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The opinion expressed in this dissertation are those of the Ph.D. candidate and do not necessarily reflect the views of the University of Limoges

To my father, Burhanudin Harahap

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General introduction

The 2007-2008 global financial crisis triggered by the US subprime mortgage crisis has had severe consequences on the stability of the financial system in many countries. The crisis has initiated discussions to search an alternative way to promote financial stability. Relying on *Shariah* principles, Islamic finance could be viewed as a complement to the traditional financial system because the complex speculative products and derivative instruments, at the source of the crisis, are prohibited in the Islamic system (Hassan and Aliyu, 2017; Imam and Kpodar, 2016).

Islamic finance has become a big industry worldwide. Islamic finance assets are indeed concentrated in the Middle East and a few Gulf Cooperation Council countries (GCC), but it has also expanded to beyond Muslim-majority countries such as Europe and Sub-Saharan Africa (Hussain and Turk-Ariss, 2015). The significant interest in Islamic finance has also emerged in the world's leading conventional financial centers such as London, New York or Hong Kong, and Western investors now consider investing in Islamic financial products (Iqbal and Mirakhor, 2013). The World Bank Islamic Banking Database (2014) documents that around 400 institutions are offering Islamic financial services in more than 50 countries. In some countries, Islamic finance has become systemically important because such assets have exceeded 15% of total domestic financial industry (Islamic Financial Service Board, 2017). Islamic finance industry has rapidly grown during the last decade, up to nearly 20% annually (The Economist, 2014), mainly supported by the expansion of Islamic banks. In 2016, global Islamic banking assets are recorded as USD 1.493 trillion, and the sector continues to dominate the global Islamic finance industry, representing 78.9% of the industry's assets (Islamic Financial Service Board, 2017).

Among countries with the presence of Islamic financial institutions, only Iran and Sudan have adopted an entirely *Shariah*-compliant financial system. In the other countries, Islamic and conventional banks operate alongside in dual banking markets. The development of Islamic banking has led to an important literature investigating the potential differences between Islamic and conventional banks in terms of profitability, risk, business models, market structure and competition (see Abedifar et al. (2015), Hassan and Aliyu (2017), and Narayan and Phan (2017) for Islamic banking literature surveys). Differences between Islamic banks

and their conventional counterparts which mainly arise from the specificity of Islamic financial contracts and the role of *Shariah* board in Islamic bank governance and their impact on banks' behaviors are at the core of this dissertation.

A first strand of the literature has investigated the issue of risk and stability in dual markets and has provided mixed results. For some authors, small Islamic banks have lower credit risk and are more stable than conventional banks especially in the predominantly Muslim population (Abedifar et al., 2013). In a similar vein, Cihak and Hesse (2010) empirically find that small Islamic banks tend to be financially stronger than small conventional banks and large Islamic banks. Conversely, the empirical results of Ibrahim and Rizvi (2017) suggest that larger Islamic banks are more stable, particularly when they are very large. However, a recent finding from Doumpos et al. (2017) suggests that although conventional and Islamic banks might exhibit important differences in financial ratios, their overall financial strength is not significantly different. By examining the soundness of Islamic and conventional banks during the global financial crisis of 2007-2008, Bourkhis and Nabi (2013) find no significant differences between them, whereas Abedifar et al. (2013) observe that Islamic banks are less stable than their conventional peers.

The presence of Islamic banks as a new entrant in the market could also affect conventional banks' stability, with mixed results highlighted by some studies. Notwithstanding its relatively small size compared to the economy and overall financial system, it is empirically shown that the presence of Islamic banks can significantly boost the development of the banking sector as a whole (Gheeraert, 2014; Imam and Kpodar, 2016). Another research underlines that the presence of Islamic banks also positively impact economic welfare and financial deepening (Abedifar et al., 2016). Kabir and Worthington (2017) highlight that the presence of Islamic banks in the market increases the competitive pressure and therefore contributes to lower bank stability. Cihak and Hesse (2010) by looking at the Islamic banks' proportion in the dual banking market highlight that in the market with a higher share of Islamic banks, the soundness of Islamic banks is not altered. Such a finding suggests that both Islamic and conventional banks could compete in a similar market without threatening their stability.

Market structure in dual banking systems has turned out to be an important issue to be investigated. If religious underpinnings for the provision of financial services do matter, one might argue that both types of banks do not compete with each other. As Muslims are known to be reluctant to use financial products which are not *Shariah*-compliant (Abedifar et al., 2013; Beck et al., 2013; Demirgüç-Kunt et al., 2013), they will favor the use of *Shariah*-compliant products provided by Islamic banks. Oppositely, non-Muslims consumers might be indifferent

between Islamic and conventional banks and might therefore choose banks based on performance considerations.

In the first two chapters of this dissertation, we study in a more detailed perspective how dual market competition shapes the behavior of Islamic and conventional banks. Specifically, we aim to answer the following questions: Are Islamic banks more stable than their conventional peers? Is the stability of Islamic and conventional affected by the heightened competition in the dual market? Do Islamic and conventional banks behave differently, specifically when they set their deposit rates?

