks with Islamic window, and the remaining 62% are purely conventional (commercial) banks. While 6 countries[14] out of the 21 in our sample do not have any Islamic bank or window, Iran's banking system is 100% Islamic. Lebanon has the highest number of banks (46), whereas Bahrain leads the number of Islamic banks with 19 Islamic and 7 Islamic window banks.

Banks in Algeria record the highest average ownership concentration with 76.5% of shares owned by one shareholder. Iraqi banks exhibit, on average, the highest ratio of equity to total assets (35%) while Israel's average is the lowest at 6%.

The highest non-performing loans to total loans ratio, NPL, of 83.2% is witnessed in Tunisia in 2011. Yemen has the highest average NPL (29%) compared to Qatar (1.79%) which has the lowest. In terms of size (natural logarithm of total assets), the largest bank (18.05) is in UAE while the smallest bank is in Yemen (10.69). Overall, Saudi Arabia has the largest banks (average natural logarithm of total assets) whereas Iraq has the smallest ones. In terms of market concentration, Palestine has, on average, the most concentrated banking sector (HHI=0.53), while the banking sector in Lebanon is the least concentrated (HHI=0.09). However, in absolute values, the highest concentration can be found in Syria (0.67) in 2006. Iraq recorded the uppermost average loan growth in the region with 53% compared to Israel at 5% being the lowest. The highest GDP per capita is in Qatar while the lowest is in Djibouti.

[14] These countries are Djibouti, Israel, Libya, Malta, Morocco, and Oman.

Table 2 Descriptive statistics

	Obs	Mean	Std. Dev.	Min	Max
L.Z-Score	2128	3.59	1.16	0.07	7.74
FS	2904	2.32	6.44	0	74
GOBs	2781	17.70	32.43	0	100
Islamic	3024	0.26	0.44	0	1
Window	3024	0.11	0.31	0	1
OC	2718	52.71	31.00	5.55	100
ETA	2162	0.15	0.10	0.04	0.64
NPL	1349	9.62	13.33	0	83.2
Size	2412	14.61	1.66	10.69	18.05
Divers	2198	0.58	0.23	0	0.98
HHI	2984	0.18	0.10	0.08	0.67
GGL	2115	21.95	38.14	-58.8	327.82
GDP	2807	8.95	1.11	6.56	10.93
GDP_Growth	2858	5.15	3.22	-5.84	17.99
FI_Growth	2930	0.28	1.60	-6.8	12.85

L.Z-Score= Natural logarithm of Z-Score, a measure of stability. FS continuous variable representing the actual number of foreign subsidiaries owned by each bank. Islamic and Window are dummy variables that take the value of one if the bank is considered Islamic, and if the bank is conventional with an Islamic window, respectively, or zero otherwise. GOBs: percentage of bank ownership held by governmental institutes. OC: percentage of the highest shareholder shares. ETA= the ratio of equity to total assets. NPL: ratio of impaired loans to total loans. Size: natural logarithm of assets. Divers= 1- | (net interest revenue – other operating income) / operating income|. HHI= Herfindhal-Hirschman index, a measure of market concentration. GGL: growth of gross loans. GDP: natural logarithm of GDP per capita. GDP_Growth: annual growth rate of GDP per capita. FI_growth: annual growth rate of foreign investments.

Table (3) shows the distribution of foreign bank subsidiaries owned by MENA banks in different world regions. Bahraini banks have the highest number of foreign subsidiaries with 167 subsidiaries covering all seven regions defined in our study, while Palestinian banks have the lowest number of foreign subsidiaries (only one) and Djibouti

has none. MENA region[15] is the home of the highest number of foreign subsidiaries (312) and Europe is the second highest (205). 90 subsidiaries in total are in South America. A closer look shows that subsidiaries in the Cayman Islands (67) and The British Virgin Islands (12) constitute the highest numbers of subsidiaries operating in South America.

Table 3 Distribution of Foreign Subsidiaries over regions

	Africa	South America	Asia	Australia	Europe	MENA	USA	Total
Algeria	0	0	0	0	4	1	0	5
Bahrain	7	26	14	2	28	62	28	167
Djibouti	0	0	0	0	0	0	0	0
Egypt	1	0	1	0	5	7	0	14
Iraq	0	0	0	0	0	6	0	6
Iran	0	0	0	0	10	2	0	12
Israel	0	2	0	0	24	0	7	33
Jordan	0	0	0	1	4	24	0	29
Kuwait	0	12	7	0	25	56	2	102
Lebanon	4	1	0	2	26	38	0	71
Libya	8	1	0	0	5	14	0	28
Malta	0	0	0	0	2	0	0	2
Morocco	18	1	1	0	19	3	0	42
Oman	4	0	8	0	2	5	0	19
Palestine	0	0	0	0	0	1	0	1
Qatar	3	17	9	0	14	29	0	72
Saudi Arabia	0	1	7	0	3	24	0	35
Syria	0	0	0	0	0	2	0	2
Tunisia	0	0	0	0	1	3	0	4
Uae	0	28	13	0	33	32	2	108
Yemen	0	0	1	0	0	3	0	4
Total	45	89	61	5	205	312	39	756

[15] This includes all subsidiaries outside the main country of operations, yet still within the MENA region.

125 banks from the MENA region in our sample own foreign subsidiaries. Some of these banks choose to only expand in one geographical region, while others diversify their subsidiaries network by having a presence in several world regions. Table (4) shows the number of banks owning subsidiaries in one region, two regions, or three or more regions. Almost half (56) of the subsidiary-owning banks have chosen to operate outside their country in one region only, 33 of these banks operate in the MENA region.

Table 4 List of banks operating in one or more regions

	1 region	2 regions	3 or more regions
Algeria	2	1	0
Bahrain	8	6	8
Djibouti	0	0	0
Egypt	3	2	1
Iraq	5	0	0
Iran	2	2	0
Israel	0	3	1
Jordan	4	1	1
Kuwait	4	4	3
Lebanon	3	7	3
Libya	0	0	1
Malta	2	0	0
Morocco	1	2	1
Oman	3	0	1
Palestine	1	0	0
Qatar	2	1	5
Saudi Arabia	4	3	2
Syria	2	0	0
Tunisia	3	0	0
UAE	7	4	5
Yemen	0	1	0
Total	56	37	32

Table 5 correlation matrix

	Z-Score	FS	ASdate	Public	Islamic	Window	OC	CAR	NPL	Size	Divers	HHI	GGL	GDP	GDP Grouth	FI Grouth
Z-Score	1															
FS	-0.037	1														
ASdate	0.1391	-0.0294	1													
Public	-0.0843	0.2908	0.0121	1												
Islamic	-0.1727	0.0772	0.05	-0.005	1											
Window	-0.0773	0.1334	-0.0512	0.2562	-0.2121	1										
OC	-0.0016	-0.0489	0.0582	0.0622	-0.083	-0.0342	1									
CAR	-0.0682	-0.0733	0.0621	0.095	0.2252	0.0138	-0.1503	1								
NPL	-0.1184	-0.115	0.012	-0.0983	-0.0497	-0.0908	0.1055	0.0135	1							
Size	-0.0012	0.4193	0.0929	0.2703	-0.024	0.3513	-0.1825	-0.2364	-0.3968	1						
Divers	-0.138	0.0435	-0.1282	0.046	-0.0672	0.0316	-0.0072	-0.0874	-0.0754	0.1547	1					
HHI	-0.001	-0.0234	-0.0088	-0.094	-0.0735	-0.2401	-0.0071	-0.0202	-0.0907	-0.1227	-0.0157	1				
GGL	-0.1138	-0.0269	-0.098	0.0387	0.1667	-0.021	-0.0584	0.1782	-0.1225	-0.0786	0.0803	-0.0302	1			
GDP	-0.0803	0.0881	0.0714	0.1501	0.0823	0.228	-0.0643	0.1874	-0.3056	0.4225	0.0722	-0.1146	0.0721	1		
GDP Grouth	0.0641	0.0186	-0.2511	-0.0373	-0.0791	0.0662	-0.0885	-0.0142	0.0047	-0.0199	0.12	-0.0078	0.1605	-0.0375	1	
FI Grouth	-0.0027	0.0029	-0.1087	0.0324	-0.0321	-0.0176	-0.0513	0.0609	-0.0393	0.031	0.097	0.0745	0.0171	0.1622	0.1654	1

L.Z-Score: Natural logarithm of Z-Score, a measure of stability. FS: continuous variable representing the actual number of foreign subsidiaries owned by each bank. ASdate, Islamic, and Window= dummy variables that take the value of one if the date is 2011 or 2012, if the bank is considered Islamic, and if the bank is conventional with an Islamic window, respectively, or zero otherwise. GOBs: percentage of bank ownership held by governmental institutes. OC: percentage of the highest shareholder shares. ETA= the ratio of equity to total assets. NPL: ratio of impaired loans to total loans. Size: natural logarithm of assets. Divers= 1-| (net interest revenue – other operating income) / operating income|. HHI= Herfindhal-Hirschman index, a measure of market concentration. GGL: growth of gross loans. GDP: natural logarithm of GDP per capita. GDP_Growth: annual growth rate of GDP per capita. FI_growth: annual growth rate of foreign investments.

Table (5) shows the correlation among all our variables and reveals no major collinearity issues.

4.2 Regressions results

The Hausman test favors the Fixed Effects (FE) model over the Random Effects (RE) model. However, when using FE, several variables that show little change over time in addition to time invariant dummies (such as GOBs, Islamic, Window …) are omitted from the regression. To combine the benefits of FE and RE, i.e. include all relevant time invariant dummies, two alternatives are suggested in the literature: the Plümper & Troeger (2007) fixed-effects vector decomposition model (FEVD) and the Hausman & Taylor (1981) model. Our estimations are carried out using the Hausman-Taylor (HT) model[16], with clustered standard errors at the bank level.

Whether a bank decides to establish subsidiaries outside the main country of operations might raise potential endogeneity issues in our econometric specification. Banks would choose to branch out based on their size, profitability, business model, and the economic environment. To rule out selection bias regarding our main variable of interest (FS), we implement the Heckman (1979) two-stage approach. In the first stage, we use a probit model to check whether our instrumental variables are weak or strong. In the second stage,

[16] Some studies favor the HT model over the FEVD estimator. See for example, Breusch, et al. (2011), Breusch, et al. (2011) and Greene (2011). The HT model uses an instrumental variable approach to deal with the possible correlation between the explanatory variables and the unobserved individual effects.

we use the estimates of the Probit model to compute the inverse Mills ratio and we then include the latter in our main regression as a control variable[17].

Table (6) reports the results for stability (column 1), asset risk (column 2) and leverage risk (column 3). The 'Arab Spring' shows no effect on bank stability in the directly hit countries, and a positive and significant effect on banks in the neighboring countries. This increase in stability during the 'Arab Spring' is mainly driven by lower leverage risk (column 3). However, when testing for the impact of the Global Financial Crisis of 2007-2008, we find that banks in the MENA region are more vulnerable to international than regional shocks.

The results also show that owning subsidiaries in a foreign country, FS, is associated with lower levels of stability for the mother-bank during the non-crisis period. Regarding the control variables, banks with partial or full governmental ownership show no difference in stability compared to private ones. Islamic banks and conventional banks with Islamic window also show no difference in stability compared to their conventional counterparts. This result is in line with Abedifar, et al. (2013), who find no statistically significant difference in stability between Islamic and non-Islamic banking models. Nonetheless, column (2) shows that Islamic banks have higher asset risk than the conventional ones. Other results also reveal that higher ownership by the major shareholder, OC, and higher loan growth, GGL, are associated with lower stability. Finally, higher levels of GDP per capita growth are positively linked with bank stability.

[17] Our instruments are: loans/total assets, ownership concentration, bank type (GOBs, Islamic, and conventional with an Islamic window), size, and economic freedom. The results from the Probit regressions are available on request.

Table 6 MENA banks stability and the effects of the 'Arab Spring' and the Global Financial Crisis (Hausman Taylor model).

	L.Z-Score 1	L.Z1 2	L.Z2 3
AS_DIRECT	0.221	-0.120	0.207
	(1.45)	(-0.66)	(1.39)
AS_INDIRECT	0.375***	0.0775	0.385***
	(3.79)	(0.70)	(3.97)
GFC	-0.182**	-0.167**	-0.185***
	(-2.48)	(-2.00)	(-2.58)
FS	-0.378**	-0.176	-0.279*
	(-2.21)	(-0.91)	(-1.76)
GOBs	0.001	-0.004	0.0006
	(0.43)	(-1.43)	(0.23)
Islamic	-0.266	-0.708***	-0.259
	(-1.27)	(-2.91)	(-1.34)
Window	0.017	0.123	-0.057
	(0.08)	(0.46)	(-0.27)
OC	-0.005**	0.00009	-0.004*
	(-2.02)	(0.03)	(-1.81)
ETA	0.654	2.108	2.006
	(0.58)	(1.45)	(1.57)
NPL	-0.008	-0.012*	-0.005
	(-1.57)	(-1.94)	(-1.07)
SIZE	0.119	0.171	0.113
	(1.17)	(1.53)	(1.18)
Divers	-0.345*	-0.245	-0.399**
	(-1.77)	(-1.08)	(-2.09)
HHI	1.473	1.296	1.623
	(0.76)	(0.60)	(0.86)
GGL	-0.004***	-0.004***	-0.004***
	(-3.41)	(-2.93)	(-3.39)
GDP	0.058	0.087	0.072
	(0.29)	(0.39)	(0.37)
GDP_Growth	0.038***	0.045***	0.041***
	(3.69)	(3.86)	(4.00)
FI_Growth	-0.0095	-0.0036	-0.0101
	(-0.54)	(-0.18)	(-0.58)
LAMBDA	-0.0006	-0.0005***	-0.0007
	(-0.61)	(-4.72)	(-0.68)
_cons	1.656	-1.055	1.202

	(0.86)	(-0.49)	(0.65)
N	957	909	944
Country effect	Yes	Yes	Yes

t statistic between parentheses. *, **, and *** indicate statistical significance at 10%, 5%, and 1%, respectively.

L.Z-Score= Natural logarithm of Z-Score, a measure of stability. L.Z1= natural logarithm of Z1, a measure of bank asset risk. L.Z2= natural logarithm of Z2, a measure of leverage risk. FS: dummy variable that takes the value of one if the bank owns on foreign subsidiary or more, zero otherwise. AS_DIRECT is a dummy variable that takes the value of one if the date is 2011 or 2012 for the countries directly hit by the Arab Spring. AS_INDIRECT is a dummy variable that takes the value of one if the date is 2011 or 2012 for the neighboring countries. GFC, Islamic, and Window are dummy variables that take the value of one if the date is 2008 or 2009, if the bank is considered Islamic, and if the bank is conventional with an Islamic window, respectively, or zero otherwise. GOBs: percentage of bank ownership held by governmental institutes. OC: percentage of the highest shareholder shares. ETA: the ratio of equity to total assets. NPL: ratio of impaired loans to total loans. Size: natural logarithm of assets. Divers= 1- | (net interest revenue – other operating income) / operating income|. HHI= Herfindhal-Hirschman index, a measure of market concentration. GGL: growth of gross loans. GDP: natural logarithm of GDP per capita. GDP_Growth: annual growth rate of GDP per capita. FI_growth: annual growth rate of foreign investments. LAMBDA: Heckman's inverse mills ratio.

To investigate the effects of owning subsidiaries outside the main country of operations during a crisis period, we introduce three interaction terms, FS_AS_DIRECT, FS_AS_INDIRECT, and FS_GFC to capture the effect of owning subsidiaries in other countries during the 'Arab Spring' and during the Global Financial Crisis, respectively. Results in table (7) show that, for AS_DIRECT, during the 'Arab Spring', banks that do not own foreign subsidiaries are not affected, while being present abroad during the same period has a positive effect on their stability. Hence, although owning subsidiaries in foreign countries is detrimental for stability outside the 'Arab Spring' period, it has the opposite effect during local political shocks. Additionally, the results also reveal lower leverage risk for such banks during the 'Arab Spring' suggesting possible capital transfers to the country of origin during regional crises. Such a result is in line with those of Cetorellia & Goldberg (2012) who show that in a response to a funding shock, parent banks reallocate funds back from the subsidiaries when they face a liquidity shortage

documenting a "sizeable and widespread inflows of internal funding in support of the head offices' balance sheet". This internal capital flow between the subsidiaries and the mother bank explains the different effects of crises on banks that own foreign subsidiaries compared to the ones that don't. Moreover, the well-documented presence of internal capital markets usually used to help and support bank-subsidiaries is also found to transmit local shocks by transferring capital back to the home-bank (de Haas & Lelyveld (2010), Jeon & Wu (2014)) which would increase the mother bank stability at the expense of the stability of its subsidiaries. As for the results regarding the neighboring countries, banks that are present abroad show an increase in stability during the 'Arab Spring' that is mostly driven by a decrease in leverage risk.

Table 8 shows the effects of the Global Financial Crisis on bank stability. The GFC has a negative effect on the stability of banks that do not own foreign subsidiaries, and a larger negative effect for the ones that do, indicating that foreign subsidiaries played a role in transferring the shock to the mother banks.

Table 7 MENA banks stability and the effects of the 'Arab Spring' on AS_DIRECT countries and the neighboring countries, (Hausman Taylor model). Effects of subsidiaries during local crises.