A third chapter discusses the specificity of Islamic bank governance and its impact on equity financing. Whereas we might find difficulties in differentiating Islamic and conventional banks' business model because both are indeed oriented to profit, the former had some characteristics that practically makes them different from the latter. From the governance perspective, Islamic banks not only have a board of directors (BOD) but also *Shariah* supervisory board (SSB). The additional governance system is expected to monitor *Shariah* practice in Islamic banks. Another characteristic that differentiates Islamic banks from their conventional peers is that Islamic banks have a mode of financing based on Islamic banks' profit-and-loss-sharing (PLS) principle. This mode of financing, widely known as equity financing, relying on risk sharing between the banks (lenders) and entrepreneurs (borrowers). We study how the existence of SSB in Islamic banks affect equity financing practices. This dissertation provides three chapter that will examine these issues.

The **first chapter** of this dissertation investigates the competitiveness of Islamic and conventional banks in a dual market. Some studies show that Islamic banks have a higher market power than conventional banks (Hamza and Katchouli, 2014; Turk-Ariss, 2010) whereas other studies find that Islamic banks' competitiveness is not higher than that of conventional ones (Weill, 2011). In our work, we go further than such studies because rather than investigating the market power of each bank type, we investigate how precisely Islamic and conventional banks compete in the dual market by analyzing their deposit pricing behavior. More particularly, our aim is to examine whether or not Islamic banks mimic their conventional rivals when they set their deposit rates. While Islamic and conventional banks are expected to behave differently, a large strand of literature documents that Islamic banks' deposit rates are pegged to the rates of their conventional counterparts (Cevik and Charap, 2011; Chong and Liu, 2009; Ito, 2013; Saraç and Zeren, 2014). Hence, Islamic banks might be competing with conventional banks because they are adjusting their deposit rate of returns based on the conventional banks' market rate. Another study even finds that Islamic banks' depositors are

more responsive than those of conventional ones especially when their deposit size is higher (Aysan et al., 2017). Our result reveals notable differences in the drivers of deposit rates in dual markets. As expected, conventional banks with lower market power set higher deposit rates but market power is not effective to explain the rates set by Islamic banks. We also show that in markets with a greater share of Islamic population or stronger presence of Islamic banks, conventional banks set higher deposit rates and even higher when their market power is lower. Such evidence suggests that religious beliefs matter in dual markets and that they may well shape economic behavior (Abedifar et al., 2016; Baele et al., 2014; Bursztyn et al., 2015; Farook et al., 2012).

The **second chapter** of this dissertation investigates the competition-stability nexus in dual banking markets. This issue has become of major interest because prior empirical studies have mostly investigated competition and stability separately. Although the competition-stability issue in Islamic banks has also been investigated by Kabir and Worthington (2017), we go further by taking a closer look at the global financial crisis of 2007-2008 and the role played by bank capital. Our finding in this chapter suggests that competition erodes bank stability, supporting the competition-fragility rather than the competition-stability nexus. Banks are encouraged to take more risk in a more competitive environment in dual banking markets, and this could jeopardize their financial stability. We also find in this chapter that the impact of competition is different for Islamic and conventional banks. Supporting the findings of our first chapter, Islamic banks' stability is not affected by competition. Furthermore, we observe that different levels of competition differently impact conventional banks' stability. Their stability significantly increases in less competitive markets and shrinks when competition is high.

In the **third chapter**, we focus on Islamic banks by analyzing their equity financing. Although Islamic banks' presence could encourage conventional banks to take a higher risk which might affect overall financial stability as we find in the two previous chapters, Islamic banks' equity financing could have a positive impact on the development of small and medium enterprises. This is because from the entrepreneurs' point of view, especially for those who just started a business, equity contracts can be more attractive than debt contracts (Khan, 1995). The equity contract is part of Islamic banks' risk-sharing features. It is embedded in the PLS principle, that is the main principle of Islamic banks (Ibrahim and Alam, 2017) that makes them different from their conventional counterparts (Minhat and Dzolkarnaini, 2017).

We further address what factors influence equity financing and also put more attention on the impact of *Shariah* supervisory board (SSB) characteristics. Differently from

conventional banks, Islamic banks have a two-layer governance system: board of directors (BOD) and SSB. While the former focuses on the bank's performance, the latter focuses primarily on the *Shariah* practices within the banks and provides advice to Islamic banks in all *Shariah*-related matters including suggesting BOD and management to use more PLS-based transactions. Additionally, we also consider the impact of the institutional and Islamic environment because equity contracts, in theory, are easier to implement in a better contracting environment. Prior studies have highlighted that Islamic banks' equity financing is rarely successful because the Islamic banking market is generally less transparent than in developed countries and more prone to rent-seeking behavior (Abdul-Rahman et al., 2014; Aggarwal and Yousef, 2000; Alam and Parinduri, 2017; Dar and Presley, 2000). In line with our prediction, we find in this chapter that Islamic banks' equity financing is affected by some characteristics of the SSB. The duality of SSB positively impacts the proportion of equity financing in Islamic banks whereas the presence of a *Shariah* department within Islamic banks negatively affects it. We also find that in a better banking environment, the impact of SSB is reduced.

This dissertation contributes to the literature in several respects. First, our work is the first to investigate how Islamic and conventional banks compete for depositors in dual markets and to what extent specific competition features might shape their deposit-rate setting behaviors. Prior empirical works may have highlighted that Islamic banks' deposit rates are pegged to those of conventional banks, but none of these studies has investigated the drivers of their deposit price setting. Our work has also shed light on the role of religiosity in the dual banking market competition. Second, our findings highlight a potential detrimental effect of dual market competition on Islamic and conventional banks' stability. When the market is competitive, banks' risk-taking behavior to attract more customers could affect their financial stability. However, the impact of competition on Islamic and conventional banks' stability might be different. Higher competition is associated with lower bank stability, but this only applies to conventional banks; not to Islamic banks. Third, our study is also the first one to jointly investigate equity financing in Islamic banks and its relationship with SSB. Because of data limitations, prior studies in equity financing tend to essentially be theoretical. Moreover, most previous studies investigate equity financing and SSB separately.

Chapter 1

Dual market competition and deposit rate setting in Islamic and conventional banks[*]

Abstract

This chapter addresses the issue of competition in dual banking markets by analyzing the determinants of deposit rates in Islamic and conventional banks. Using a sample of 20 countries with dual banking systems over the 2000-2014 period, our results show significant differences in the drivers of Islamic and conventional banks' pricing behavior. Conventional banks with stronger market power set lower deposit rates but market power is not significant for Islamic banks. In predominantly Muslim environments, conventional banks set higher deposit rates and further higher when their market power is lower. Whereas conventional banks are influenced by the competitiveness of Islamic banks, Islamic banks are only affected by their peers in predominantly Muslim countries. Our findings have important implications regarding competition and bank stability in dual banking markets.

Keywords: deposit rate, competition, dual banking market, Islamic and conventional banks

[*] This chapter draws from Meslier, C., Risfandy, T., Tarazi, A., 2017. Dual market competition and deposit rate setting in Islamic and conventional banks. *Economic Modelling*. Vol. 63, pp. 318–333. doi:http://dx.doi.org/10.1016/j.econmod.2017.02.013

1. Introduction

Islamic banking has substantially grown since the 2007-2008 global financial crisis. Islamic banking assets grew at an annual rate of 17.6% between 2009 and 2012 and are expected to grow at almost 20% per year until 2018 (The Economist, 2014). Islamic banks' total assets have reached US$ 1.9 trillion in 2014 (Hussain and Turk-Ariss, 2015) and are expected to rise to US$2.6 trillion by 2017 (The Economist, 2013). While Islamic finance accounts for a relatively small fraction of global banking assets (less than 2%), it has sharply increased its penetration in several countries and exceeds the threshold of 15%[1] of total banking system assets in at least 10 countries (Iran and Sudan with a full-fledged Islamic financial sector, Bangladesh, Brunei, Kuwait, Malaysia, Qatar, Saudi Arabia, the United Arab Emirates, and Yemen) (Islamic Financial Service Board, 2015). Moreover, Islamic finance has expanded beyond Muslim countries, reaching Europe and Sub-Saharan regions. Islamic banks are present in Denmark, France, South Africa and the United Kingdom among others. How Islamic and conventional banks compete in such growing dual markets remains an insufficiently documented issue. In this work, we investigate how bank deposit rates are influenced by the concomitant presence of Islamic and conventional banks in an increasing number of countries.

The development of Islamic banking has led to an important literature investigating the potential differences between Islamic and Conventional banks in terms of profitability, risk, business models, market structure and competition (see Abedifar et al. (2015) for a survey). Nevertheless, despite the growing presence of dual banking markets, where Islamic and conventional banks operate alongside, there is a scarce literature on the impact of dual banking market structure on Islamic and conventional banks' behavior. Moreover, the results of such studies are often mixed. While Turk-Ariss (2010b) finds that Islamic banks are less competitive than their conventional counterparts, Weill (2011) does not find significant market power differences between both types of banks, in contradiction with the view that Islamic banks may benefit from captive customers. Other papers look at the macroeconomic and social implications of further penetration of Islamic banks in the financial system as a whole. Gheeraert (2014) shows that the presence of Islamic banking in Muslim countries can boost banking sector development. Abedifar et al. (2016) highlight a positive impact of the market share of Islamic banks on financial deepening and economic welfare. They also find a positive

[1] The Islamic Financial Stability Board (IFSB) considers the Islamic financial sector as systemically important when the total Islamic banking assets account for more than 15% of the total domestic banking sector assets.

relationship between the presence of large Islamic banks and the efficiency of conventional banks in predominantly Muslim countries. Čihák and Hesse (2010) further highlight that a higher market share of Islamic banks does not alter the soundness of the other banks in a given country, suggesting that both types of banks could compete on the same market without jeopardizing financial stability.