	L.Z-Score	L.Z1	L.Z2	L.Z-Score	L.Z1	L.Z2
	1	2	3	4	5	6
AS_DIRECT (β1)	-0.170	-0.316	-0.170	0.220	-0.121	0.207
	(-0.90)	(-1.44)	(-0.93)	(1.44)	(-0.67)	(1.39)
AS_INDIRECT (β2)	0.363***	0.0623	0.374***	0.225*	-0.0791	0.264**
	(3.57)	(0.54)	(3.77)	(1.82)	(-0.57)	(2.19)
GFC	-0.190**	-0.172**	-0.194***	-0.179**	-0.162*	-0.183**
	(-2.56)	(-2.01)	(-2.66)	(-2.45)	(-1.95)	(-2.56)
FS (β3)	-0.435**	-0.200	-0.311*	-0.413**	-0.211	-0.308*
	(-2.38)	(-0.99)	(-1.84)	(-2.40)	(-1.08)	(-1.93)
FS_AS_DIRECT (β4)	0.938***	0.456	0.905***			
	(3.48)	(1.41)	(3.48)			
FS_AS_INDIRECT (β4)				0.284**	0.305*	0.229*
				(2.01)	(1.92)	(1.66)
N	925	877	912	957	909	944
Country effect	Yes	Yes	Yes	Yes	Yes	Yes
Bank specific variables	Yes	Yes	Yes	Yes	Yes	Yes
Wald test:						
(β1) + (β4)	0.768***	0.14	0.735***			
(β2) + (β4)				0.509***	0.225*	0.493***
(β3) + (β4)	0.503*	0.256	0.594**	-0.129	0.094	-0.151

t statistics between parentheses. *, **, and *** indicate statistical significance at 10%, 5%, and 1%, respectively.

L.Z-Score= Natural logarithm of Z-Score, a measure of stability. L.Z1= natural logarithm of Z1, a measure of bank asset risk. L.Z2= natural logarithm of Z2, a measure of leverage risk. AS_DIRECT is a dummy variable that takes the value of one if the date is 2011 or 2012 for the countries directly hit by the Arab Spring. AS_INDIRECT is a dummy variable that takes the value of one if the date is 2011 or 2012 for the neighboring countries. GFC is a dummy variable that take the value of one if the date is 2008 or 2009, or zero otherwise. FS: dummy variable that takes the value of one if the bank owns on foreign subsidiary or more, zero otherwise. FS_AS_DIRECT: interaction between AS_DIRECT and FS. FS_AS_DIRECT: interaction between AS_INDIRECT and FS.

Table 8 MENA banks stability and the effects of the Global Financial Crisis, (Hausman Taylor model). Effects of subsidiaries during international crises.

	L.Z-Score	L.Z1	L.Z2
	1	2	3
AS_DIRECT	0.213	-0.150	0.198
	(1.37)	(-0.82)	(1.31)
AS_INDIRECT	0.362***	0.0518	0.369***
	(3.53)	(0.45)	(3.69)
GFC (β1)	-0.160*	-0.180*	-0.180**
	(-1.78)	(-1.77)	(-2.05)
FS (β2)	-0.371**	-0.214	-0.276*
	(-2.14)	(-1.09)	(-1.72)
FS_GFC (β3)	-0.075	0.013	-0.035
	(-0.58)	(0.09)	(-0.28)
N	925	877	912
Country effect	Yes	Yes	Yes
Bank specific variables	Yes	Yes	Yes
Wald:			
(β1) + (β3)	-0.235**	-0.167	-0.215**
(β2) + (β3)	-0.446**	-0.201	-0.311

t statistics between parentheses. *, **, and *** indicate statistical significance at 10%, 5%, and 1%, respectively.

L.Z-Score= Natural logarithm of Z-Score, a measure of stability. L.Z1= natural logarithm of Z1, a measure of bank asset risk. L.Z2= natural logarithm of Z2, a measure of leverage risk. AS_DIRECT is a dummy variable that takes the value of one if the date is 2011 or 2012 for the countries directly hit by the Arab Spring. AS_INDIRECT is a dummy variable that takes the value of one if the date is 2011 or 2012 for the neighboring countries. GFC is a dummy variable that take the value of one if the date is 2008 or 2009, or zero otherwise. FS: dummy variable that takes the value of one if the bank owns on foreign subsidiary or more, zero otherwise. FS_GFC: interaction between FS and GFC.

For deeper insights, we group foreign subsidiaries based on their geographical location. These world regions are Africa, South America, Asia, Australia, Europe, MENA, and the U.S. Table (9) shows the results when adding these regions, as well as interaction terms between each of the regions and the AS_DIRECT (panel a) and AS_INDIRECT (panel b) variables in the regressions. Subsidiaries in South America are shown to be a

source of instability for their owning banks except during the 'Arab Spring'. In our sample, such subsidiaries are mostly located in the tax haven countries: the Cayman Islands and the British Virgin Islands. Nonetheless, banks that own subsidiaries located in Asia, Europe, and the MENA region enjoy better stability during the 'Arab Spring' than during the rest of the sample period, as can be seen from equations 3a, 4a, and 5a in table (9). Furthermore, column 2b shows that banks that own subsidiaries in South America during the non-Arab-Spring period suffer from lower stability outside the 'Arab Spring' period. During the 'Arab Spring', however, the impact is reversed, showing a positive effect on stability. Similarly, owning subsidiaries in the MENA region (column 5b) also positively impacts bank stability during the 'Arab Spring', suggesting a flow of funds between countries in the MENA region.

In table (10), we look more deeply into the impact of the Global Financial Crisis of 2007-2008. Overall, the results show that owning subsidiaries in most parts of the world does not alter the impact of the crisis on bank stability. However, owning subsidiaries in Europe during the Global Financial Crisis negatively impacts the stability of the mother bank. In other words, subsidiaries in Europe might have played a significant role in transmitting the Global Financial Crisis to the mother banks. One might expect that owning subsidiaries in the United States should be the main source of GFC transmission and not subsidiaries located in Europe. However, given that the number of owned subsidiaries in Europe is 5 times bigger than in the U.S., the transmission of GFC from European subsidiaries rather than from the ones in the U.S. is reasonable.

Table 9 MENA banks stability and the effects of the 'Arab Spring' on banks in AS_DIRECT countries (panel a) and on banks in neighboring countries (panel b). (Hausman Taylor model). Grouped subsidiaries by region (second line from the top). Dependent variable is L.Z-Score.

Panel (a)	1a	2a	3a	4a	5a	6a
FS_Region:	Africa	America	Asia	Europe	MENA	USA
AS_DIRECT (β1)	0.224	0.247	0.140	-0.110	-0.0553	0.207
	(1.29)	(1.42)	(0.80)	(-0.60)	(-0.25)	(1.62)
AS_INDIRECT	0.345***	0.331***	0.353***	0.352***	0.339***	0.476***
	(3.23)	(3.10)	(3.30)	(3.32)	(3.16)	(4.98)
GFC	-0.196**	-0.197**	-0.194**	-0.197**	-0.200**	-0.119*
	(-2.46)	(-2.48)	(-2.45)	(-2.51)	(-2.51)	(-1.73)
FS_Region (β2)	0.0745	-0.735***	-0.103	-0.124	-0.290	-3.803***
	(0.20)	(-2.77)	(-0.38)	(-0.53)	(-1.38)	(-2.92)
FS_Region_AS_Direct (β3)	0.654	0.393	1.163***	1.660***	0.664**	0.312
	(1.30)	(0.83)	(2.77)	(5.03)	(2.30)	(0.73)
Wald:						
(β1) + (β3)	-	-	1.303***	1.55***	0.609***	-
(β2) + (β3)	-	-	1.06**	1.536***	0.374	-
Panel (b)	1b	2b	3b	4b	5b	6b
AS_DIRECT	0.288*	0.281*	0.291*	0.290*	0.295*	0.284*
	(1.73)	(1.70)	(1.75)	(1.75)	(1.78)	(1.71)
AS_INDIRECT (β1)	0.358***	0.278**	0.365***	0.351***	0.215*	0.329***
	(3.31)	(2.50)	(3.26)	(3.01)	(1.75)	(3.00)
GFC	-0.195**	-0.201**	-0.194**	-0.190**	-0.194**	-0.195**
	(-2.45)	(-2.54)	(-2.43)	(-2.39)	(-2.44)	(-2.45)
FS_Region (β2)	0.172	-0.717***	0.030	0.001	-0.267	-0.048
	(0.48)	(-2.72)	(0.11)	(0.01)	(-1.27)	(-0.12)
FS_Region_AS_Indirect (β3)	-0.319	0.516**	-0.149	0.0198	0.335**	0.304
	(-0.77)	(2.00)	(-0.61)	(0.11)	(2.12)	(0.96)
Wald:						
(β1) + (β3)	-	0.794***	-	-	0.55***	-
(β2) + (β3)	-	-0.201	-	-	0.068	-
N	856	856	856	856	856	856
Country effect	Yes	Yes	Yes	Yes	Yes	Yes
Bank specific variables	Yes	Yes	Yes	Yes	Yes	Yes

t statistic is between parentheses. *, **, and *** indicate statistical significance at 10%, 5%, and 1%, respectively.

L.Z-Score= Natural logarithm of Z-Score, a measure of stability. AS_DIRECT (AS_INDIRECT) is a dummy variable that takes the value of one if the date is 2011 or 2012 for the countries directly hit by the Arab Spring

(for the neighboring countries). GFC is a dummy variable that take the value of one if the date is 2008 or 2009, or zero otherwise. FS_Region: dummy variable that take the value of one if the bank owns one foreign subsidiary or more in the said region, zero otherwise. FS_Region_AS_Direct (FS_Region_AS_Direct): interaction variable between the region variable and the AS_DIRECT variable (AS_INDIRECT variable).

Table 10 MENA banks stability and the effects of the 'Global Financial Crisis' (Hausman Taylor model). Grouped subsidiaries by region (second line from the top). Dependent variable is L.Z-Score.

	1	2	3	4	5	6
Region:	Africa	America	Asia	Europe	MENA	USA
AS_DIRECT	0.284*	0.288*	0.287*	0.300*	0.287*	0.288*
	(1.71)	(1.74)	(1.72)	(1.81)	(1.73)	(1.73)
AS_INDIRECT	0.352***	0.337***	0.346***	0.359***	0.341***	0.348***
	(3.28)	(3.15)	(3.23)	(3.34)	(3.16)	(3.24)
GFC (β1)	-0.177**	-0.173**	-0.189**	-0.113	-0.128	-0.194**
	(-2.17)	(-2.09)	(-2.29)	(-1.25)	(-1.29)	(-2.39)
FS_Region (β2)	0.236	-0.616**	0.031	0.066	-0.192	-0.010
	(0.64)	(-2.32)	(0.12)	(0.28)	(-0.91)	(-0.02)
FS_Region_GFC (β3)	-0.309	-0.233	-0.057	-0.262*	-0.159	-0.012
	(-1.03)	(-1.04)	(-0.26)	(-1.77)	(-1.16)	(-0.04)
N	856	856	856	856	856	856
Country effect	Yes	Yes	Yes	Yes	Yes	Yes
Bank specific variables	Yes	Yes	Yes	Yes	Yes	Yes
Wald:						
(β1) + (β3)	-	-	-	-0.375***	-	-
(β2) + (β3)	-	-	-	-0.196	-	-

t statistic is between parentheses. *, **, and *** indicate statistical significance at 10%, 5%, and 1%, respectively.

L.Z-Score= Natural logarithm of Z-Score, a measure of stability. AS_DIRECT (AS_INDIRECT) is a dummy variable that takes the value of one if the date is 2011 or 2012 for the countries directly hit by the Arab Spring (for the neighboring countries). GFC is a dummy variable that take the value of one if the date is 2008 or 2009, or zero otherwise. FS_Region: dummy variable that take the value of one if the bank owns one foreign subsidiary or more in the said region, zero otherwise. FS_Region_GFC: interaction variable between the region variable and the GFC variable.

Table 11 MENA banks stability and the effects of the 'Arab Springs' and the 'Global Financial Crisis' (Hausman Taylor model) for banks with subsidiaries in one region, two regions, and three or more regions. Dependent variable is L.Z-Score.

	1a	2a	3a	1b	2b	3b	1c	2c	3c
#Regions:	1	2	3	1	2	3	1	2	3
AS_DIRECT (β1)	0.336*	0.289	0.0115	0.286*	0.293*	0.286*	0.282*	0.291*	0.282*
	(1.87)	(1.64)	(0.06)	-1.72	-1.76	-1.72	-1.7	-1.76	-1.7
AS_INDIRECT (β1)	0.347***	0.346***	0.334***	0.309***	0.316***	0.329***	0.351***	0.345***	0.355***
	(3.24)	(3.23)	(3.14)	-2.61	-2.86	-2.96	-3.28	-3.23	-3.3
GFC	-0.194**	-0.195**	-0.203**	-0.195**	-0.194**	-0.197**	-0.261***	-0.161*	-0.143*
	(-2.44)	(-2.45)	(-2.57)	(-2.45)	(-2.44)	(-2.46)	(-2.95)	(-1.91)	(-1.70)
#Regions (β2)	-0.190	-0.224	-0.199	-0.263	-0.257	-0.0836	-0.297*	-0.172	0.0411
	(-1.06)	(-0.98)	(-0.77)	(-1.46)	(-1.13)	(-0.33)	(-1.65)	(-0.76)	(0.16)
#Regions_Direct (β3)	-0.259	0.000115	1.441***						
	(-0.71)	(0.00)	(3.95)						
#Regions_Indirect (β3)				0.120	0.223	0.128			
				(0.71)	(1.02)	(0.52)			
#Regions_GFC (β3)							0.257*	-0.226	-0.360*
							(1.67)	(-1.22)	(-1.85)
N	856	856	856	856	856	856	856	856	856
Country effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank specific variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wald:									
(β1) + (β3)	-	-	-	-	-	-	-	-	-0.53***
(β2) + (β3)	-	-	-	-	-	-	-	-	-0.319

t statistic is between parentheses. *, **, and *** indicate statistical significance at 10%, 5%, and 1%, respectively.

L.Z-Score= Natural logarithm of Z-Score, a measure of stability. AS_DIRECT (AS_INDIRECT) is a dummy variable that takes the value of one if the date is 2011 or 2012 for the countries directly hit by the Arab Spring (for the neighboring countries). GFC is a dummy variable that take the value of one if the date is 2008 or 2009, or zero otherwise. #Regions: dummy variables that take the value of one if the bank owns a foreign subsidiary in one, two, or three or more regions, zero otherwise. #Regions_DIRECT: interaction variable between the #Regions variable and the AS_DIRECT variable. #Regions_INDIRECT: interaction variable between the #Regions variable and the AS_INDIRECT variable. #Regions_GFC: interaction variable between the #Regions variable and the GFC variable.

In table (11), we look more closely into the influence played by the number of world regions where banks are present. Owning foreign subsidiaries in three or more regions, for countries that are directly hit by the 'Arab Spring', is a source of better stability during this domestic crisis (column 3a), while it is a source of instability during the Global Financial Crisis (column 3c). Hence, being present in one or two regions might not be enough to offset the impact of the 'Arab Spring', but being present in three or more regions is effective. However, such a broad geographical presence makes banks more vulnerable to the Global Financial Crisis.

4.3 Robustness checks

In this section, we run various regressions to check the validity of our main results.

First, we substitute the HT model with the random effects model. We also run the regressions using the fixed effects estimator. Our main results remain unchanged.

Second, instead of a binary variable, we use a continuous variable as a proxy of bank openness defined as the actual number of subsidiaries owned by each bank. The results confirm that banks that own subsidiaries in foreign countries are less stable during the non-crisis period, but more stable during the 'Arab Spring' period.

Third, because only Arab speaking countries were directly affected by the 'Arab Spring' we restrict our sample to Arab speaking countries of the MENA region. Specifically, we exclude Iran, Israel and Malta. Overall, our main findings remain identical.

Moreover, we re-run the regression using subsample for countries directly hit by the ‘Arab Spring’ and their neighbors, instead of the dummies included in the main regression. In these sub-samples, we introduce the foreign subsidiaries variable as a dummy in the first set of regressions, and replace it with a continuous variable in the second set. Our main results remain unchanged.

5. Summary and concluding remarks

Using a sample of 336 banks over the 2004-2012 period in the 21 countries that comprise the MENA region, this study identifies the determinants of bank stability and examines the effects of both local crises, namely the 'Arab Spring', and international crises such as the Global Financial Crisis of 2007-2008. Specifically, we investigate the impact of owning subsidiaries outside the homeland of the mother bank on stability, during normal times and during the before mentioned crises.

On the whole, our results show that while the Global Financial Crisis of 2007-2008 negatively impacted bank stability in the MENA region, the 'Arab Spring' did not have such an effect. A deeper look shows that although owning bank subsidiaries outside the main country of operations proved to be a source of instability during normal times and during the Global Financial Crisis of 2007-2008, yet these subsidiaries were a source of increased stability during the ‘Arab Spring’ by decreasing leverage risk. Such findings suggest a possible transfer of capital between the subsidiaries and the main bank. Furthermore, we find that banks with subsidiaries in South America are less stable than

other banks and that owning subsidiaries in South America, Europe, and the MENA region is better for stability during the 'Arab Spring' than during normal times. Finally, owning foreign subsidiaries in one or two world regions does not mitigate the effect of the 'Arab Spring'. Owning subsidiaries in three or more regions, however, is a source of higher stability during the 'Arab Spring', but at the expense of negatively affecting the stability of the mother banks during the Global Financial Crisis.

Our findings have important policy implications. Although banks that expand their operations internationally by opening subsidiaries in different world regions appear to be more vulnerable in both normal times and during international shocks they are also found to be more resilient to local shocks possibly because of their ability to channel capital. Hence, such bank geographical diversification is only effective in improving stability during specific local shocks and has the opposite effect otherwise. These results are not only important and relevant to the analyzed region in this paper, but could also be generalized to other regions as global banks are becoming more and more alike regardless of where they operate from. To monitor and manage bank stability, prudential regulation and bank supervision should closely account for the structure of banking groups and their international diversification.