In this work, we question how bank competition in dual markets affects the deposit rate setting behavior of Islamic and conventional banks, an issue which is of great importance from both a market structure perspective and a financial stability perspective. Focusing on differences in deposit rate setting in dual markets is of particular interest due to the specific nature of Islamic banks' depositors. Islamic banks follow the Profit and Loss Sharing (PLS) principle. Transposed to banks this principle implies that profits and losses have to be shared between the borrowers and the bank and then between the bank and the depositors. Hence, the bank-depositor relationship in Islamic banking is not debt-based as in conventional banks. Islamic depositors are considered as "quasi-shareholder" and participate in bank funding through equity-based contracts, where Islamic depositors act as a source of funds and banks as a fund manager. Islamic depositors cannot claim a fixed rate of return on their deposits, a rate which will in fact depend on the bank's actual ex post profit. While Islamic banks and conventional banks are expected to set their deposit rates differently, empirical research does not report significant differences in their pricing behavior. Chong and Liu (2009) and Ito (2013) provide strong evidence that the deposit rates of Islamic and conventional banks in Malaysia are closely pegged. Investigating the deposit rates of conventional and Islamic banks in Malaysia and Turkey, Charap and Cevik (2011) show that conventional banks' deposit rates and PLS returns are cointegrated. Moreover, the authors find that conventional banks' deposit rates Granger cause returns on PLS accounts. Saraç and Zeren (2014) confirm such results and highlight a strong dependency between the deposit rates of Islamic and conventional banks in Turkey. Moreover, they also find evidence of bi-directional causality thereby highlighting more complex interactions between both types of banks than in earlier studies. While these papers provide statistical evidence of a co-evolution of deposit rates of Islamic and conventional banks, they do not investigate the determinants of deposit rates per se and to what extent they actually differ between both types of banks.

For the purpose of our study, we consider a sample of 98 Islamic and 386 conventional banks from 20 Muslim and non-Muslim countries where Islamic and conventional banks operate alongside. We first examine the determinants of deposit rates for each type of banks with a specific focus on the role played by market power. We analyze how both types of banks

set deposit rates depending on the degree of their market power in possibly segmented markets (i.e. where Islamic and conventional banks compete for different depositors) or in integrated markets (i.e. where Islamic and conventional banks compete for the same depositors). On the one hand, one might argue that both types of banks do not compete with each other and that a depositor switching from a depository institution is more likely to go to a similar type of depository institution (Adams et al., 2007; Cohen and Mazzeo, 2007). In theory, the equity-based deposit accounts offered by Islamic banks should be very different from the debt-based deposit accounts of conventional banks. Moreover, Muslims are known to be reluctant to use conventional banks financial products which are not Sharia-compliant (Abedifar et al., 2016; Beck et al., 2013; Demirgüç-Kunt et al., 2013). In a segmented market, banks should be only influenced by the market conditions of their own segment. On the other hand, because some studies find that Islamic and conventional banks' deposit rates are closely pegged, one might consider that those banks compete in integrated markets with the same depositors. Nevertheless, it could also be argued that while religiosity might prevent depositors from Islamic banks to switch to conventional banks, Islamic banks could well attract depositors of conventional banks if they offer higher expected returns. We hence also examine the case of a one way/asymmetric competition where conventional banks are influenced by Islamic banks but not the other way round. In such a situation, conventional banks would be competing with both categories of banks, conventional and Islamic banks. We further investigate how Islamic and conventional banks react to stronger presence of Islamic banks and Muslim population. While these factors might not influence bank behavior in segmented markets, the behavior of both Islamic and conventional banks can be influenced by the importance of Muslim population and the presence of Islamic banks.

Our findings reveal notable differences in the drivers of deposit rates of Islamic banks and conventional banks. As expected, conventional banks with stronger market power set lower deposit rates but market power is not effective for Islamic banks. Moreover, conventional banks are influenced by the market conditions prevailing on the Islamic segment whereas Islamic banks are indifferent to the market structure of the conventional segment. We also find that stronger presence of Islamic banks and higher share of Islamic population are associated with higher deposit rates for conventional banks. Moreover, in countries with either a strong presence of Islamic banks or a high proportion of Muslim population, conventional banks set higher deposit rates which are even higher for the least competitive ones. Our results support previous findings (Abedifar et al., 2016; Baele et al., 2014; Farook et al., 2012) indicating that

religious beliefs matter in dual markets and that they may well shape economic behavior (Bursztyn et al., 2015).