Chapter 2

Institutional Environment and Bank Capital Ratios

Abstract

We investigate the influence of the institutional environment on bank capital levels. Using a sample of 183 banks operating in the MENA region for the period 2004 to 2014, we find that low corruption levels, high political stability, as well as high economic and financial freedom are associated with higher capital adequacy levels. The effect of institutional factors on bank capital adequacy ratios is also more pronounced for conventional, listed, non-government owned bank, and for banks operating in countries with less developed stock markets. For leverage ratios, institutional variables are significant when we consider countries with relatively developed stock markets.

JEL classification: G21, G28, G32

Keywords: Bank Capital Structure, Institutions, MENA Region

- This chapter draws from the contribution of Alraheb, Nicolas and Tarazi (2017). Institutional Environment and Bank Capital Ratios. Working paper.

1. Introduction

Research on bank capital structure has mostly focused on bank specific factors and market related fundamentals (Diamond & Rajan 2000; Berger et al. 2008; Gropp & Heider 2010; Harding et al. 2013). Another strand of the literature pioneered by Demirgüç-Kunt & Maksimovic (1999) has stressed the importance of considering the legal and institutional framework affecting firms' capital structure decisions. In their paper, Demirgüç-Kunt & Maksimovic (1999) posit that a significant part of long term debt variation can be explained by countries' institutional foundations. Nevertheless, the existing literature on the role played by institutions in explaining capital structure variation mainly includes studies of non-financial firms rather than financial ones (Booth et al. 2001; de Jong et al. 2008; Cho et al. 2014; Belkhir et al. 2016). In this paper, we build on these two strands of the literature to investigate whether institutional factors affect capital holdings of banking firms. Specifically, we focus on a world region whose underdeveloped institutions can be considered as a major obstacle to its economic and financial development: the MENA region[18]. To our knowledge, our paper is the first attempt to specifically focus on the influence of institutional foundations on bank capital ratios.

The MENA region is a fast-growing area which remains understudied when it comes to the capital structure of its financial institutions. This region suffers from ongoing

[18] The MENA region refers to the Middle East and North Africa and consists of the following countries: Algeria, Bahrain, Djibouti, Egypt, Iraq, Iran, Israel, Jordan, Kuwait, Lebanon, Libya, Malta, Morocco, Oman, Palestine, Qatar, Saudi Arabia, Syria, Tunisia, United Arab Emirates (UAE) and Yemen

political instability and lags behind the rest of the world in many dimensions. Particularly, institutions in the MENA region exhibit many deficiencies: widespread corruption, weak governance, limited creditors' rights, and a skeletal rule of law (World Bank 2014). The financial system is highly bank-based with banks assets reaching on average 130% of GDP (Saadaoui 2015). The region is characterized by underdeveloped financial markets (if existing) in most countries. There is no suitable alternative to bank finance. The banking sector is highly concentrated in most countries of the region (with the three largest banks holding more than 65% of total banking assets on average) and barriers to entry are still high (Turk-Ariss 2009; Anzoategui et al. 2010). Thus, MENA banking sector is far from being adequately developed, with the exception of Lebanon, Jordan, and the GCC[19] countries (Creane et al. 2004). At the same time, most MENA banks showed resiliency during the global financial crisis of 2007-2008. In fact, this region was less affected by the financial turmoil compared to other parts of the world. Some researchers attributed this partial resiliency to a number of factors including the presence of a stable funding basis, prudent lending, and sound bank capitalization. Banks in the MENA region hold total regulatory capital ratios and tier 1 capital ratios significantly above international standards and the Basel requirements[20]. This should, in principle, make them safer and more resilient to economic shocks. However, this might also make them too cautious in their intermediation role and their contribution to economic growth and development.

[19] Gulf Cooperation Council - Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and United Arab Emirates.
[20] MENA Total capital adequacy ratio and Tier 1 capital ratio fluctuated on average between 18.5% and 21.7% and 15% and 18.2%, respectively, during the period 2004 to 2014. (Source: BankScope - Bureau van Dijk database)

Throughout the last decade, the MENA region has experienced profound changes. What is prevalent however, is the fact that it still has underdeveloped institutions. A fragile rule of law and government ineffectiveness still prevail coupled with a weak and under-developed civil society. According to a recent World Bank (2016) survey, the most important obstacles to development in the MENA region are the ongoing political instability and the high levels of corruption. Also, in an earlier World Bank (2014) report, improving the rule of law, fighting corruption, improving accountability, stimulating government transparency and filling the gap between regulation and implementation are essential reforms that need to be conducted to improve the quality of institutions in the region.

The aim of this paper is to investigate the role played by institutional factors in determining capital buffers set by regulators and banks themselves. We contribute to the literature in several ways. First, we provide new insights on the financial benefits of developing the quality of existing institutions by examining the effect of different aspects of institutional development on bank capital ratios. We focus on capital levels of banking institutions whose capital decisions might substantially differ from non-financial firms. To our knowledge, no other study has explicitly focused on the link between institutions and bank capital ratios. Second, we perform our study on a region, which unlike other Western regions, remains understudied when it comes to bank capital and solvency ratios. Third, we consider both weighted regulatory capital ratios and un-weighted leverage ratios to investigate whether the quality of institutions affects banks' internal capital decisions regardless of regulation or more specifically to comply with regulatory constraints.

We consider a sample of 183 banks from 14 MENA region countries covering the 2004–2014 period. Our findings indicate that institutional variables are significant in explaining risk-based capital adequacy ratios imposed by regulators. However, institutional variables (except for corruption) affect non-weighted equity-to-asset ratios (internally set capital) only for countries with developed stock markets. We provide evidence that higher corruption and political instability levels are associated with lower capital adequacy ratios. Creditor rights, however, negatively influence capital adequacy ratios. As for economic freedom and financial openness measures, the effect is positive. We also find that the effect of institutional variables is more pronounced for listed, conventional, and non-government owned banks compared to non-listed, Islamic, and privately-owned banks, respectively.

The paper unfolds as follows. Section 2 presents an overview of the existing literature. Description of the sample, the used variables and the empirical model are presented in section 3. Section 4 discusses the regression results and presents robustness tests. Finally, section 5 concludes.

2. Related Literature

There is a substantive literature dedicated to the determinants of bank capital ratios. Brewer et al. (2008) argue that bank capital is significantly dependent on capital regulations. Moreover, the existence of deposit insurance creates moral hazard incentives which lead banks to choose high levels of leverage, thus maintaining low capital ratios

while complying with regulation (Keeley 1990). However, this justification of bank capital levels does not explain the prevalence of bank capital buffers, i.e. higher levels than those required by regulations. In fact, many researchers emphasize that capital regulations are not binding and might not be significant determinants of bank capital levels (Flannery, 1994, and Diamond & Rajan, 2000).

One major explanation of high capital buffers is the fear of shocks which might drive a bank below capital requirements accompanied by high costs of adjusting back to the minimum threshold, leading to regulatory interference and eventually loss of reputation (Milne & Whalley, 2001). Moreover, according to Brewer et al. (2008) and Harding et al. (2013), bank capital ratios seem high in countries where regulators have prompt sanction powers in dissolving financial institutions that fall below regulatory minimum. The latter authors also point out the importance of the franchise value in the choice of the optimal capital structure. From another perspective, Berger et al (1995) argue that banks' capital buffers are used to meet unexpected investment opportunities. Fonseca & Gonzales (2007) analyze the determinants of bank capital buffers across a selection of world countries. They conclude that market discipline and market power positively and largely influence the level of capital held by banks. Consequently, banks accumulate regulatory capital buffers mainly because of fear of adverse shocks, regulatory intervention, and market discipline.

Recently, a growing body of literature has focused on the role that institutions might play in determining firm capital structure. However, the findings regarding the influence of legal and institutional frameworks in explaining firms' funding choices are mixed. On the one hand, many studies find that firms operating in a better institutional environment

have easier access to external funding associated with more favorable conditions (La Porta et al. 1997; Demirgüç-Kunt & Maksimovic 1999; Booth et al. 2001; Giannetti 2003; Djankov et al. 2007; Qian & Strahan 2007; González & González 2008; Fan et al. 2012). A strong legal framework can help mitigate agency problems by reducing information asymmetries and when information is more readily available to investors, firms might start relying more on external rather internal funding. Hence, firms might hold less capital and more debt in countries with more developed institutions when considering the investors' or the supply point of view. On the other hand, supporters of the demand side view argue that lower debt prevails in markets with higher creditor rights. Cho et al. (2014) explain this finding using a large sample of 48 countries. They argue that managers in countries with high creditor protection prefer to limit debt usage to avoid losing control should financial distress prevail. This view is also supported by Rajan & Zingales (1995) who argue that whenever manager rights are limited during bankruptcy and creditor rights are strong, managers tend to prefer equity over debt. Thus, no consensus has been reached in the literature regarding the effect of institutional quality on capital funding choices of non-financial firms[21]. In their paper, Flannery & Oztekin (2012) go further by studying the role that institutions might play in capital structure adjustment speeds. They find that firms operating in countries with better institutions benefit from lower transaction costs which makes them adjust faster to their target capital structure.

As we mentioned previously, we find no existing studies in the literature that specifically explore the link between institutional variables and bank capital holdings.

[21] For further studies covering corporate capital decisions, please see: Deesomsak et al. (2004); Bancel & Mittoo (2004); Gungoraydinoglu & Öztekin (2011); de Jong et al. (2008); An et al. (2016).

. Fonseca & González (2010) analyze the determinants of bank capital buffers while controlling for the role of institutions across a selection of world countries. The authors examine how institutions might alter the effect of market power and market discipline on capital holdings. For this purpose, they use the simple average of six institutional indicators as per Kaufman et al. (2001): control of corruption, government effectiveness, voice and accountability, regulatory quality, political stability, and the rule of law. They find that on the one hand, institutions improve market discipline and therefore increase bank capital ratios. On the other hand, good institutional quality reduces bank market power thus reducing bank incentives to hold high capital buffers. The overall effect on capital buffer is negative.

In the MENA region, studies on bank capital have focused on bank-specific factors rather on the way in which banks interact with their macroeconomic and institutional environment. In their studies of bank capital and risk in the MENA region, Farazi et al. (2011); Srairi (2010); Al-tamimi & Jellali (2013) focus on the role played by ownership structure. Their findings show that state-owned banks take higher risk and have lower performance levels. Murinde & Yaseen (2006) investigate the dynamic capital-risk adjustment structure among MENA banks. They conclude that capital regulations are significant determinants of capital ratios. However, the authors point out that they do not affect capital levels, but they increase risk taking behaviors. Bougatef & Mgadmi (2016) examine the role of prudential regulation on bank risk taking and capital holding in a selection of MENA banks. They find that regulatory pressure does not significantly affect neither risk nor capital ratios of MENA banks. The authors link this finding to weaknesses in the institutions of those countries. This finding contradicts many studies on developing

economies and more specifically the conclusion of Klomp & Haan (2013) that stricter supervision reduces bank risk taking among banks in emerging countries. Saadaoui (2015) studies the cyclical behavior of MENA bank capital buffers and confirms the existence of a positive relationship between the business cycle and bank capital ratios indicating that the implementation of Basel counter-cyclical capital regulations is not necessary in the case of MENA banks.

Very few studies assess the influence of institutional factors on the banking sector characteristics in the MENA region. Naceur & Omran (2011) study the determinants of the performance of MENA banks. They conclude that institutional variables including corruption and rule of law play an important role in bank performance. Maraghni & Bouheni (2015) show that institutional conditions are significant in determining the insolvency risk of Tunisian banks. Sassi (2013) points out the benefits of operating in a good institutional environment in terms of bank efficiency. Likewise, Nabi & Suliman (2008) and Gazdar & Cherif (2015) show that banking development contributes much more to economic growth in countries exhibiting higher levels of institutional development.

Belkhir et al. (2016) study the role of institutions in determining corporate structure decisions of firms in the MENA region. Using data on 444 firms operating in the MENA region, they conclude that countries endowed with a better institutional framework (regulatory effectiveness and rule of law) rely relatively more on debt than equity. Corruption, on the contrary, has the opposite effect. Arwatani et al (2016) perform a study on corporate debt maturity of MENA banks. Their findings confirm a positive relationship between the use of long term debt and the quality of institutions in each country. Since

Gropp & Heider (2010) have shown that the drivers of banks' capital structure are close to those of non-financial firms, institutional factors could also play an important role in explaining bank capital ratios in the MENA region. Hence, bank regulations might be playing a less important role in determining bank capital ratios (Flannery 1994; Diamond & Rajan 2000; Allen et al. 2011) and institutional factors need to be taken into consideration.

3. Data, variables, and econometric specification

In this section, before presenting our econometric approach and our variables, we describe our sample.

3.1 Sample

Our sample period ranges from 2004 to 2014. We eliminate outliers at 1% and 99% of all variables. After filtering, the sample includes 1499 bank-year observations, representing 183 banks (145 conventional and 38 Islamic banks) from 14 MENA region countries. These countries are Algeria, Bahrain, Egypt, Israel, Jordan, Kuwait, Lebanon, Malta, Morocco, Oman, Qatar, Tunisia, United Arab Emirates and Yemen. The sample includes state-owned and privately-owned banks and both listed and unlisted banks. Yearly bank level data are extracted from the BankScope - Bureau van Dijk database. We use consolidated data and unconsolidated data when the former is not available. Macroeconomic data are gathered from the Global Financial Development Database and the World Development Indicators of the World Bank. As for institutional data, we use

different databases; the World Governance Indicators, the Doing Business Creditor Rights (World Bank), the Transparency International Organization and the World Heritage Foundation.

3.2 Definition of variables

3.2.1 Dependent variables

The MENA region has underdeveloped capital markets in some countries, and even no capital markets in others. For this reason, we focus in this study on book capital ratios. Our main dependent variable is the total regulatory capital ratio (TCR). This total capital adequacy ratio as per Basel rules is the ratio of Tier 1 and Tier 2 capital (hybrid capital, subordinated debt, reserves for loan losses, and valuation reserves) to total risk weighted assets (and off-balance sheet weighted risks). For further insights, we consider the equity to total assets ratio (EQTA) which is non-risk weighted and therefore reflects the internal bank capital holding decisions while TCR reflects the regulatory influenced capital. We also consider the Tier 1 ratio, which is considered as the core capital.

3.2.2 Independent variables

3.2.2.1 Main variables

First, we use an indicator of political stability (PS) from the World Governance Indicators of the World Bank. Political instability is one of the major obstacles facing

countries in the MENA region. This indicator is scaled from -2.5 to +2.5 with higher values indicating higher political stability. On the one hand, banks in politically unstable regions might boost their capital ratios as a mean of gaining trust of investors/clients. Hence, attracting depositors might be a major explanation of high capital holdings by banks in fragile political environments. On the other hand, banks operating in fragile environments might be reluctant to raise equity and might prefer to maintain low capital ratios to prevent any potential loss of control should the country's political situation get worse. Hence, the impact of political stability on capital holdings is uncertain.

We use two indicators of creditors' rights form the Doing Business database, namely resolving insolvency and getting credit. The Resolving Insolvency (RI) variable includes the time, costs, outcome of insolvency, liquidation, and reorganization proceedings. The Getting Credit (GC) indicator measures the ease of obtaining credit as well as the ease of accessing credit information (existence of credit bureaus and credit registries for example). These two indicators are scaled from 0 to 100 with higher scores indicating higher levels of creditors' rights. Results concerning the effect of creditors' rights on capital ratios have been conflicting. As mentioned previously, high creditor rights might lead managers to limit debt usage to avoid losing control should financial distress prevail. At the same time, higher creditors' rights result in less information asymmetry and easier access to external funding. Thus, credit would be available at more favorable conditions. Hence, firms in this case might prefer holding more debt than equity.

We also use two Economic Freedom (EF) sub-indexes from the World Heritage Foundation, namely investment freedom[22]. and financial freedom. We build an indicator that we call Financial Openness (FO) to focus closer on the potential role that can be attributed to trade and financial freedom. Trade freedom measures the ease of importing and exporting goods and services. Financial freedom captures the independence of the financial sector from government control as well as bank efficiency. This indicator is also scaled from 0 (lowest freedom) to 100 (highest freedom). We expect a positive effect of EF and FO indexes on bank capital ratios. Broader exposure to international markets as well as more financial freedom and thus higher competition pushes banks to hold higher capital levels possibly to signal stronger financial conditions aiming at attracting more funds.

We include the corruption perception index (CPI) which represents the perceived level of corruption in a country's public sector. CPI is calculated on a scale of 0 (severely corrupt) to 100 (no corruption). Corruption is a widespread phenomenon which is more prevalent in underdeveloped and developing economies. It's effect on economic growth has been widely studied. Many studies confirm the detrimental role of corruption on growth. Other studies, however, such as Shleifer & Vishny (1993); Mo (2001); Wei (2000), find that it can have a beneficial effect on economic growth by promoting a better allocation of resources. One way is paying bribes to evade inefficient rules for example (Huntington 1970; Acemoglu & Verdier 2000). In the MENA region, a large part of bank capital is held by government officials and political parties. Hence, corruption might lead banks to abide

less by capital regulations as political power and bribery can be used to circumvent such regulations.

3.2.2.2 Control variables

We include several bank specific variables widely used in most capital determinants studies. We proxy bank size by introducing the natural logarithm of bank total assets (SIZE). SIZE is expected to negatively influence capital levels as larger banks tend to hold less capital consistent with the "too big to fail hypothesis" (Brewer et al. 2008; Kleff & Weber 2008; Fonseca & González 2010). These banks might also benefit from economies of scale, broader asset diversification, and an ease of obtaining equity on a short notice which makes them subject to lower financial distress costs (Rime 2001; Berger et al. 2008).