The contribution of this chapter is twofold. First, our chapter complements the existing literature on bank market structure. For instance, following the deregulation process which occurred during the 2000s in the U.S., numerous studies have investigated how U.S. banks of different type, size or scope compete together. Biehl, (2002), Hannan and Prager (2004), Rosen (2007) highlight significant differences, in deposit price behavior, between multimarket and single market banks, with significantly lower deposit rates at multi-market banks. Moreover, these studies also highlight a strong influence of both local market concentration and presence of multimarket banks on the pricing behavior of single-market banks. However, Hannan and Prager (2004) highlight that single market banks' deposit price setting behavior is influenced by the market share of multimarket banks in local markets. Adams et al. (2007) findings' support the presence of market segmentation among different types of depository institutions (banks versus thrifts institutions). This limited competition both between single-market and multimarket banks and between thrifts and banks is confirmed by Cohen and Mazzeo (2007), indicating significant differences in consumer preferences for banking products. Among the different factors which might influence individual financial choices, many authors stress the importance of morality and religious belief (Bursztyn et al., 2015; Khan, 2010). Our chapter brings a novel dimension to the existing literature on bank market structure by investigating the influence of religious belief in banking competition. Despite an abundant literature concluding that Islamic banks mimic conventional banks behaviors, these papers do not provide an analysis of the drivers of Islamic and conventional banks pricing behavior. To the best of our knowledge, our work is the first to investigate if and how Islamic and conventional banks compete in dual markets and to what extent specific competition features might shape their behaviors. We show that even though prior literature has highlighted that Islamic banks mimic conventional banks when they set their interest rates (Charap and Cevik, 2015; Chong and Liu, 2009; Ito, 2013; Saraç and Zeren, 2014), the determinants of such rates are very different.

Second, this work also contributes to the debate on financial stability in dual markets. Increased competition can be detrimental for financial stability and among others, Hellman et al. (2000) theoretically show that deposit-rate ceilings can be necessary to prevent banks from competing through inefficiently high deposit rates possibly leading to destructive competition. We bring the issue of competition-stability nexus specifically in the dual market, an important issue that has rarely been addressed in the recent Islamic banking literature. The extent to which

Islamic banking development leads to more or less financial stability remains an open question. On the one hand, some papers highlight the benefits of Islamic banking development for the stability of the financial system through lower default rates on small business Islamic loans (Baele et al., 2014), better asset quality and capitalization (Beck et al., 2013), lower default risk of small Islamic banks (Abedifar et al., 2013; Cihak and Hesse, 2010), more counter-cyclical behavior of Islamic banks in the loan market (Ibrahim, 2016) or lower failure rate (Pappas et al., 2014). On the other hand, other papers find large Islamic banks to be less stable (Cihak and Hesse, 2010) and less diversified and less hedged (Beck et al., 2013) than large conventional banks highlighting potential instability sources. By providing evidence that conventional banks set higher rates to attract depositors in reaction to higher competitiveness of the Islamic segment, our study highlights potential detrimental effects of competition, in terms of financial stability, in dual markets.

The rest of the chapter is organized as follows. Section 2 presents the data, the methodology, and the descriptive statistics of our variables. Section 3 reports the empirical results and section 4 provides some further investigations and robustness tests. Section 5 concludes.

2. Method and data

2.1. Econometric model

In order to investigate the determinants of deposit rates of Islamic and conventional banks, we base our investigation on a similar baseline model than the one used in previous studies (Hannan and Prager, 2004; Rosen, 2007) and adopt the following econometric specification:

$$Deposit\ rate_{i,t} = \alpha_i + \alpha_t + \beta_1 Lerner_{i,t} + \varphi X_{i,t-1} + \gamma Z_{j,t} + \varepsilon_{i,t}. \quad (1)$$

where the i, j and t subscripts refer to the individual bank, country and time dimensions respectively. α_i and α_t are respectively the individual/bank effects and time-specific effects.

Deposit rate is our dependent variable[2]. We calculate for each Islamic and conventional bank the implicit deposit rate by considering the ratio of total interest expense on customer

[2] As noted by an anonymous referee, there are different types of deposit contracts in Islamic banks and some depositors do not share the profits and losses with the bank. For instance in *wadiah* contracts the depositor deposits his funds or assets with the bank for safekeeping and in most of the agreements the bank charges a fee for the safe

deposits to total customer deposits[3]. This proxy has been widely used in the literature to analyze deposit rate setting behavior (Hannan and Prager, 2004; Rosen, 2007). It is also the proxy which is commonly used in the deposit insurance and market discipline literature (Demirgüç-Kunt and Huizinga, 2004; Hori et al., 2009; Imai, 2006; Martinez-Peria and Schmukler, 2001; Murata and Hori, 2006). In line with the structure-performance hypothesis, a substantial literature documents that banks set a lower deposit rate in a more concentrated market (Berger and Hannan, 1989; Hannan and Berger, 1991; Nys et al., 2015; Rosen, 2007). Furthermore, we expect banks with higher market power to set a lower deposit rate.

To measure market power, we use the Lerner index (*Lerner*) commonly used in the bank competition literature (Berger et al., 2009; Love and Maria Soledad Martinez-Peria, 2015; Turk-Ariss, 2010b; Weill, 2011). The Lerner index is defined as the markup pricing of banking products over marginal cost. We follow previous literature (Berger et al., 2009; Love and Maria Soledad Martinez-Peria, 2015; Turk-Ariss, 2010b; Weill, 2011) and use a three input cost function specification to estimate marginal cost (See Appendix A for a more detailed presentation of the computation of the Lerner index). The coefficient β_1 is expected to be negative, indicating that banks with lower market power will set higher rates to attract depositors.

In order to measure the degree of competition at the country level, we construct the following three country-level Lerner indexes:

$$LernerIB_{j,t} = \sum_{i=1}^{n} Market\ Share\ IB_{i,IB,j,t} * Lerner_{i,t}$$

$$LernerCB_{j,t} = \sum_{i=1}^{n} Market\ Share\ CB_{i,CB,j,t} * Lerner_{i,t}$$

$$LernerMKT_{j,t} = \sum_{i=1}^{n} Market\ Share_{i,j,t} * Lerner_{i,t}$$

custody of the depositor's funds. Ideally, estimations excluding this type of deposits should be conducted at least for robustness considerations. However, data limitations in Bankscope do not allow us to make a distinction between PLS deposits and other type of deposits. This is unfortunately a drawback of all cross-country papers on Islamic banking but also on conventional banks where actual rates need to be proxied by implicit rates drawn from income statements and balance sheets.

[3] For Islamic banks, the term "deposit return" might be more appropriate than "deposit rate" because Islamic banks do not pay interests to their depositors (see Farook et al. (2012)). However, in the rest of the chapter, we use the term "deposit rate" for both Islamic and conventional banks.

$LernerIB_{jt}$ and $LernerCB_{jt}$ are computed as the weighted average of the individual Lerner indexes of respectively, the Islamic banks and the conventional banks operating in country j at time t. These two indexes ($LernerIB_{jt}$ and $LernerCB_{jt}$) measure the degree of competition in the Islamic and conventional banking segments respectively. We also compute a measure of competition at the country-industry level, $LernerMKT_{jt}$, as the weighted average of the individual Lerner indexes of all banks (both Islamic and conventional banks) operating in country j at time t. The latter measures the degree of market competition for the whole banking market (including both Islamic and conventional banks). Whereas some authors rely on an simple unweighted average of individual Lerner indexes (Love and Martinez-Peria, 2015), we follow Leon (2015) and use a weighted average to take into account the relative market share of each Islamic or conventional bank either in their own market segment (Islamic or conventional banks) or in the whole market (Islamic and conventional banks).

As highlighted by previous studies on Islamic banking, religious beliefs might have a significant influence on individual decisions, leading Muslim consumers to avoid banking products which are not Sharia-compliant and stay away from conventional banks (Kumru and Sarntisart, 2016). Beck et al. (2013) and Demirgüç-Kunt et al., (2013) find evidence that Muslims are less willing than non-Muslims to own formal accounts or to save their money at a formal financial institution. Islamic depositors might also be more loyal towards Islamic banks (Abedifar et al., 2016). In countries with a stronger Islamic presence, we expect that conventional banks will face more difficulties to attract consumers, especially the religious ones. Moreover, this effect might be stronger for banks having a lower market power.

In order to investigate the impact of stronger Islamic presence (*Islamic presence*$_j$) on the deposit rate/competition nexus, we extend our baseline specification as follows:

$$Deposit\ rate_{j,t} = \alpha_i + \alpha_t + \beta_1 Lerner_{i,t} + \beta_2\ Islamic\ presence_{j,t} + \beta_3 Lerner_{i,t} * Islamic\ presence_{j,t} + \varphi X_{i,t-1} + \gamma Z_{j,t} + \varepsilon_{i,t}. \quad (2)$$

where *Islamic presence* is either ($HighMPOP_j$) or ($HighShareIB_{jt}$).

We use two different measures to capture the extent of Islamic presence. We follow Abedifar et al. (2016) and use the proportion of Muslim population in country j ($MPOP_j$). We also use the market share of Islamic banks in country j at time t ($ShareIB_{jt}$) to investigate whether differences in Islamic bank presence might impact Islamic and conventional banks'

deposit rate setting behavior. We construct two dummy variables ($HighMPOP_j$ and $HighShareIB_{jt}$) that take the value of one if the share of Muslim population in country j ($MPOP_j$) and the market share of Islamic banks in country j at time t ($ShareIB_{jt}$) respectively are above the sample mean and zero otherwise.

The impact of *Lerner* on the deposit rate is given by (β_1) in countries with a low level of Islamic presence and by ($\beta_1+\beta_3$) in countries with a high level of Islamic presence. Moreover, we also compute the impact of Islamic presence on deposit rate. Computed for different values of the Lerner index, this effect is given by ($\beta_2+\beta_3*Lerner^{ith}$) where $Lerner^{ith}$ is the value of the Lerner index at either the 25^{th}, the 50^{th} or the 75^{th} percentile.

We then consider which behavior would be consistent in either segmented or integrated market as well as markets with asymmetric competition. In segmented markets, conventional and Islamic banks would compete in separate markets for distinct consumers. Islamic banks would presumably set deposit rates according to the PLS principle, regardless of the importance of Muslim population or of the market share of Islamic banks in the country. Conventional banks behavior should not be altered by stronger presence of Islamic population, as conventional banks do not expect to attract this type of customers.