To account for risk, we include the ratio of non-performing loans to total loans (NPL). This risk measure has been widely used in the banking capital literature (Aggarwal & Jacques 2001; Fiordelisi et al. 2011; Shim 2013; Distinguin et al. 2013). The effect of risk on capital holdings is mixed. Many studies find a positive effect of risk on capital since regulatory capital serves as a cushion for possible losses and banks tend to hold more capital when they have a higher risk exposure (Shrieves & Dahl 1992; Nier & Baumann 2006; Gropp & Heider 2010; Berger et al. 2008). However, from another perspective, the relationship between capital and risk might be negative since banks who have a high appetite for risk also tend to hold lower capital ratios (Fonseca & González 2010).

The Return on Assets (ROA) is used to proxy bank profitability. It is calculated as the ratio of a bank's net income to its average assets. Profitability is expected to boost

capital ratios as more profitable banks tend to have higher capital to assets ratio by injecting their retained earnings into capital, consistent with the pecking order theory (Gropp and Heider 2010, Brewer et al 2008). This view is especially expected to hold in a region with underdeveloped financial markets such as the MENA region.

To account for a country's regulatory framework, we include an indicator of regulatory capital stringency (REG). This indicator is manually constructed based on the Barth et al World Bank Regulation and Supervisory Database[23] (Barth et al. 2004, Barth et al 2008, and Barth et al. 2013). This indicator ranges from 0 to 3 with one point given to every risk type covered by the country's regulatory jurisdiction (credit risk, market risk, and operational risk). The higher the indicator, the stricter the capital regulations are. The sign of this variable is expected to be positive since banks will be more constrained to hold higher capital ratios in countries where regulations on capital are tighter and cover more aspects of banking risk.

We follow González & González (2008) in using bank concentration (CONC) as a determinant of capital levels. This variable is calculated based on the sum of the assets of the three largest banks to the total assets of the banking sector in a country. In countries with high bank concentration, banks with higher market power would hold more capital to preserve their charter value. At the same time, a higher franchise value might be

[23] We use the three versions available of this database (2003, 2007, and 2012). We consider the variables constant between the 3 versions. In other words, years 2004 to 2006 take the values of the 2003 survey, years 2008 to 2011 take the values of the 2007 survey, and years 2013 and 2014 takes the values of the 2012 most recent survey.

considered as a source of extra income, which reduces the need to hold higher capital levels to hedge against unexpected losses (Fonseca & Gonzales 2010).

We consider GDP Growth (GDP) to examine the possible impact of the business cycle on capital ratios. Many studies document a negative relationship between regulatory capital ratios and the business cycle (Ayuso et al. 2004; Shim 2013). As per these authors, banks tend to decrease (increase) their capital holding during economic upturns (downturns). At the same time, banks might prefer to increase capital ratios during economic booms to benefit from potential investment opportunities (Berger 1995).

Finally, we include three dummy variables to capture whether a bank is conventional or Islamic, Government-owned or privately-owned, and listed or unlisted. We aim to test how a bank's internally-set and externally-set capital ratios are influenced by those different characteristics.

3.3 Econometric specification

We adopt the following econometric model:

$$CR_{ijt} = \beta_0 + \sum_{k=1}^{6} \beta 1\ INST\ jt + \sum_{k=1}^{3} \beta 2\ BANK\ ijt + \sum_{k=1}^{3} \beta 3\ OTHER\ jt + \sum_{k=1}^{3} \beta 4 SPECS\ ijt + c_j + c_t + \varepsilon_{ijt} \quad [1]$$

where CRijt stands for the capital ratio which represents either the total capital adequacy ratio (TCR), the equity to total assets ratio (EQTA), or the TIER1 ratio of bank i in country j at time t. INSTjt is a set of variables accounting for country institutional

framework. $BANK_{ijt}$ represents a vector of variables used to control for bank specific characteristics. $OTHER_{ijt}$ is a vector of variables containing country level variables, other than institutional ones. $SPECS_{ijt}$ includes a set of dummy variables specifying whether a bank is conventional or Islamic, Government owned or privately owned, and listed or unlisted. C_j and c_t control for country and time specific effects respectively to account for country level unobserved heterogeneity or some other global trend in banking behavior.

To deal with possible endogeneity issues with capital ratios, we use the first lag of all bank level independent variables. Thus, size, return on assets, and risk measures are included in the regression at their lagged values.

As for estimations method, we consider the following: The fixed effects within estimator resolves the issue of correlation between the unobserved individual random effects and the explanatory variables. However, by subtracting individuals means from variables, all time-invariant variables are dropped. To deal with this issue, Hausman Taylor (1981) proposed an instrumental variable estimator approach by which some of the regressors are allowed to correlate with the individual effects. This alternative to the "nothing" or "everything" assumptions of the between and within estimators is dubbed the Hausman Taylor Estimator (HT). We adopt the HT methodology in this paper for several reasons. First, our main variables; institutional variables are almost time-invariant, hence using fixed effects would lead to these variables getting dropped. Second, HT deals with possible endogeneity induced by individual bank specific effects. The HT model uses the means of strictly exogenous dependent variables as instruments for time invariant dependent variables which are correlated with individual bank specific effects. Third, the fixed effects estimator doesn't account for within country variations, while the HT estimator allows us to control for

cross country variations while at the same time allowing for the incorporation of time-invariant variables.

We use the Hausman test to verify that using the HT model is the most appropriate in the case of our data. The Hausman test does not reject the null that the HT estimator is equivalent to the fixed effects estimator. Fixed effects estimator is thus consistent but less efficient, suggesting the use of HT as consistent and more efficient estimator.

4. Results

4.1 Descriptive statistics

Table (1) presents the descriptive statistics of the variables used in this study. Mean TCR, EQTA, and TIER1 are respectively at 18.4%, 13.8%, and 18%. EQTA exhibits large cross-country variations, ranging between 3% and 77%. The highest average profitability in the region (ROA) is recorded in Algeria with 2.8% while the remaining countries range around 1%. On average, Bahrain and Egypt have the largest banks in our sample. Banking concentration averages at 69% for the whole sample with the most concentrated banking sectors being in Qatar and Bahrain.

Institutional quality also varies greatly between countries in our sample. On a scale of -2.5 to +2.5, PS ranges between -2.5 and 1.39 and averages as low as -0.44. The mean for the region is at -0.44 which shows high political instability for the region as a whole. FO and EF indicators both average at 64/100 approximately. Corruption levels have high

disparity between countries, attaining as low as 15/100 to as high as 77/100 with a total sample average of 45/100.

Table 1. Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
TCR	1256	18.37	7.04	5.77	49.66
EQTA	1594	13.72	9.53	2.81	76.94
TIER1	1236	18.01	10.53	4.75	75.41
ROA	1651	1.44	1.53	-5.76	8.99
NPL	1651	6.50	6.41	0.12	37.30
CONC	1651	68.93	16.85	40.22	99.87
GDP	1651	4.73	3.94	-15.09	26.17
SIZE	1651	15.08	1.51	9.31	18.68
REG	1651	1.31	1.37	0	3
ISLAMIC	1651	0.18	0.38	0	1
GOV	1651	0.19	0	0	1
LISTED	1651	0.65	0.48	0	1
CPI	1651	45.18	14.77	15.00	77.00
PS	1651	-0.44	1.02	-2.47	1.39
GC	1457	38.96	19.76	6.25	87.50
RI	1536	35.02	11.27	17.13	65.24
EF	1582	63.36	6.24	48.30	77.70
FO	1582	64.48673	10.29179	30.1	85.4

TCR is the total capital adequacy ratio calculated as the sum of Tier 1 and Tier 2 capital to total risk weighted assets. EQTA is the equity to total unweighted assets ratio. ROA is the return on average assets. NPL is a a measure of risk which is calculated as the ratio of non-performing loans to total loans. CONC is a measure of bank concentration, it is equal to the share of assets held by the three largest banks in a country. GDP measures the annual GDP Growth rate. REG is a score which measures the stringency of a country's capital regulatory jurisdiction. SIZE is calculated by the log of the total assets held by a bank. Islamic is a dummy variable which takes the value of 1 if the bank is Islamic and zero it is conventional. Gov is a dummy variable which takes the value of 1 if the government owns 75% or more of a banks's capital and zero otherwise. Listed is also another dummy variable which takes the value of 1 if the bank is listed on a stock exchange market and zero otherwise. PS is the measure of political stability. GC is the first component of creditor's

rights and measures the ease of getting credit. RI is the other component of the creditor's rights index and it accounts for the ease of resolving insolvency, as well as liquidation. EF is the economic freedom index. FO is a measure of financial openness and includes financial and trade freedom. CPI is a corruption perception index accounting for the level of perceived corruption in each country.

Table 2. MENA bank distribution by type

	Number of banks	Conventional	Islamic	Listed	Unlisted	Private	Governmental
ALGERIA	5	5	0	0	5	5	0
BAHRAIN	18	10	8	10	8	14	4
EGYPT	24	21	3	19	5	21	3
ISRAEL	7	7	0	6	1	7	0
JORDAN	15	12	3	12	3	14	1
KUWAIT	11	5	6	11	0	8	3
LEBANON	29	29	0	5	24	26	3
MALTA	7	7	0	3	4	7	0
MOROCCO	9	9	0	6	3	9	0
OMAN	10	8	2	7	3	7	3
QATAR	9	6	3	6	3	7	2
TUNISIA	9	8	1	6	3	8	1
UNITED ARAB EMIRATES	24	15	9	18	6	15	9
YEMEN	6	3	3	0	6	4	2
Grand Total	**183**	**145**	**38**	**109**	**74**	**152**	**31**

Table (2) shows the distribution of banks in our sample between Islamic and conventional, listed and unlisted, and governmentally owned banks and privately-owned banks. Five countries in our sample do not have Islamic banks, while Algeria and Yemen do not have any listed banks, compared to Kuwait where all banks are listed. Egypt, Lebanon and UAE have the highest total number of banks.

Table (3) shows the evolution of TCR and EQTA averages by country and through time. It also shows high homogeneity between countries. Table (4) presents the distribution of our institutional variables by country.

Table 3: Average values of Capital ratios by country over the sample period 2004-2014

		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Algeria	TCR	21.1	16.8	17.1	19.7	18.6	20.0	18.4	20.0		49.0	36.0
	EQTA	14.7	13.9	16.5	17.1	15.7	23.6	23.6	23.8	23.5	21.9	20.9
Bahrain	TCR	23.0	23.2	21.7	25.2	23.0	21.7	25.2	22.5	22.1	23.1	23.8
	EQTA	24.6	21.3	19.5	27.9	23.5	21.6	21.8	23.5	23.2	26.0	29.6
Egypt	TCR	12.7	15.7	14.0	12.8	12.6	20.1	19.0	18.2	16.3	16.4	16.7
	EQTA	8.2	9.6	9.3	8.6	9.2	10.5	10.0	10.9	11.1	11.4	11.6
Israel	TCR	11.8	11.9	12.1	11.5	12.5	14.4	14.4	14.3	15.3	15.1	14.9
	EQTA	5.8	5.5	6.0	5.8	5.7	6.3	6.1	5.8	6.1	5.9	5.9
Jordan	TCR	17.5	18.1	20.4	18.9	20.3	19.1	19.6	18.0	20.4	19.8	20.1
	EQTA	14.1	14.8	15.9	15.8	14.8	13.5	15.1	14.7	14.7	14.2	14.0
Kuwait	TCR	16.5	19.3	18.7	18.9	17.1	16.1	20.4	19.7	19.7	22.1	19.1
	EQTA	14.8	18.2	21.4	24.4	23.9	15.1	16.3	18.3	22.0	15.3	20.4
Lebanon	TCR	22.2	24.6	24.9	22.9	22.1	16.6	15.1	12.1	13.3	14.4	15.1
	EQTA	7.0	7.8	8.4	10.4	10.0	11.5	10.9	10.7	10.8	10.7	10.6
Malta	TCR	16.1	16.7	14.2	14.2	23.4	19.6	19.4	20.7	13.2	17.9	14.0
	EQTA	18.5	18.3	16.3	16.7	16.2	18.4	17.4	19.1	19.3	17.0	10.5
Morocco	TCR	8.5	12.6	10.8	8.9	11.2	11.2	12.2	11.9	13.1	13.6	13.6
	EQTA	8.7	8.5	7.7	7.5	8.8	9.3	9.6	9.7	9.7	9.5	9.9
Oman	TCR	18.1	23.3	19.3	18.7	15.3	15.1	15.6	15.1	15.6	15.7	18.9
	EQTA	16.4	17.7	16.9	17.6	19.3	18.7	18.6	17.1	16.9	22.6	25.5
Qatar	TCR	28.2	21.8	18.0	20.0	18.4	18.1	20.9	21.2	17.6	17.0	17.0
	EQTA	18.1	19.7	17.2	19.5	19.0	20.7	19.1	22.8	16.5	20.6	17.6
Tunisia	TCR	24.0	27.2	24.9	28.6	28.7			26.5	22.2	31.5	
	EQTA	11.7	12.6	14.0	13.7	13.1	13.5	12.8	11.7	11.2	10.2	11.4
United Arab Emirates	TCR	22.5	27.1	19.7	18.1	16.4	21.2	21.7	22.2	22.1	20.5	18.9
	EQTA	21.7	21.5	19.2	15.4	14.8	15.9	15.9	16.9	19.4	17.9	18.5
Yemen	TCR	46.0	11.6	29.3	26.5	16.3	17.3	17.7	21.0	27.9	26.8	27.7
	EQTA	10.0	10.4	11.0	13.8	15.0	14.0	11.4	13.5	11.4	8.5	7.9

TCR is the total capital adequacy ratio calculated as the sum of Tier 1 and Tier 2 capital to total risk weighted assets. EQTA is the equity to total unweighted assets ratio.

Table 4: Average values of institutional variables by country over the sample period 2004-2014

	PS	GC	RI	EF	FO	CPI
Algeria	-1.37	21.25	54.72	55.34	48.73	30.50
Bahrain	-0.36	38.39	42.91	74.94	77.94	53.08
Egypt	-0.80	37.50	20.92	54.89	49.36	31.50
Israel	-1.27	86.25	55.92	65.51	69.73	61.50
Jordan	-0.35	13.75	29.21	66.18	66.22	49.25
Kuwait	0.28	47.50	32.80	65.89	64.29	44.92
Lebanon	-1.29	37.50	32.28	59.20	66.38	28.67
Malta	1.27	18.75	42.16			58.73
Morocco	-0.37	34.38	34.42	59.38	52.40	34.42
Oman	0.78	40.00	37.88	66.42	63.16	53.17
Qatar	1.00	27.68	57.72	65.52	61.28	64.67
Tunisia	-0.08	37.50	55.89	59.82	44.27	43.67
United Arab Emirates	0.86	43.75	29.98	69.19	62.19	63.00
Yemen	-1.82	13.75	25.07	51.10	48.03	22.92

PS is the measure of political stability. GC is the first component of creditor's rights and measures the ease of getting credit. RI is the other component of the creditor's rights index and it accounts for the ease of resolving insolvency, as well as liquidation. EF is the economic freedom index. FO is a measure of financial openness and includes financial and trade freedom. CPI is a corruption perception index accounting for the level of perceived corruption in each country.

Table (5) displays the correlation matrix between all variables employed. No major correlation issues exist between our variables except for correlation coefficients between institutional variables. Due to high correlation between these variables, we include one institutional variable at a time when running our regressions.

Table 5: Correlation matrix

	ROA	NPL	CONC	GDP	REG	SIZE	PS	GC	RI	EF	FO	CPI
ROA	1.00											
NPL	-0.15	1.00										
CONC	-0.01	-0.05	1.00									
GDP	0.21	-0.03	0.05	1.00								
REG	-0.06	-0.14	0.00	-0.15	1.00							
SIZE	-0.01	-0.31	-0.18	-0.02	0.15	1.00						
PS	0.12	-0.26	0.10	-0.01	0.03	0.24	1.00					
GC	-0.10	-0.19	-0.27	-0.20	0.23	0.41	0.14	1.00				
RI	0.03	-0.23	0.30	0.08	0.09	-0.03	0.10	0.09	1.00			
EF	0.11	-0.23	0.07	0.15	0.07	0.02	0.43	0.17	0.30	1.00		
FO	0.01	-0.19	-0.04	0.10	0.01	-0.01	-0.00	0.25	0.14	0.81	1.00	
CPI	0.10	-0.31	0.07	0.04	0.14	0.22	0.80	0.30	0.35	0.73	0.45	1.00

4.2 Regressions results

4.2.1 Main regression results

Table 6 reports the main regression results. Each institutional variable is separately introduced in the regressions due to high correlation among these variables. Panel A (columns 1 to 6) reports the results for TCR, Panel B (columns 7 to 12) represents the results for EQTA while Panel C reports results of TIER1. All institutional variables reported are significant in explaining total capital ratio (TCR). TCR is positively affected by political stability. Banks in politically stable countries tend to hold higher risk weighted capital ratios. Consistent with (González & González 2008) who show that stronger

creditor rights cause firms to be more leveraged, we find that creditor rights have a negative significant effect on TCR. When a client defaults on his debt, the easier the bank can guarantee the retrieval of the amount of the loan, the less the bank will hold capital as a cushion to hedge against risky loan loss. Hence, banks hold less capital in countries where resolving insolvency is easier. Moreover, creditor rights also measure the ease of liquidation and reorganization proceedings. A bank might prefer holding lower capital ratios when stricter liquidation rules apply. La Porta et al., (1997) argue that firms are likely to be more leveraged in the presence of more favorable creditor rights because in such a context credit would be available in more favorable conditions. Higher economic and financial freedom indexes are significantly associated with higher values of TCR. Broader exposure to international markets and thus higher competition to attract funds pushes banks to hold higher capital levels possibly to signal stronger financial conditions. CPI is positively significant at the 1% level. Less corruption leads banks to hold more capital, a result which is consistent with the findings of Belkhir et al., (2016) regarding MENA non-financial firms whose leverage levels are found to be positively linked with corruption.

Among control variables, we find that risk, concentration, and size are highly significant. Large banks tend to hold less capital, consistent with the view that they can raise capital more quickly should an adverse situation occur. This is also in line with Berger et al. (2008), Fonseca and Gonzales (2010) and Demirgüç-Kunt, Kane, & Laeven, (2014) who posit that large banks benefit from government bailouts and other guarantees, have higher economies of scale and better risk management and therefore can hold less capital than smaller banks. Consistent with previous studies, riskier banks exhibit higher

capital ratios in order to mitigate any potential unexpected loss induced by their higher risk exposure (Berger et al. 2008; Awdeh et al. 2011). The coefficient of CONC is significant and positive indicating that banks operating in a more concentrated environment tend to hold higher capital ratios. GDP however has an insignificant coefficient meaning that there seems to be no cyclical or counter cyclical behavior of capital ratios for banks in the MENA region. Capital adequacy ratio coverage (REG), which measures the stringency of capital regulations is also insignificant. Banks do not seem to be affected by the country's regulatory framework when choosing their capital holdings. This is in line with (Bougatef & Mgadmi 2016; Awdeh et al. 2011) who show that regulations do not affect capital holdings of banks operating in the MENA region.

Furthermore, the dummy variables we included provide evidence that government owned banks as well as listed banks hold higher TCR than privately owned banks and unlisted banks, respectively. Listed banks are indeed expected to hold more capital because of easier access but also because they are subject to market discipline and hence "pushed" by the market to hold higher TCR. Concerning, EQTA, it is also higher among government owned banks.

Unlike TCR, EQTA levels are not affected by institutional variables except for corruption which has a positive and significant coefficient. Institutional factors hence appear to affect the regulatory constraint related to capital without playing a major role in determining the capital targets that banks set internally regardless of regulation. TIER1 capital also behaves as EQTA, whereby only corruption is significant in explaining this ratio.

Table 6: The impact of institutional variables on bank capital - Main Regression

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Panel A: TCR						Panel B: EQTA					
PS	1.037**						0.0531					
	(2.04)						(0.18)					
GC		-0.0837***						0.0159*				
		(-5.29)						(1.67)				
RI			-0.138**						0.000157			
			(-2.38)						(0.00)			
EF				0.303***						0.0667		
				(4.54)						(1.63)		
FO					0.362***						-0.0158	
					(8.77)						(-0.69)	
CPI						0.142***						0.0514**
						(4.01)						(2.17)
ROA	-0.203	-0.0693	-0.109	-0.142	-0.140	-0.149	0.606***	0.554***	0.733***	0.678***	0.673***	0.612***
	(-1.50)	(-0.50)	(-0.78)	(-1.05)	(-1.06)	(-1.11)	(8.26)	(7.48)	(9.88)	(9.23)	(9.16)	(8.34)
NPL	0.178***	0.141***	0.158***	0.152***	0.155***	0.183***	0.0323*	0.00928	0.0165	0.0247	0.0278	0.0321*
	(5.34)	(4.01)	(4.51)	(4.48)	(4.74)	(5.53)	(1.79)	(0.50)	(0.92)	(1.41)	(1.60)	(1.78)
CONC	0.0813***	0.141***	0.103***	0.0741**	0.0652**	0.0433	-0.0181	-0.0242	-0.0187	-0.0262	-0.0203	-0.0295
	(2.86)	(4.47)	(3.42)	(2.47)	(2.23)	(1.47)	(-0.99)	(-1.23)	(-1.02)	(-1.43)	(-1.11)	(-1.55)
GDP	-0.0466	-0.0538	-0.0401	-0.0482	-0.0519	-0.0554	-0.0307	-0.0192	0.0218	0.00721	0.00670	-0.0309
	(-1.21)	(-1.32)	(-0.97)	(-1.23)	(-1.36)	(-1.44)	(-1.23)	(-0.77)	(0.84)	(0.29)	(0.27)	(-1.24)
REG	-0.0786	-0.183	-0.299	0.0242	0.0700	-0.135	-0.0290	-0.0526	0.0184	0.000996	-0.0254	-0.0336
	(-0.44)	(-1.00)	(-1.51)	(0.13)	(0.40)	(-0.76)	(-0.26)	(-0.48)	(0.16)	(0.01)	(-0.23)	(-0.31)
SIZE	-5.057***	-4.635***	-4.159***	-4.931***	-4.603***	-5.288***	-5.987***	-7.073***	-6.216***	-5.884***	-5.856***	-6.158***
	(-10.13)	(-8.01)	(-7.70)	(-9.97)	(-9.64)	(-10.58)	(-18.31)	(-18.18)	(-18.19)	(-18.75)	(-18.68)	(-18.91)

Islamic	-1.797	-1.742	-1.582	-1.764	-1.589	-1.788	0.411	-0.0417	0.324	0.590	0.577	0.346
	(-0.94)	(-0.95)	(-0.90)	(-0.95)	(-0.90)	(-0.91)	(0.22)	(-0.02)	(0.17)	(0.34)	(0.33)	(0.18)
Gov	4.701**	4.505**	4.157**	4.620**	4.406**	4.936***	5.088***	5.693***	5.555***	5.538***	5.514***	5.317***
	(2.52)	(2.51)	(2.41)	(2.55)	(2.56)	(2.59)	(2.70)	(2.76)	(2.90)	(3.17)	(3.16)	(2.80)
Listed	5.380***	5.417***	5.047***	5.564***	5.055***	5.565***	1.636	2.463	1.805	2.165	2.012	1.899
	(2.93)	(3.05)	(2.96)	(3.06)	(2.93)	(2.97)	(0.96)	(1.31)	(1.04)	(1.33)	(1.24)	(1.10)
constant	84.67***	78.05***	72.27***	64.36***	57.10***	84.23***	101.1***	116.6***	103.8***	95.16***	99.19***	102.1***
	(10.59)	(8.70)	(8.36)	(7.69)	(7.20)	(10.82)	(18.48)	(18.47)	(18.16)	(17.24)	(18.67)	(19.08)
Observations	1191	1057	1109	1154	1154	1191	1499	1322	1398	1440	1440	1499
Groups	170	168	168	164	164	170	210	209	204	197	197	210
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

This table reports the main regression results of bank capital determinants and the effect of institutional variables using the Hausman-Taylor model. The dependent variables are TCR; the total capital ratio (column 1 to 6) and EQTA; equity to total assets ratio (column 7 to 12). The independent variables are the following: ROA is the return on average assets. NPL is a a measure of risk which is calculated as the ratio of non-performing loans to total loans. CONC is a measure of bank concentration, it is equal to the share of assets held by the three largest banks in a country. GDP measures the annual GDP Growth rate. REG is a score which measures the stringency of a country's capital regulatory jurisdiction. SIZE is calculated by the log of the total assets held by a bank. Islamic is a dummy variable which takes the value of 1 if the bank is Islamic and zero it is conventional. Gov is a dummy variable which takes the value of 1 if the government owns 75% or more of a bank's capital and zero otherwise. Listed is also another dummy variable which takes the value of 1 if the bank is listed on a stock exchange market and zero otherwise. PS is the measure of political stability. GCREDIT is the first component of creditor's rights and measures the ease of getting credit. RI is the other component of the creditor's rights index and it accounts for the ease of resolving insolvency, as well as liquidation. EF is the economic freedom index. FO is a measure of financial openness and includes financial and trade freedom. CPI is a corruption perception index accounting for the level of perceived corruption in each country. Reported beneath each coefficient estimate is the t-statistic adjusted for clustering at the bank level. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table 6 (Continued): The impact of institutional variables on bank capital - Main Regression

	(13)	(14)	(15)	(16)	(17)	(18)
	Panel C: TIER1					
PS	0.0157					
	(0.02)					
GC		-0.0303				
		(-1.09)				
RI			-0.0632			
			(-0.58)			
EF				0.0361		
				(0.3)		
FO					0.022	
					(0.31)	
CPI						0.155***
						(2.7)
ROA	0.00419	0.0835	0.0653	-0.00406	-0.00553	-0.0015
	(0.02)	(0.38)	(0.3)	(-0.02)	(-0.03)	(-0.01)
NPL	0.224***	0.201***	0.191***	0.225***	0.227***	0.227***
	(3.75)	(3.02)	(2.95)	(3.73)	(3.79)	(3.84)
CONC	0.0202	0.0424	0.0334	0.0171	0.0151	-0.0223
	(0.45)	(0.83)	(0.7)	(0.37)	(0.33)	(-0.48)
GDP	-0.0238	0.00057	0.00359	-0.0185	-0.0222	-0.0517
	(-0.37)	(0.01)	(0.05)	(-0.28)	(-0.34)	(-0.79)
REG	-0.332	-0.385	-0.433	-0.302	-0.315	-0.432
	(-1.14)	(-1.20)	(-1.31)	(-1.01)	(-1.07)	(-1.50)
SIZE	-7.387***	-7.714***	-7.516***	-7.515***	-7.467***	-8.063***
	(-8.56)	(-7.05)	(-7.40)	(-8.61)	(-8.62)	(-9.14)
Islamic	-0.369	-0.878	-0.802	-0.681	-0.595	-0.767
	(-0.12)	(-0.28)	(-0.26)	(-0.23)	(-0.20)	(-0.25)
Gov	7.910***	8.050**	8.083***	7.811***	7.858***	8.594***
	(2.64)	(2.57)	(2.61)	(2.6)	(2.62)	(2.76)
Listed	3.222	3.348	3.298	3.36	3.186	3.793
	(1.13)	(1.1)	(1.1)	(1.15)	(1.09)	(1.27)
constant	122.5***	127.6***	125.3***	122.1***	122.6***	130.5***
	(8.83)	(7.42)	(7.69)	(7.99)	(8.5)	(9.38)
Observations	914	814	848	897	897	914
Groups	146	144	144	142	142	146
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

4.2.2 Further Investigations

For deeper insight, we split our sample into several sub samples. Tables 7 and 8 show results for the subsamples of small and large banks. We consider a bank as large if its total assets are above one billion USD and/or if it belongs to the top 5 banks in each of our countries. Results show no different effects of institutional variables on large and small banks' regulatory capital ratio (TCR), except for proxies of creditor rights (GC and RI) that negatively impact TCR for small banks only (GC is only marginally significant at 10% for large banks). Also, GC and CPI positively impact EQTA only for large banks. Economic freedom is the only institutional variable that affects EQTA for small banks, higher EF leads to higher internally set capital.

Tables 9 and 10 display the results for governmentally owned banks versus their private counterparts. As one would expect, all the institutional variables affect TCR for privately owned banks while for governmentally owned banks except for the economic freedom indexes, institutional variables are not significant.

Table 7: The impact of institutional variables on bank capital - Large Banks

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Panel A: TCR						Panel B: EQTA					
PS	1.022						0.228					
	(1.33)						(0.69)					
GC		-0.0424*						0.0255**				
		(-1.74)						(2.41)				
RI			-0.0361						-0.0215			
			(-0.39)						(-0.53)			
EF				0.258**						0.0161		
				(2.34)						(0.32)		
FO					0.385***						0.0313	
					(6.5)						(1.23)	
CPI						0.130**						0.0725***
						(2.35)						(2.8)
Constant	71.72***	37.00**	23.58	44.99***	45.32***	71.92***	49.50***	63.11***	45.87***	49.32***	48.92***	51.19***
	(5.12)	(2.32)	(1.59)	(3.04)	(3.35)	(5.41)	(7.16)	(7.21)	(5.97)	(6.66)	(7.05)	(7.72)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Nbr. of obs.	429	362	383	409	409	429	484	406	436	464	464	484
Nbr. of groups	48	48	48	46	46	48	50	50	50	48	48	50

This table reports the regression results of bank capital determinants and the effect of institutional variables for a sample of large banks using the Hausman-Taylor model. The dependent variables are TCR; the total capital ratio (column 1 to 6) and EQTA; equity to total assets ratio (column 7 to 12). PS is the measure of political stability. GCREDIT is the first component of creditor's rights and measures the ease of getting credit. RI is the other component of the creditor's rights index and it accounts for the ease of resolving insolvency, as well as liquidation. EF is the economic freedom index. FO is a measure of financial openness and includes financial and trade freedom. CPI is a corruption perception index accounting for the level of perceived corruption in each country. Controls include all the control variables used in the main regression. Reported beneath each coefficient estimate is the t-statistic adjusted for clustering at the bank level. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table 8: The impact of institutional variables on bank capital - Small Banks

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Panel A: TCR						Panel B: EQTA					
PS	1.096						-0.122					
	(1.53)						(-0.29)					
GC		-0.106***						0.00685				
		(-5.05)						(0.52)				
RI			-0.210***						-0.0116			
			(-2.80)						(-0.26)			
EF				0.352***						0.112**		
				(4.1)						(2.03)		
FO					0.335***						-0.0482	
					(5.77)						(-1.50)	
CPI						0.148***						0.0297
						(3.13)						(0.9)
Constant	97.02***	101.1***	104.0***	79.02***	71.61***	96.20***	126.0***	141.0***	129.2***	117.2***	125.0***	127.9***
	(8.76)	(8.24)	(8.57)	(7.03)	(6.44)	(8.92)	(17.17)	(17.34)	(17.4)	(16.21)	(17.69)	(17.74)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Nbr. of obs.	762	695	726	745	745	762	1015	916	962	976	976	1015
Nbr. of groups	122	120	120	118	118	122	160	159	154	149	149	160

This table reports the regression results of bank capital determinants and the effect of institutional variables for a sample of small banks using the Hausman-Taylor model. The dependent variables are TCR; the total capital ratio (column 1 to 6) and EQTA; equity to total assets ratio (column 7 to 12). PS is the measure of political stability. GCREDIT is the first component of creditor's rights and measures the ease of getting credit. RI is the other component of the creditor's rights index and it accounts for the ease of resolving insolvency, as well as liquidation. EF is the economic freedom index. FO is a measure of financial openness and includes financial and trade freedom. CPI is a corruption perception index accounting for the level of perceived corruption in each country. Controls include all the control variables used in the main regression. Reported beneath each coefficient estimate is the t-statistic adjusted for clustering at the bank level. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table 9: The impact of institutional variables on bank capital - Government Owned Banks

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Panel A: TCR						Panel B: EQTA					
PS	-1.733						0.161					
	(-1.41)						(0.19)					
GC		0.00323						-0.0082				
		(0.08)						(-0.33)				
RI			0.276						0.0808			
			(1.41)						(0.72)			
EF				0.330**						0.0436		
				(2.14)						(0.41)		
FO					0.227**						0.0501	
					(2.17)						(0.77)	
CPI						0.148*						0.0745
						(1.93)						(1.38)
Constant	54.09***	67.74***	35.84**	51.22***	58.83***	77.58***	134.4***	149.8***	147.2***	133.8***	133.8***	136.1***
	(3.34)	(3.36)	(2.02)	(2.95)	(3.61)	(4.55)	(10.29)	(9.56)	(10.06)	(10.41)	(11.08)	(11.14)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Nbr. of obs.	264	230	240	264	264	264	283	243	255	279	279	283
Nbr. of groups	34	34	34	34	34	34	38	38	37	37	37	38

This table reports the regression results of bank capital determinants and the effect of institutional variables for a sample of government-owned banks using the Hausman-Taylor model. The dependent variables are TCR; the total capital ratio (column 1 to 6) and EQTA; equity to total assets ratio (column 7 to 12). PS is the measure of political stability. GCREDIT is the first component of creditor's rights and measures the ease of getting credit. RI is the other component of the creditor's rights index and it accounts for the ease of resolving insolvency, as well as liquidation. EF is the economic freedom index. FO is a measure of financial openness and includes financial and trade freedom. CPI is a corruption perception index accounting for the level of perceived corruption in each country. Controls include all the control variables used in the main regression. Reported beneath each coefficient estimate is the t-statistic adjusted for clustering at the bank level. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table 10: The impact of institutional variables on bank capital - Non-government owned Banks

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Panel A: TCR						Panel B: EQTA					
PS	1.659***						0.108					
	(2.95)						(0.33)					
GC		-0.103***						0.0184*				
		(-6.00)						(1.75)				
RI			-0.153**						-0.00859			
			(-2.47)						(-0.24)			
EF				0.269***						0.0779*		
				(3.53)						(1.7)		
FO					0.385***						-0.0312	
					(8.46)						(-1.27)	
CPI						0.124***						0.043
						(3.04)						(1.59)
Constant	86.65***	76.02***	77.50***	65.63***	55.45***	83.85***	89.40***	105.3***	90.59***	80.97***	86.03***	90.55***
	(9.56)	(7.58)	(7.92)	(6.73)	(6.04)	(9.38)	(14.92)	(15.31)	(14.72)	(13.27)	(14.67)	(15.31)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Nbr. of obs.	927	827	869	890	890	927	1216	1079	1143	1161	1161	1216
Nbr. of groups	136	134	134	130	130	136	172	171	167	160	160	172

This table reports the regression results of bank capital determinants and the effect of institutional variables for a sample of non-government-owned banks using the Hausman-Taylor model. The dependent variables are TCR; the total capital ratio (column 1 to 6) and EQTA; equity to total assets ratio (column 7 to 12). PS is the measure of political stability. GCREDIT is the first component of creditor's rights and measures the ease of getting credit. RI is the other component of the creditor's rights index and it accounts for the ease of resolving insolvency, as well as liquidation. EF is the economic freedom index. FO is a measure of financial openness and includes financial and trade freedom. CPI is a corruption perception index accounting for the level of perceived corruption in each country. Controls include all the control variables used in the main regression. Reported beneath each coefficient estimate is the t-statistic adjusted for clustering at the bank level. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

In tables 11 and 12, we split the sample by type of bank: conventional and Islamic. We find that conventional banks' TCR is influenced by almost all the institutional variables while Islamic banks' capital ratios are not affected by most of them. Our results hence suggest that improving the institutional environment in the MENA region is less likely to affect the solvency of Islamic banks possibly because using capital to hedge against risk is less relevant for such banks.