On the contrary, in integrated markets, where Islamic and conventional banks compete alongside for the same consumers, a higher percentage of Muslim population may lead Islamic and conventional banks to set higher deposit rates (β_2 positive and significant)[4]. Moreover, in countries where the market share of Islamic banks is relatively high, it might be more difficult for conventional banks to attract depositors, leading them to increase their deposit rate. Whether Islamic banks set higher/lower rates or even actually react in such an environment is unclear. Moreover, we expect the impact of stronger Islamic presence to be stronger for banks having lower market power (β_3 negative). In order to attract depositors in more religious environments or in countries with a stronger presence of Islamic banks, low market power banks will need to set higher deposit rates. Eventually, in presence of asymmetric competition, Islamic banks would be insensitive to conventional banks' market power but the opposite would not be true. To prevent customers from fleeing to Islamic banks, in some circumstances conventional banks might need to adjust their deposit rates upwards (β_3 negative).

We also control for a large set of bank-level (X_{it}) characteristics. These variables are included with a one-year lag. We use the bank's return on equity (*ROE*) as a proxy for the PLS

[4] If Islamic and conventional banks are not viewed as very different institutions (Beck et al., 2013; Charap and Cevik, 2015; Chong and Liu, 2009; Saraç and Zeren, 2014), Islamic banks are expected to follow conventional banks in increasing their deposit rates to attract customers.

principle[5]. Indeed, depositors in Islamic banks are investment account holders and they are considered as bank "quasi-shareholders". Hence, we expect a positive correlation between the return on equity and the return provided to Islamic banks' investment account holders. For conventional banks, ROE might also be considered as a proxy for profitability. We expect higher profitability to reduce default risk and hence enable banks to set a lower deposit rate. A higher ROE may therefore also be associated with a lower deposit rate (Martinez-Peria and Schmukler, 2001). We control for different dimensions of bank risk using the ratio of liquid assets to total assets (*Liquidity*) as a measure of liquidity risk, the ratio of loan loss reserve to total loan (*LLR*) to proxy credit risk and the capital ratio (*Equity*) to proxy default risk. Highly risky banks are expected to increase their deposit rates to attract customers (Acharya and Mora, 2015; Martinez-Peria and Schmukler, 2001). We also control for bank size using the logarithm of total assets (*Size*). Even though large and small banks might set different rates there's no clear-cut expected relationship (Rosen, 2007). Larger banks might offer higher rates to their customers because they have better investment options. However, they may also offer lower rates because they have alternative sources of funding. Listed banks are also captured by a dummy variable (*Listed*) which takes the value of one is the bank is listed and zero otherwise. Listed banks, which have an easier access to market funding, may be less reliant on deposits and may set lower rates than privately-owned banks (Nys et al., 2015).

We also include in our regressions a set of country-level variables (Z_{jt}). We control for banking market structure using the Herfindahl-Hirschman Index (*HHI*), computed as the sum of the squared values of each bank's market share (both IBs and CBs) in the overall market. Computation of bank market share relies on banks' deposits. The value of this index lies between 0 and 1. A greater value of this index indicates a more concentrated market, which may lead banks to offer a lower deposit rate (Nys et al., 2015; Rosen, 2007). Finally, we control for macroeconomic conditions using the inflation rate (*Inflation*) and the growth of GDP (*GGDP*). Table B1 (appendix B) provides a description of all the variables used in this study.

We estimate Equations (1) and (2) on two distinct sub-samples, Islamic banks and conventional banks. Equation 1 is estimated using the fixed effect estimator with standard errors clustered at the bank level. For Equation 2, we rely either on the fixed-effect estimator

[5] As noted by an anonymous referee, in practice, the share of profit distributed to investment account holders is drawn from different types of reserves like the profit equalization reserves (PER) and the investment risk reserve (IRR). Hence ROE might not be a sufficient and accurate measure. Unfortunately, data on PER and IRR are not available. While such information could be collected from the banks' annual reports, only few Islamic banks publish PER and IRR information. Therefore, we use a standard accounting measure such as ROE to proxy PLS. Although this is not a perfect measure it is strongly correlated with the return on investment accounts (Aysan et al., 2015).

(when *HighShareIB* is used as a proxy of *Islamic presence*) or on the Hausman-Taylor estimator (when *HighMPOP* is used as a proxy of *Islamic presence*)[6]. Indeed, as the variable *HighMPOP* is time-invariant, we cannot use the fixed-effect estimator. While switching to the random effect (RE) estimator might allow us to identify all the coefficients of our equations, the Hausman test indicates that the RE estimator might be inconsistent. We hence use Hausman-Taylor (HT) estimator. The HT estimation requires the partition of the variables into endogeneous and exogeneous variables. We follow Baltagi (2005), Baltagi et al. (2003), and Bouvatier (2014) and use the the Hausman test (FE vs. HT) for the choice of endogenous variables. We choose the combination which maximizes the p-value of the Hausman test (FE vs. HT).