We further test whether the behavior of listed and unlisted banks differ in this scope (tables 13 and 14). Our findings show that listed banks hold higher TCR in more corrupt economies while unlisted banks are not affected by corruption. Political stability has a negative relationship with TCR of unlisted banks while it is positively significant in the case of listed banks.

Finally, we divide our sample into two sub-samples of developed stock markets (above the 50^{th} percentile) versus less developed stock markets (below the 50^{th} percentile) using the market capitalization to GDP indicator (tables 15 and 16). For TCR, institutional variables are significant for underdeveloped stock markets. Conversely, these institutional variables are significant in explaining leverage ratios when markets are more developed. In other words, when the stock market is developed, better institutional environment positively affects banks' internally set capital as a signal of more soundness. While when the market is weak, a well-developed institutional environment seems essential to ensure the effectiveness bank capital regulations.

Table 11: The impact of institutional variables on bank capital - Islamic Banks

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Panel A: TCR						Panel B: EQTA					
PS	2.832*						1.47					
	(1.65)						(1.16)					
GC		0.123**						0.03				
		(2.38)						(0.66)				
RI			-0.0284						0.0514			
			(-0.17)						(0.35)			
EF				0.193						0.305**		
				(1.34)						(2.17)		
FO					0.449***						0.0634	
					(3)						(0.56)	
CPI						0.0546						0.302***
						(0.57)						(3.15)
Constant	76.97***	70.12***	65.96***	67.77***	55.73***	75.62***	143.8***	168.6***	143.6***	120.5***	131.8***	142.7***
	(3.92)	(3.54)	(3.11)	(3.37)	(2.79)	(3.79)	(8.53)	(9.33)	(8.73)	(7.1)	(7.98)	(8.73)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Nbr. of obs.	172	162	164	172	172	172	257	234	244	254	254	257
Nbr. of groups	32	32	32	32	32	32	42	42	41	41	41	42

This table reports the regression results of bank capital determinants and the effect of institutional variables for a sample of Islamic banks using the Hausman-Taylor model. The dependent variables are TCR; the total capital ratio (column 1 to 6) and EQTA; equity to total assets ratio (column 7 to 12). PS is the measure of political stability. GCREDIT is the first component of creditor's rights and measures the ease of getting credit. RI is the other component of the creditor's rights index and it accounts for the ease of resolving insolvency, as well as liquidation. EF is the economic freedom index. FO is a measure of financial openness and includes financial and trade freedom. CPI is a corruption perception index accounting for the level of perceived corruption in each country. Controls include all the control variables used in the main regression. Reported beneath each coefficient estimate is the t-statistic adjusted for clustering at the bank level. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table 12: The impact of institutional variables on bank capital - Conventional Banks

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Panel A: TCR						Panel B: EQTA					
PS	0.52						-0.394					
	(0.97)						(-1.46)					
GC		-0.0914***						0.00164				
		(-5.46)						(0.19)				
RI			-0.148**						-0.0267			
			(-2.36)						(-0.90)			
EF				0.335***						0.0307		
				(4.5)						(0.82)		
FO					0.398***						-0.0309	
					(9.22)						(-1.59)	
CPI						0.121***						0.00602
						(3.15)						(0.28)
Constant	75.67***	70.34***	63.51***	55.68***	47.57***	76.72***	80.86***	98.75***	81.34***	77.54***	81.27***	83.28***
	(8.79)	(7.26)	(6.91)	(6.11)	(5.65)	(9.19)	(15.4)	(16.27)	(15.14)	(14.86)	(16.35)	(16.27)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Nbr. of obs.	1003	881	931	968	968	1003	1208	1060	1123	1156	1156	1208
Nbr. of groups	134	133	133	129	129	134	160	160	156	150	150	160

This table reports the regression results of bank capital determinants and the effect of institutional variables for a sample of conventional banks using the Hausman-Taylor model. The dependent variables are TCR; the total capital ratio (column 1 to 6) and EQTA; equity to total assets ratio (column 7 to 12). PS is the measure of political stability. GCREDIT is the first component of creditor's rights and measures the ease of getting credit. RI is the other component of the creditor's rights index and it accounts for the ease of resolving insolvency, as well as liquidation. EF is the economic freedom index. FO is a measure of financial openness and includes financial and trade freedom. CPI is a corruption perception index accounting for the level of perceived corruption in each country. Controls include all the control variables used in the main regression. Reported beneath each coefficient estimate is the t-statistic adjusted for clustering at the bank level. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table 13: The impact of institutional variables on bank capital - Unlisted Banks

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Panel A: TCR						Panel B: EQTA					
PS	-3.690***						-0.162					
	(-3.60)						(-0.34)					
GC		-0.161***						0.00954				
		(-4.48)						(0.66)				
RI			0.0603						0.155**			
			(0.41)						(2.43)			
EF				0.296*						-0.0589		
				(1.7)						(-0.76)		
FO					0.272***						-0.0587	
					(3.25)						(-1.46)	
CPI						0.118						0.0493
						(1.38)						(1.16)
Constant	91.18***	86.85***	75.38***	83.65***	71.49***	107.3***	108.5***	99.00***	105.0***	108.4***	111.7***	109.0***
	(5.66)	(4.82)	(4.11)	(4.59)	(4.08)	(6.49)	(11.18)	(9.47)	(10.08)	(11)	(11.25)	(11.35)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Nbr. of obs.	384	339	356	367	367	384	522	464	491	499	499	522
Nbr. of groups	67	65	65	63	63	67	90	89	88	84	84	90

This table reports the regression results of bank capital determinants and the effect of institutional variables for a sample of unlisted banks using the Hausman-Taylor model. The dependent variables are TCR; the total capital ratio (column 1 to 6) and EQTA; equity to total assets ratio (column 7 to 12). PS is the measure of political stability. GCREDIT is the first component of creditor's rights and measures the ease of getting credit. RI is the other component of the creditor's rights index and it accounts for the ease of resolving insolvency, as well as liquidation. EF is the economic freedom index. FO is a measure of financial openness and includes financial and trade freedom. CPI is a corruption perception index accounting for the level of perceived corruption in each country. Controls include all the control variables used in the main regression. Reported beneath each coefficient estimate is the t-statistic adjusted for clustering at the bank level. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table 14: The impact of institutional variables on bank capital – Listed Banks

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Panel A: TCR						Panel B: EQTA					
PS	2.364***						0.323					
	(4.03)						(0.8)					
GC		-0.0276						0.0158				
		(-1.58)						(1.3)				
RI			-0.149**						-0.0702*			
			(-2.55)						(-1.74)			
EF				0.219***						0.0826*		
				(3.19)						(1.71)		
FO					0.314***						0.0177	
					(6.39)						(0.6)	
CPI						0.100***						0.0843***
						(2.61)						(2.88)
Constant	84.77***	88.88***	78.27***	66.48***	62.97***	80.37***	93.38***	118.8***	95.09***	85.94***	88.76***	95.60***
	(9.46)	(8.2)	(8.19)	(7.08)	(6.97)	(9.02)	(14.08)	(14.99)	(13.98)	(12.81)	(13.75)	(14.63)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Nbr. of obs.	807	718	753	787	787	807	977	858	907	941	941	977
Nbr. of groups	103	103	103	101	101	103	120	120	116	113	113	120

This table reports the regression results of bank capital determinants and the effect of institutional variables for a sample of listed banks using the Hausman-Taylor model. The dependent variables are TCR; the total capital ratio (column 1 to 6) and EQTA; equity to total assets ratio (column 7 to 12). PS is the measure of political stability. GCREDIT is the first component of creditor's rights and measures the ease of getting credit. RI is the other component of the creditor's rights index and it accounts for the ease of resolving insolvency, as well as liquidation. EF is the economic freedom index. FO is a measure of financial openness and includes financial and trade freedom. CPI is a corruption perception index accounting for the level of perceived corruption in each country. Controls include all the control variables used in the main regression. Reported beneath each coefficient estimate is the t-statistic adjusted for clustering at the bank level. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table 15: The impact of institutional variables on bank capital – Underdeveloped Stock Markets

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Panel A: TCR						Panel B: EQTA					
PS	0.584						0.885					
	(0.48)						(1.30)					
GC		-0.167**						0.0544				
		(-2.43)						(1.54)				
RI			0.368***						-0.0323			
			(-3.26)						(-0.46)			
EF				0.876***						0.0993		
				(5.23)						(0.98)		
FO					0.640***						0.0910*	
					(7.93)						(1.77)	
CPI						0.461***						0.0833
						(5.11)						(1.53)
Constant	41.45***	44.87***	46.22***	-7.334	0.0128	32.78***	110.4***	108.6***	113.9***	102.8***	103.1***	102.4***
	(3.17)	(3.29)	(3.49)	(-0.53)	(0.00)	(2.78)	(10.76)	(9.64)	(10.57)	(9.51)	(10.33)	(10.94)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Nbr. of obs.	429	390	417	409	409	429	505	451	492	479	479	505
Nbr. of groups	90	88	88	84	84	90	101	101	101	94	94	101

Table 16: The impact of institutional variables on bank capital – Developed Stock Markets

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Panel A: TCR						Panel B: EQTA					
PS	1.181*						-0.373					
	(1.92)						(-0.84)					
GC		-0.0209						-0.00743				
		(-0.91)						(-0.43)				
RI			0.0306						-0.0834*			
			(0.44)						(-1.65)			
EF				0.0616						0.133**		
				(0.82)						(2.50)		
FO					0.0456						0.0000319	
					(0.90)						(0.00)	
CPI						0.0271						1.982***
						(0.68)						(3.24)
Constant	99.06***	85.19***	77.03***	93.77***	93.90***	98.14***	91.54***	123.5***	102.0***	83.82***	89.78***	96.39***
	(11.06)	(7.74)	(7.34)	(9.70)	(9.96)	(10.49)	(13.23)	(13.94)	(13.35)	(11.87)	(13.13)	(13.70)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Nbr. of obs.	762	667	692	745	745	762	994	871	906	961	961	994
Nbr. of groups	158	153	153	153	153	158	205	198	193	193	193	205

4.3 Robustness checks

To check for the robustness of our results, we conduct the following. We estimate our model using the random effects estimator, the results remain significant. We use another indicator for corruption: the control of corruption indicator which we obtain from the World Governance Indicators of the World Bank. Results remain unchanged. We also exclude the GCC countries, Malta and Israel from the regressions as these countries are endowed with better institutional foundations compared to others in the sample, results remained unaltered.

5. Summary and concluding remarks

This paper studies the influence of institutional factors on bank capital structure using panel data on 183 banks operating in the MENA region for the period 2004 to 2014. We contribute to the increasing number of studies pioneered by Demirguc-Kunt and Maksimovic (1999) on the importance of accounting for country level institutional characteristics when studying different aspects of the financial sector.

For this purpose, we use two measures of bank capital structure; the regulatory capital ratio which accounts for the level of risk in banks' asset portfolios and a measure of leverage which is a non-risk weighted simple equity-to-asset ratio. Our results indicate that banks in countries with higher political stability, more pronounced economic and financial freedom, as well as lower levels of corruption hold more regulatory capital but creditor

rights, on the contrary, have the opposite effect. These results only hold for externally-set regulatory capital and not for internally-set capital which doesn't seem to be affected by the institutional foundations of a given country (except for the corruption control index). Nonetheless, when capital markets are developed, institutional variables have high impact on leverage ratios, implying that banks in developed markets use higher levels of internally set capital ratios to signal a good capital position to the market. We also find that the effect of institutional factors on regulatory capital ratios is more pronounced for conventional, listed, and non-government owned banks as well, these results mainly stem from banks operating in countries with less developed stock markets.

Our results have several policy implications. Institutional quality must not be disregarded when studying capital structures of banks operating in the MENA region. The region suffers from several institutional deficiencies which seem to have implications on many sectors including the financial and banking sector. According to our results banks operating in countries with better institutional environments hold higher bank capital ratios and are therefore expected to be safer than banks in countries with less developed institutions. Hence, promoting institutional development can be considered of vital importance not only to a country's economic and social development but also to ensure financial stability and resilience to local or global shocks. Finally, our results indicate that complying with more stringent international regulatory standards is possibly easier to achieve in countries with a better institutional environment. Also, in weaker institutional environments, regulators and supervisors need to monitor banks more closely and make more efforts in that direction.

Chapter 3

Does Financial Consumer Protection and Creditors' Rights Impact Intermediation Costs and Lending Growth?

Abstract

We investigate the effects of financial consumer protection and creditors' rights on banks' cost of intermediation and loan growth. Our findings show that the cost of intermediation increases with higher financial consumer protection and falls with higher creditors' rights; higher creditors' rights increase banks' lending, especially when coupled with higher financial consumer protection. Listed banks focus more on non-traditional activities when their rights are low and consumers' rights are high. We also find that banks tend to shift their lending towards short-term loans when consumers' rights are high and creditor rights are low and increase long-term loans when both rights are high. Our findings contribute to the literature examining banks' cost of intermediation and lending growth.

JEL classification: G21, G28, G38, G01

Keywords: Financial consumer protection, Creditors' rights, Cost of intermediation, Bank loan growth.

* This chapter draws from the contribution of Alraheb, Molyneux and Tarazi (2017). Does Financial Consumer Protection and Creditors' Rights impact Intermediation Costs and Lending Growth? Working paper.

1. Introduction

Legal frameworks operate to strengthen the operating environment for lenders (creditor rights) as well as to protect consumers of financial products (consumer protection rights). Creditors' Rights (CR) encourage financial institutions, especially banks, to inject more credit whereas Financial Consumer Protection (FCP) laws are set to encourage financial institutions to be more transparent and for customers to have more faith in these institutions. On the one hand, an increase in FCP comes with higher compliance cost for banks, which might translate into higher interest charges on loans, or a decrease in lending if greater transparency on loan charges and fees lead potential borrowers to refuse loan conditions. Higher CR, on the other hand, is likely to increase banks' lending appetite as it reduces the loss related to defaulting loans.

The effects of creditor's rights on bank loans and pricing is not unanimously agreed upon. Jappelli et al. (2005) document that higher creditor's rights (higher judicial efficiency) increase Italian banks' lending and that the effect on loan pricing is dependent on the degree of bank competition. Laeven et al. (2005), find that an increase in creditors' rights leads to a decrease in the cost of financial intermediation. Qian & Strahan (2007) and Ge et al. (2012) find that when creditor's rights are strong, bank loans have longer maturities, lower interest rates and their ownership is more concentrated. Bae & Goyal (2009) show that weak enforceability of contracts leads to a decrease in loan amounts, shorter maturities, and higher interest margins. Stronger creditor's rights, however, is only associated with lower interest margins, showing no effect on loan size and maturity. They conclude that the contract-enforceability is more important in shaping loans' structure and

prices than the mere presence of creditor's rights. Mathur & Marcelin (2015) show that higher property rights reduce bank profits while stronger creditors' rights increase bank profits significantly. Other studies have found that better creditors' rights decrease collateral spread (Liberti & Mian, 2010), provide higher firm access to bank loans (Safavian & Sharma (2007) and Moro et al. (2016)), and decrease loan covenants (Daher, 2017).

The literature on the effects of Financial Consumer Protection in the banking sector is rather scarce. Only Pasiouras (2016), to our best knowledge, has explicitly examined this area. He finds that increased financial consumer protection laws reduce the cost of intermediation in banks located in developed economies. The results for developing economies differ, however, where an increase in FCP is shown to increase the cost of intermediation as banks pass on the regulatory burdens to their customers. Other non-empirical studies have highlighted the failure of indirect consumer protection methods through promoting higher competition, and pinpointed the need for direct consumer protection laws (Akinbami, 2011). Lumpkin (2010) argues that in order for consumer protection to be effective, financial institutions should develop sufficient internal measure for client protection and regulators should impose stricter penalties to address mis-selling, fraud, or misconduct. Wehinger (2012) points out that financial consumer protection has not received appropriate attention from regulators, and that it is as important as enhancing efficiency and competition. Campbell et al. (2011) argue that for financial consumer protection to be beneficial, it must address specific problems rather than being general for institutions and products.

Other research done on factors affecting banks' cost of intermediation have found that higher market power has a positive relationship with NIM in some studies (Maudos & de Guevara, 2004), and a negative effect in others (Fungácová, et al., 2017). Higher cost efficiency leads to higher net interest margins (Carbo, et al., 2009). Higher credit and liquidity risks increase the net interest margins (Valverde & Fernández (2007) and Hawtrey & Liang (2008)). Furthermore, Birchwood et al. (2017) show that bank market power, operating costs, credit risk, and liquid asset holdings increase the net interest margin.

Other studies done on factors affecting bank lending growth have found a negative relationship between bank lending and: high capitalization and liquidity (for small banks) (Kim & Sohn, 2017), poor supervisory CAMELS ratings (Kupiec, et al., 2017), and consumer and analysts anxiety (Delis, et al., 2014). Allen et al. (2017) results show that foreign-owned banks lending increased during a domestic crisis and decreased during the global financial crisis, while government-owned banks lending behaved oppositely.[24]

This study is related to the work of Pasiouras (2016) and Qian & Strahan (2007). We take the investigation further by evaluating the effects of both consumers' and creditors' rights on bank cost of intermediation and lending growth in an attempt to offer regulators an insight on the different effects of higher creditors', and borrowers', rights. We also investigate the effects on loan growth by maturity, less than and more than 1 year, to evaluate the change in the maturity mix of the loan portfolio.

[24] Other studies have focused on bank lending channel reaction to monetary policy shocks, see for example: (Kashyap & Stein, 2000), (Kishan, et al., 2000), (Gambacorta & Mistrulli, 2004), (Kishan & Opiela, 2006), (Brei, et al., 2013), (Ferri, et al., 2014) and (Fungácová, et al., 2014).

The paper unfolds as follows. Section 2 provides definitions of dependent and independent variables, in addition to the empirical model. Section 3 documents the regression results, and additional robustness checks. Finally, section 4 concludes.

2. Data, Variables, and Empirical Model

In this section, before presenting our empirical model and our variables, we describe our sample.

2.1 Sample

The sample considered in this study is an unbalanced panel of annual bank-level data ranging from 2010 to 2015. We eliminate outliers at 1% and 99% of all variables. Banks with less than 4 years of observations are dropped. After filtering, the sample includes 3470 bank-year observations, representing 852 commercial banks (of which, 186 are listed) from 27 European countries[25]. Bank level data are extracted from Bankscope - Bureau van Dijk Database. Following Pasiouras (2016), the financial consumer protection index is built from the Global Survey on Consumer Protection and Financial Literacy conducted by the World Bank in 2010 and 2013 (World Bank (2012) and World Bank (2014)). The creditors'

[25] The number of banks in each country is listed between brackets as follows: Austria (55), Belarus (13), Belgium (19), Bosnia and Herzegovina (17), Croatia (26), Czech Republic (13), Denmark (35), Finland (6), France (90), Germany (92), Hungary (13), Ireland (9), Italy (66), Latvia (15), Luxembourg (50), Netherlands (18), Norway (7), Poland (27), Portugal (13), Romania (17), Serbia (23), Slovakia (9), Slovenia (13), Spain (36), Switzerland (94) and United Kingdom (76).

rights index is built based on the World Bank Doing Business database. GDP growth variable is collected from the World Bank database.

2.2 Definition of variables

2.2.1 Main independent variables

To examine the effect of the presence of Financial Consumer Protection on bank lending behavior and the cost of bank intermediation, we build the FCP index based on the Global Survey on Consumer Protection and Financial Literacy conducted by the World Bank in 2010 and 2013. Specifically, the FCP index is constructed based on the legal framework of the financial consumer protection scheme, which denotes applicable laws and regulations concerning consumer protection in financial institutions. The FCP index ranges from 0 to 7 with higher values indicating higher financial consumer protection. The index is built following Pasiouras (2016) based on four different laws denoting the presence of, or the absence of, a general consumer protection law and three different types of financial consumer protection laws. The initial index takes the value of (0) in the absence of a legal framework for consumer protection; the value of (1) when there is a general consumer protection law with implicit coverage of financial services; the value of (2) when either the consumer protection law explicitly covers financial services, or in the presence of consumer protection regulations within the framework of financial sector legislation or other financial consumer protection law/regulation; the value of (3) in the case of the presence of a general consumer protection law and any one of the other three laws; the value of (4) when there is a combination of two out of the three non-general laws; the value

of (5) for a combination of the general consumer protection law and two out of the other three laws; the value of (6) for a combination of the three non-general consumer protection laws; and the value of (7) for a combination of all four laws. We use two dummy variables based on the constructed FCP index; FCP75th and FCP50th, taking the value of 1 if the value is above the 75th and the 50th percentiles, respectively, zero otherwise.

To examine the effects of Creditors' Rights on bank lending behavior and the cost of bank intermediation, we construct a variable, CR, based on two variables from the World Bank Doing Business database; the ease of resolving insolvency and enforcing contracts. The resolving insolvency variable includes the time, costs, outcome of insolvency, liquidation, and reorganization proceedings. While the ease of enforcing contracts variable measures the time and cost for resolving a commercial dispute through a local first-instance court and the quality of judicial processes. The CR variable ranges between 0 and 100, with higher values indicating higher creditors' rights. We use two dummy variables based on the constructed CR index; CR75th and CR50th. Taking the value of 1 if the value is above the 75th and the 50th percentiles, respectively, zero otherwise.

2.2.2 Dependent variables

Our first dependent variable is Net Interest Margin (NIM), a widely used proxy for bank intermediation cost in the previous literature (Demirgüç-Kunt et al. (2004) and Demirgüc-Kunt & Huizinga (1999)). Net interest margin is defined as the net interest income to total assets. High levels of NIM is a reflection of higher intermediation cost, resulting from higher interest income, or lower interest expenses, or both. Through

modifying NIM, banks counterbalance higher costs related to banking operations in lending, monitoring, deposit activities and costly regulations they need to abide by. These costs are typically transferred to their customers, either by higher loan rates for borrowers and/or lower rates for depositors (Soedarmono & Tarazi, 2013). Our second dependent variable is Loan Growth (LG), calculated as the annual growth in gross loans from time t-1 to time t. The LG variable is then split to two variables LG<1 and LG>1, denoting the growth of loans with maturities less than and more than one year, respectively.

2.2.3 Independent variables

2.2.3.1 Control variables (NIM equation)

We consider several bank-specific and country-specific control variables widely used in the literature. Specifically, we consider the logarithm of banks' total assets (Size), equity to total assets (E_TA), cost to income ratio (CIR), liquid assets to total assets (LIQ)[26], banking sector concentration (HHI_TA)[27], and the growth rate of real per capita income (GDP_Gr).

We use SIZE to control for the Too-Big -To-Fail (TBTF) effect on loan pricing behavior. TBTF banks could charge lower interest rates as they enjoy cheaper funding options through the market or traditional deposits (Mishkin, et al., 2006). Higher E_TA is a signal of lower default risk, which would lead to lower funding costs as these banks are

[26] LIQ is calculated as follows: (cash + trading securities + interbank lending [< 3 months]) / total assets.
[27] HHI_TA is calculated as follows: the sum of the squared weights of banks assets for each country and year.

considered 'safer' than low capital banks (Demirgüç-Kunt, et al., 2004). CIR proxy's management inefficiency, an increase in this ratio is expected to have a negative impact on NIM implying a decrease in the efficiency or the quality of management (Maudos & de Guevara, 2004). Banks with higher LIQ are considered safer and therefore might enjoy lower cost of funds, yet higher levels of this variable also represents higher opportunity costs which banks might need to compensate for by increasing loan prices (Maudos & de Guevara, 2004). Higher levels of HHI_TA denote higher market power which, according to the market power hypothesis, is linked with higher lending rates as these banks have high control over prices. However, according to the information hypothesis, higher market power reduces information asymmetries through having greater soft information, leading to lower lending rates (Fungácová, et al., 2017). GDP_GR reflects the business cycle movements, its relationship with banks' funding costs is unclear as it depends on the banks' proficiency in managing the changes in the business cycle (Soedarmono & Tarazi, 2013).

2.2.3.2 Control variables (GL equation)

We consider several bank-specific and country-specific control variables widely used in the literature. Specifically, we consider the logarithm of banks' total assets (Size), equity to total assets (E_TA), liquid assets to total assets (LIQ), the net interest margin (NIM), and the growth rate of real per capita income (GDP_Gr).

Consistent with the TBTF theory, big banks have an enticement to take higher risks by excessively increasing the loan output, taking advantage of the conceivable government

bailout. Nonetheless, the relationship between Size and loan growth could be negative, as big banks can diversify risk by engaging in different types of securities and non-traditional activities, unlike small banks that rely heavily on traditional lending (Kim & Sohn, 2017).

On the one hand, banks that are more capitalized and have higher liquidity are expected to have higher loan growth, as the more the solvency and liquidity are, the more loans banks can create (Košak et al. (2015) and de Haas & van Lelyveld (2010)). On the other hand, higher levels of liquidity (LIQ) and solvency (E_TA) can be a sign of risk aversion and therefore would have a negative effect on loan growth (de Haas & van Lelyveld (2010) and Kupiec et al. (2017)). NIM and GDP_Gr are used to account for the demand-side effect on loan growth, an increase in interest rates is expected to decrease loan demand and therefore loan growth (Kim & Sohn, 2017), while a positive relationship between loan growth and GDP_Gr is expected (Olivero et al. (2011) and Košak et al. (2015)).

2.3 Econometric specification

To test the impact of the financial consumer protection on bank cost of intermediation and loan growth, we consider the following model:

$$NIM_{ij,t} = \alpha_i + \beta_1 FCP_{jt} + \beta_2 CR_{jt} + \sum_{k=1}^{5} \beta_3 Controls_{ij,t} + \beta_4 GDP\_Gr_{jt} + \varphi_j + \varepsilon_{ij,t}$$

$$LG_{ij,t} = \alpha_i + \beta_1 FCP_{jt} + \beta_2 CR_{jt} + \sum_{k=1}^{4} \beta_3 Controls_{ij,t} + \beta_4 GDP\_Gr_{jt} + \varphi_j + \varepsilon_{ij,t}$$

Controls represent the vector of bank-specific control variables. φ is the country fixed effects.

3. Results

3.1 Descriptive statistics

Table (1) presents descriptive statistics of the variables used in this study. Tables (2) and (3) show the breakdown of FCP and CR, respectively, by country and year. Highest average score of CR is found in Norway, while the lowest is in Greece.

Table 1: Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
CR	4,736	69.169	11.839	42.460	88.105
FCP	4,736	4	2	0	7
NIM	4,457	0.021	0.015	0.001	0.092
LG	4,522	-0.003	0.271	-0.975	2.819
SIZE	4,640	7.531	1.964	2.944	14.506
E_TA	4,553	0.120	0.086	0.017	0.612
LIQ	4,505	0.246	0.211	0.001	0.899
CIR	4,137	0.635	0.162	0.200	0.990
HHI	4,823	0.207	0.143	0.000	0.618
GDP_gr	4,736	0.014	0.021	-0.091	0.263

CR: the creditors' rights index. FCP: the financial consumer protection index. NIM: net interest margin. LG: loan growth. SIZE: the logarithm of banks' total assets. E_TA: equity to total assets. LIQ: liquid assets to total assets. CIR: cost to income ratio. HHI: banking sector concentration. GDP_gr: the growth rate of real per capita income.

Table 2: Breakdown of FCP values by country and date

Row Labels	2010 - 2012	2013 -2015
AUSTRIA	3	5
BELARUS	0	5
BELGIUM	7	4
BOSNIA AND HERZEGOVINA	2	6
CROATIA	3	6
CZECH REPUBLIC	5	5
DENMARK	4	5
FINLAND	6	4
FRANCE	7	4
GERMANY	0	4
GREECE	5	4
HUNGARY	2	5
IRELAND	4	6
ITALY	5	6
LATVIA	3	4
LUXEMBOURG	0	4
NETHERLANDS	3	5
NORWAY	5	3
POLAND	7	5
PORTUGAL	5	3
ROMANIA	0	4
SERBIA	5	3
SLOVAKIA	5	3
SLOVENIA	0	4
SPAIN	5	3
SWITZERLAND	7	5
UNITED KINGDOM	7	5

Table 3:Breakdown of CR value by country and date

Row Labels	2010	2011	2012	2013	2014	2015	2010 - 2015 average
AUSTRIA	78.80	79.66	79.47	85.17	79.68	77.16	80.21
BELARUS	48.32	53.27	53.32	51.48	60.18	56.06	53.23
BELGIUM	85.30	85.98	85.84	86.60	80.74	74.12	84.00
BOSNIA AND HERZEGOVINA	48.15	47.12	47.27	47.53	61.58	63.41	51.21
CROATIA	48.96	47.99	48.57	48.09	58.77	64.90	51.45
CZECH REPUBLIC	45.24	64.12	64.16	64.32	71.82	68.15	62.66
DENMARK	81.36	82.52	81.40	81.27	76.56	77.91	80.36
FINLAND	84.24	85.37	84.66	85.00	83.66	81.63	84.14
FRANCE	62.86	63.13	63.44	64.85	68.99	74.49	65.89
GERMANY	81.70	82.43	82.99	80.58	84.19	83.02	82.42
GREECE	50.24	48.78	47.04	46.00	49.72	53.09	48.89
HUNGARY	57.36	57.08	57.79	57.55	61.05	60.93	58.55
IRELAND	86.17	86.64	84.52	84.86	77.73	68.96	82.58
ITALY	51.64	52.41	54.05	55.68	60.77	63.58	55.41
LATVIA	55.60	57.13	64.14	63.55	69.58	66.15	62.13
LUXEMBOURG	65.32	66.38	66.25	66.26	65.49	59.45	65.44
NETHERLANDS	82.24	81.84	84.94	85.53	79.61	70.93	81.34
NORWAY	87.11	88.10	87.97	88.06	83.31	82.94	86.33
POLAND	46.78	47.71	45.39	61.83	66.70	66.59	54.49
PORTUGAL	72.35	74.06	73.16	75.11	76.90	78.60	74.79
ROMANIA	47.80	46.30	47.85	48.22	60.85	64.11	50.94
SERBIA	43.43	45.64	42.46	44.99	57.70	60.93	48.71
SLOVAKIA	56.77	61.83	61.27	61.20	67.21	64.43	61.90
SLOVENIA	50.40	53.30	53.43	52.75	57.65	56.44	53.77
SPAIN	67.35	69.46	72.17	72.74	69.53	71.76	70.02
SWITZERLAND	60.02	60.39	60.76	60.77	65.43	64.85	61.74
UNITED KINGDOM	78.73	82.12	82.23	81.71	75.06	76.45	79.50

Table (4) shows the correlation among all our variables and reveals no major collinearity issues.

Table 4: Correlation matrix

	LG	NIM	FCP	CR	SIZE	E_TA	LIQ	GDP_gr	CIR	HHI
LG	1									
NIM	-0.0245	1								
FCP	0.0775	0.0594	1							
CR	-0.0456	-0.1228	-0.1552	1						
SIZE	-0.0207	-0.0678	0.0608	-0.0996	1					
E_TA	0.006	0.1303	-0.0345	-0.0605	-0.3339	1				
LIQ	0.0068	-0.1101	0.0045	-0.0558	-0.0335	0.0912	1			
GDP_gr	0.1228	-0.1013	-0.1158	0.0289	-0.0257	0.0639	0.1191	1		
CIR	-0.0007	-0.0531	0.0665	-0.0573	-0.1327	-0.068	0.0989	-0.0128	1	
HHI	0.0089	-0.2056	-0.2435	0.2262	-0.1798	0.1063	-0.0675	0.1501	-0.0295	1

LG: loan growth. NIM: net interest margin. FCP: financial consumer protection index. CR: creditors' rights index. SIZE: the logarithm of banks' total assets. E_TA: equity to total assets. LIQ: liquid assets to total assets. GDP_gr: the growth rate of real per capita income. CIR: cost to income ratio. HHI: banking sector concentration.

3.2 Regression results

To estimate our regressions, we use the two-stage least squares GMM estimator with CIR and HHI being the instruments in the first stage regression. Results for the baseline NIM regression (table 5) show that higher levels of financial consumer protection increase the cost of lending, in line with the finding of (Pasiouras, 2016), while higher creditors' rights decrease the cost of lending (columns 1 and 4), in line with (Laeven, et al., 2005). However, when creditors' rights are high, the negative effect of higher levels of FCP become insignificant (columns 2 and 5). The positive relationship between FCP and NIM is mainly

driven by low levels of CR (columns 3 and 6). In other words, banks react to higher levels of FCP, especially when creditors' rights are low, by increasing their net interest margin to compensate for the cost of abiding by stricter regulations. Higher creditors' rights, however, decreases the cost of lending given the lower costs of enforcing contracts and resolving insolvency of borrowers. These two opposite effects cancel each other when both FCP and CR are at high levels, signifying that the regulators should not apply more stringent financial consumer protection laws independently from better creditors' rights.

Other results show that SIZE is negatively correlated with NIM, as TBTF banks can charge lower interest rates benefitting from their cheaper funding options compared to small banks. High levels of management inefficiency (CIR) is shown to have a negative impact on NIM, as expected. Banks with higher liquidity (LIQ) compensate for the opportunity cost by increasing the cost of lending. Increased market power (HHI) is linked with lower NIM, in-line with the information hypothesis discussed above (Ferri, et al., 2014).

Table (6) shows the regression results of the LG baseline regression. Loan growth is not affected by higher levels of financial consumer protection, while higher creditors' rights boost the banks' lending expansion (columns 1 and 4), in line with the findings of (Qian & Strahan (2007) and Ge et al. (2012)). Nevertheless, when accompanied by high levels of CR, increased FCP leads to higher loan expansion (columns 2 and 5). This implies that the regulators should bear in mind that applying stricter financial consumer protection laws alongside better creditors' rights is key to increased credit disbursed by banks.

Table 5: Baseline NIM regression, columns 2 and 5: subsample high CR, columns 3 and 6: subsample low CR.

	NIM					
	(1)	(2)	(3)	(4)	(5)	(6)
FCP75th	0.0062***	0.0015	0.0053***			
	(5.14)	(0.79)	(3.42)			
CR75th	-0.0063***					
	(-6.92)					
FCP50th				0.0039***	0.0013	0.0072***
				(2.82)	(0.40)	(4.92)
CR50th				-0.0041***		
				(-4.32)		
SIZE	-0.0043**	-0.0128***	-0.0002	-0.0033**	-0.0055**	-0.0009
	(-2.58)	(-4.61)	(-0.08)	(-2.06)	(-2.34)	(-0.36)
E_TA	0.0096	0.0089	0.0085	0.0134	0.0096	0.0093
	(0.78)	(0.82)	(0.71)	(0.97)	(0.89)	(0.52)
CIR	-0.0211***	-0.0266***	-0.0174***	-0.0175***	-0.0186***	-0.0187***
	(-6.29)	(-5.41)	(-4.03)	(-5.62)	(-4.63)	(-3.84)
LIQ	0.0069**	0.0120**	0.0046	0.0061**	0.0202***	0.0058
	(2.40)	(2.52)	(1.16)	(2.31)	(3.74)	(1.25)
HHI	-0.0315***	-0.0418***	-0.0267***	-0.0327***	-0.0257***	-0.0535***
	(-9.06)	(-7.27)	(-5.96)	(-9.09)	(-7.05)	(-4.17)
GDP_gr	-0.0006	0.1062**	0.0120	-0.0010	-0.0429	-0.0280
	(-0.03)	(2.47)	(0.66)	(-0.06)	(-1.62)	(-1.01)
Nbr. of obs.	3470	792	2606	3470	1422	1958
Time effects	Yes	Yes	Yes	Yes	Yes	Yes

t statistic between parentheses. *, **, and *** indicate statistical significance at 10%, 5%, and 1%, respectively.

NIM: net interest margin. FCP75thand FCP50th: dummy variables that take the value of one for values above the 75th and 50th percentiles of the financial consumer protection index, respectively, zero otherwise. CR75thand CR50th: dummy variables that take the value of one for values above the 75th and 50th percentiles of the creditors' rights index, respectively, zero otherwise. SIZE: the logarithm of banks' total assets. E_TA: equity to total assets. CIR: cost to income ratio. LIQ: liquid assets to total assets. HHI: banking sector concentration. GDP_gr: the growth rate of real per capita income.

Table 9: LG baseline regression, columns 2 and 5: subsample high CR, columns 3 and 6: subsample low CR.

	LG					
	(1)	(2)	(3)	(4)	(5)	(6)
FCP75th	0.0056	0.0514***	0.0007			
	(0.44)	(3.74)	(0.04)			
CR75th	0.0331***					
	(2.75)					
FCP50th				0.0147	0.0320***	0.0062
				(1.13)	(2.37)	(0.33)
CR50th				0.0381***		
				(2.86)		
SIZE	0.2170***	0.1501**	0.2286***	0.2164***	0.2556***	0.1984***
	(4.94)	(1.99)	(4.25)	(4.92)	(4.96)	(2.74)
E_TA	0.1898	0.4132	0.1357	0.2148	0.0725	0.5645
	(0.63)	(1.18)	(0.31)	(0.72)	(0.28)	(0.84)
LIQ	-0.3706***	-0.2058*	-0.4867***	-0.3645***	-0.2315**	-0.4995***
	(-4.87)	(-1.83)	(-4.96)	(-4.71)	(-2.16)	(-4.43)
NIM	-0.5430	0.9085	-2.5355	-0.9422	-0.1121	-4.4298**
	(-0.40)	(0.50)	(-1.21)	(-0.67)	(-0.06)	(-2.13)
GDP_gr	0.6531**	0.4945	0.7076**	0.7117***	0.1805	0.8568***
	(2.38)	(0.43)	(2.36)	(2.78)	(0.31)	(2.60)
Nbr. of obs.	3470	792	2606	3470	1422	1958
KP_F_Stat	55.08	39.61	23.28	54.56	31.85	15.51
Hansen_J	0.40	0.31	0.44	0.41	0.39	0.71

t statistic between parentheses. *, **, and *** indicate statistical significance at 10%, 5%, and 1%, respectively.

LG: loan growth. FCP75thand FCP50th: dummy variables that take the value of one for values above the 75th and 50th percentiles of the financial consumer protection index, respectively, zero otherwise. CR75thand CR50th: dummy variables that take the value of one for values above the 75th and 50th percentiles of the creditors' rights index, respectively, zero otherwise. SIZE: the logarithm of banks' total assets. E_TA: equity to total assets. LIQ: liquid assets to total assets. NIM: net interest margin. GDP_gr: the growth rate of real per capita income.

Other results show that consistent with the TBTF theory, SIZE has a positive relationship with loan growth, confirming that big banks have an enticement to take higher risks by excessively increasing the loan output. LIQ is negatively and significantly correlated with LG, giving evidence that high liquidity banks are more risk averse which translates into

lower lending levels. GDP_gr positively affect bank lending, supporting the procyclicality theory of bank lending (Berger & Udell, 2004).

We take our analysis further by splitting the sample into listed Vs. non-listed banks. Similarly, the results (tables 7 and 8) show for both sub-samples that the cost of intermediation decreases when creditors' rights are high, and it increases when FCP is high, and when accompanied by low creditors' rights, while when accompanied with high CR, the two opposite effects cancel each other. As for lending, higher creditors' rights increase its' growth for both sub-samples, while higher FCP levels do not affect the loan growth unless it is coupled with high CR where the effect becomes positive and significant. However, when FCP is high and CR is low (for listed banks), higher FCP levels lead to a decrease in lending, which one might interpret as listed banks reverting to non-traditional activities in the case where their rights are low and their consumers' rights are high.

A further investigation about how bank loans shift between long-term (more than one year) and short-term (less than one year) in response to FCP and CR show that both long-term and short-term loans increase when creditors' rights are high (table 9), confirming the results shown in table (6). Banks increase their long-term lending when FCP and CR are high. Finally, high FCP levels accompanied by low CR lead to an increase in short-term lending and a decrease in long-term lending. In other words, when consumers' rights are high and banks' rights are low, banks tend to shift their lending towards short-term loans as they are less risky and can be better monitored and managed, when compared to long-term loans.

Table 7: NIM and LG regressions, listed banks sub-sample, columns 2 and 5: subsample high CR, columns 3 and 6: subsample low CR.

Panel A	**NIM / Listed Banks**					
	(1)	(2)	(3)	(4)	(5)	(6)
FCP75th	0.0065**	0.0037	0.0153***			
	(2.34)	(1.10)	(9.96)			
CR75th	-0.0106***					
	(-4.43)					
FCP50th				0.0047**	0.0065	0.0112**
				(2.16)	(1.01)	(2.13)
CR50th				-0.0083***		
				(-2.70)		
Nbr. of obs.	607	129	472	607	232	366
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes
Time effect	Yes	Yes	Yes	Yes	Yes	Yes

Panel B	**LG / Listed Banks**					
FCP75th	0.0012	0.1173**	-0.0423**			
	(0.05)	(2.09)	(-2.06)			
CR75th	0.0992**					
	(2.49)					
FCP50th				0.0115	0.0404**	-0.0337**
				(0.23)	(2.26)	(-2.22)
CR50th				0.0429**		
				(2.33)		
Nbr. of obs.	607	129	472	607	232	366
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes
Time effect	Yes	Yes	Yes	Yes	Yes	Yes

t statistic between parentheses. *, **, and *** indicate statistical significance at 10%, 5%, and 1%, respectively.

NIM: net interest margin. LG: loan growth. FCP75thand FCP50th: dummy variables that take the value of one for values above the 75th and 50th percentiles of the financial consumer protection index, respectively, zero otherwise. CR75thand CR50th: dummy variables that take the value of one for values above the 75th and 50th percentiles of the creditors' rights index, respectively, zero otherwise.

Table 8: NIM and LG regressions, non-listed banks sub-sample, columns 2 and 5: subsample high CR, columns 3 and 6: subsample low CR.

Panel A	NIM / non-Listed Banks					
	(1)	(2)	(3)	(4)	(5)	(6)
FCP75th	0.0039***	0.0014	0.0049***			
	(2.76)	(0.53)	(2.66)			
CR75th	-0.0035***					
	(-3.98)					
FCP50th				0.0042***	-0.0031	0.0053***
				(2.78)	(-0.79)	(3.57)
CR50th				-0.0036***		
				(-3.52)		
Nbr. of obs.	2862	661	2134	2862	1189	1592
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes
Time effect	Yes	Yes	Yes	Yes	Yes	Yes

Panel B	LG / non-Listed Banks					
FCP75th	0.0006	0.0443***	0.0095			
	(0.05)	(3.42)	(0.52)			
CR75th	0.0892***					
	(2.38)					
FCP50th				0.0102	0.0251***	-0.0079
				(0.62)	(3.21)	(-0.28)
CR50th				0.0384***		
				(2.09)		
Nbr. of obs.	2862	661	2134	2862	1189	1592
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes
Time effect	Yes	Yes	Yes	Yes	Yes	Yes

t statistic between parentheses. *, **, and *** indicate statistical significance at 10%, 5%, and 1%, respectively.

NIM: net interest margin. LG: loan growth. FCP75thand FCP50th: dummy variables that take the value of one for values above the 75th and 50th percentiles of the financial consumer protection index, respectively, zero otherwise. CR75thand CR50th: dummy variables that take the value of one for values above the 75th and 50th percentiles of the creditors' rights index, respectively, zero otherwise.

Table 9: Loan growth of less and more than one year, columns 2 and 5: subsample high CR, columns 3 and 6: subsample low CR.

Panel A	LG<1					
	(1)	(2)	(3)	(4)	(5)	(6)
FCP75th	0.0214	-0.0287	0.0462**			
	(0.69)	(-0.69)	(2.49)			
CR75th	0.0853***					
	(3.44)					
FCP50th				0.0142	-0.0340	0.0518***
				(0.39)	(-0.75)	(2.58)
CR50th				0.0545**		
				(2.34)		
Nbr. of obs.	2383	878	1452	2383	1419	884
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes
Time effect	Yes	Yes	Yes	Yes	Yes	Yes

Panel B	LG>1					
FCP75th	0.0245	0.0678**	-0.0371**			
	(1.36)	(2.00)	(-2.47)			
CR75th	0.0726***					
	(3.10)					
FCP50th				0.0117	0.0835***	-0.0422***
				(0.56)	(2.76)	(-3.43)
CR50th				0.0371**		
				(2.53)		
Nbr. of obs.	2225	878	1452	2383	1419	884
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes
Time effect	Yes	Yes	Yes	Yes	Yes	Yes

t statistic between parentheses. *, **, and *** indicate statistical significance at 10%, 5%, and 1%, respectively.

LG<1: growth of loans maturing in less than one year. LG>1: growth of loans maturing in more than one year. FCP75thand FCP50th: dummy variables that take the value of one for values above the 75th and 50th percentiles of the financial consumer protection index, respectively, zero otherwise. CR75thand CR50th: dummy variables that take the value of one for values above the 75th and 50th percentiles of the creditors' rights index, respectively, zero otherwise.

3.3 Robustness checks

We substitute NIM with interest income on loans over loans, LG with the change in the natural logarithm of gross loans, FCP and CR dummies with their continuous values, and LG<1 and LG>1 with the change in the natural logarithm of loans maturing less and more than one year, respectively. We also employ OLS random effects estimator. The main results remain robust.

4. Summary and concluding remarks

Using a sample of 852 commercial banks over the 2010-2015 period in the 27 European countries, this study identifies the effects of the financial consumer protection and creditors' rights on banks' cost of intermediation and loan growth.

We find that banks react to higher levels of FCP by increasing their net interest margin to compensate for the cost of abiding by stricter regulations. Higher creditors' rights, however, decreases the cost of lending given the lower costs of enforcing contracts and resolving insolvency of borrowers. Moreover, when both FCP and CR are at high levels, the two opposing effects cancel each other. We also show that higher creditors' rights boost the banks' lending expansion, while loan growth is not affected by higher levels of financial consumer protection if not accompanied by high levels of creditor's rights, where it leads to higher loan growth. Furthermore, when FCP is high and CR is low for listed banks, this

leads to a decrease in lending, suggesting that listed banks might revert to non-traditional activities in the case where their rights are low and their consumers' rights are high.

When accounting for loan growth by maturity (i.e. less than and more than one year), our results show that when consumers' rights are high and banks' rights are low, banks tend to shift their lending towards short-term loans as they are less risky and can be better monitored and managed, when compared to long-term loans. These long-term loans increase when both rights are high.

Our results are of special importance to regulators, showing that they should not apply stricter financial consumer protection laws independently from better creditors' rights, because it would increase the cost of intermediation. Also, applying more stringent financial consumer protection laws alongside better creditors' rights is key to increased credit disbursed by banks.

General Conclusion

Numerous regulatory changes have been implemented since the Global Financial Crisis of 2007 to increase the stability and the capital holdings of the banking sector. Regulators have also aimed to increase creditors' and financial consumer rights in an attempt to decrease losses related to defaulting loans and to increase financial services transparency. The purpose of this dissertation is, therefore, to analyze three aspects: 1) the different effects of international and domestic shocks on banks' stability, 2) the effect of the institutional environment on bank capital, and 3) the effects of creditors' and financial consumer rights on bank lending growth and cost.

In the first chapter of this dissertation, we analyze the impact of the 'Arab Spring' and the Global Financial Crisis of 2007-2008 on the banking sector stability in the MENA region. We find evidence that the 'Arab Spring' did not have a negative effect on banks' stability, while the Global Financial Crisis significantly decreased banks' stability. Then we investigate the effects of owning subsidiaries in countries outside the main country of operations on the 'mother'-bank stability during non-crisis periods, and during such shocks. We show that these subsidiaries were a source of increased fragility during the non-crisis period, yet a source of higher stability during the local crisis but not during the Global Financial Crisis. Then we take our investigation a step forward by examining the possible effect of owning subsidiaries in certain regions on banks' stability. Indeed, the results reveal that owning subsidiaries in specific world regions, including the MENA

region, contributes to higher stability during the 'Arab Spring'. While owning subsidiaries in Europe helped transmit the shock of the Global Financial Crisis to the banks that own these subsidiaries. Moreover, being present in three or more regions, through subsidiaries, is more stabilizing during the 'Arab Spring' and more destabilizing during the Global Financial Crisis.

These findings indicate that banks' geographical diversification is only effective in improving stability during specific local shocks and has the opposite effect during international crises. To monitor and manage bank stability, regulators should closely account for the structure of banking groups and their international diversification when implementing or refining regulations and policies.

The second chapter investigates the role played by the institutional environment in determining capital buffers set either by regulators or by banks internally. We show that for the regulatory capital ratios to be effective, the institutional environment should not be neglected when implementing these ratios. Then we separate between countries with developed and underdeveloped stock markets to add into the assessment the role of market discipline. We find evidence that the institutional environment affects the internally set capital for countries with developed stock markets which can be attributed to market discipline. Finally, we take the investigation deeper by separating between listed and unlisted banks, government-owned and privately-owned banks, and Islamic and conventional banks. The result show that the institutional environment effect is more pronounced for listed, conventional, and non-government owned banks compared to non-listed, Islamic, and privately-owned banks, respectively.

These results highlight the financial benefits of developing the quality of the institutional environment. Regulators, therefore, should consider the institutional environment when implementing or amending banks' capital requirements, in addition to promoting a solid and well-developed stock markets, especially since the results show that the institutional environment, alongside a developed stock market, would lead banks to voluntarily hold more capital, regardless of the presence or the absence of the regulatory capital restrictions.

In the third chapter, we investigate the different effects of both consumers' and creditors' rights on the cost of lending. We show evidence that the cost of lending increases in the presence of strong financial consumer protection laws, while higher creditors' rights decrease this cost. Then we evaluate the effects of these two rights on the cost of lending when both rights are high. Indeed, we show that the two opposing effects cancel each other. Next, we investigate the different effects of both consumers' and creditors' rights on loan growth and whether their relationship with loan growth differ when both rights are at high levels. The results show that banks increase lending when creditors' rights are high, while financial consumer protection laws do not seem to alter banks' lending preferences or targets, unless accompanied by high levels of creditor's rights, where financial consumer protection leads to higher loan growth. Finally, we evaluate the change in the maturity mix of the loan portfolio, loans with a maturity of less-than and more-than 1 year, in response to the presence of creditors' and consumers' rights. The results reveal that when consumers' rights are high and banks' rights are low, banks tend to shift their lending towards short-term loans, while long-term loans increase when both rights are high.

These findings indicate that regulators should not apply stricter financial consumer protection laws independently from improving creditors' rights, as it would increase the cost of intermediation. While promoting both rights simultaneously does not inflect extra financial burden on borrowers, and would lead to an increase in credit disbursed by banks.

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Table of Contents

Abstract

This thesis examines three important issues in the banking sector, namely: Risk, Capital and Lending. It comprises of three empirical essays. The first chapter analyzes the impact of the 'Arab Spring' and the Global Financial Crisis of 2007-2008 on the banking sector stability in the MENA region. The results show that the 'Arab Spring' did not have a negative effect on banks' stability, while the Global Financial Crisis significantly decreased banks' stability. The second chapter investigates the role played by the institutional environment in determining capital buffers set either by regulators or by banks internally. The findings provide evidence that for the regulatory capital ratios to be effective, the institutional environment should not be neglected when implementing these ratios. The third chapter investigates the different effects of both consumers' and creditors' rights on the cost of lending. The results reveal that the cost of lending increases in the presence of strong financial consumer protection laws, while higher creditors' rights decrease this cost.

Keywords: [Financial crises, Bank stability, Subsidiaries, Capital, Financial consumer protection, Creditors' rights, Cost of intermediation, Bank loan growth]

Resumé

Cette thèse examine trois questions importantes dans le secteur bancaire, à savoir le risque, les fonds propres et le crédit. Elle comprend trois essais empiriques. Le premier chapitre analyse l'impact du «printemps arabe» et de la crise financière mondiale de 2007-2008 sur la stabilité du secteur bancaire dans la région MENA. Les résultats montrent que le «printemps arabe» n'a pas eu d'effet négatif sur la stabilité des banques, alors que la crise financière mondiale a considérablement réduit leur stabilité. Le deuxième chapitre étudie le rôle joué par l'environnement institutionnel dans la mise en place de coussin de fonds propres par les régulateurs ou par les banques en interne. D'après les résultats, pour que les ratios de capital réglementaire soient efficaces, l'environnement institutionnel ne doit pas être négligé lors de la mise en place de ces ratios. Le troisième chapitre étudie les différents effets des droits des consommateurs et des créanciers sur le coût des prêts. Les résultats révèlent que le coût des prêts augmente en présence de lois strictes sur la protection des consommateurs, tandis que l'augmentation des droits des créanciers réduit ce coût.

Mots-clés: [Crise financière, Stabilité bancaire, Filiales, Capital, Protection financière des consommateurs, Droits des créanciers, Coût de l'intermédiation, Croissance des crédits bancaires]