2.2. Data and descriptive statistics

Our empirical analysis is based on bank-level and country-level data for a sample of Islamic and conventional banks from countries with dual banking systems over the 2000-2014 period. Our bank-level data come from the Bankscope database. We use consolidated data when available and otherwise unconsolidated data. In order to deal with Islamic banking misclassification issues in the Bankscope database (Abedifar et al., 2013; Cihak and Hesse, 2010; Gheeraert, 2014), we also refer to the World Bank database of Islamic banking[7]. However, as the World Bank database covers not only Islamic commercial banks but also Islamic investment banks, we also check each Islamic bank's website and drop purely Islamic investment banks having no customer deposits. We winsorize our main variables at the 1% and 99% level. Our final sample includes of 2,869 observations for a set of 98 Islamic and 386 conventional banks from 20 Muslim and non-Muslim countries[8]. Table 1 presents some country-level information for our sample of countries. Our country-level data come from different sources. We collect GDP growth data and inflation rates from the World Bank website and the percentage of the Muslim population comes from The World Factbook.

[6] Mixed effect/multilevel methodology could be an alternative way to solve the issue raised by time-invariant variables. This approach could allow us to model varying coefficients (intercept and slope) across two groups (countries with a high level of Muslim population (*HighMPOP*=1) and countries with a low level of Muslim population (*HighMPOP*=0). However, as discussed in Gelman and Hill (2007), when the number of groups is small (less than 5), there is not enough information to accurately estimate group-level variation. Despite this limitation, we run the estimations using this methodology, leaving our main results unchanged.

[7] The database is available here: http://go.worldbank.org/AE0U8AYQ20

[8] Bahrain, Bangladesh, Egypt, Indonesia, Iraq, Jordan, Kenya, Kuwait, Malaysia, Mauritania, Pakistan, Qatar, Saudi Arabia, South Africa, Sudan, Tunisia, Turkey, United Arab Emirates, United Kingdom and Yemen.

Table B1. Summary of the variable definition

	Variables description	Source
Bank-level variables		
$Deposit\ rate_{it}$	The ratio of total interest expense on deposits to consumer deposits.	Bankscope
$Lerner_{it}$	Bank-level Lerner index.	Bankscope
ROE_{it}	The ratio of equity to total assets.	Bankscope
$Liquidity_{it}$	The ratio of liquid assets to total assets.	Bankscope
ROA_{it}	The ratio of net income to total assets.	Bankscope
$Equity_{it}$	The ratio of equity capital to total asset.	Bankscope
$Size_{it}$	The logarithm of total assets.	Bankscope
LLR_{it}	The ratio of non-performing loans to gross loans.	Bankscope
Listed	A dummy variable that takes the value of one if the bank is listed and zero otherwise	Bankscope
Country-level variables		
$LernerIB_{jt}$	The weighted average of the individual Lerner indexes of Islamic banks in country j at time t.	Bankscope
$LernerCB_{jt}$	The weighted average of the individual Lerner indexes of conventional banks in country j at time t.	Bankscope
$LernerMKT_{jt}$	The weighted average of the individual Lerner indexes of all banks (both Islamic and conventional banks) operating in country j at time t.	Bankscope
$ShareIB_{jt}$	Market share of Islamic banks (in terms of total deposits) in country j at time t.	Bankscope
$HighShareIB_{jt}$	A dummy variable that takes the value of one if the value of $ShareIB_{jt}$ is above the sample mean and zero otherwise.	Bankscope
$MPOP_j$	Proportion of Muslims in country j.	The World Factbook
$HighMPOP_j$	A dummy variable that takes the value of one if the value of $MPOP_j$ is above the sample mean and zero otherwise	World Factbook
$Inflation_{jt}$	Rate of inflation	The World Bank.
$GGDP_{jt}$	GDP growth	The World Bank.
HHI_{jt}	Hirschman-Herfindahl index (HHI) is a proxy for market concentration in country j at date t: $HHI_{j,t} = \sum_{i=1}^{n}\left(Total\_Assets_{i,j,t}/\sum_{i=1}^{n} Total\_Assets_{i,j,t}\right)^2$. The value ranges between 0 and 1. Higher values indicate that the market is more concentrated.	Bankscope
$Interest\ rates_{jt}$	Short-term interest rate	International Financial Statistics (IMF)

Table 2 provides descriptive statistics of our bank-level variables for the whole sample of banks and reports the results of mean tests between Islamic and conventional banks sub-samples. Islamic banks' deposit rates are significantly lower than those of conventional banks. This finding is in line with the results of Aysan et al. (2016) who observe that Turkish Islamic

banks pay lower deposit rates than their conventional counterparts. Consistent with Weill (2011), we do not find significant differences for the Lerner indexes, meaning that, on average, the market power of Islamic banks and conventional banks are not different.

Conventional banks in our sample are larger (*Size*) than Islamic banks. Moreover, as highlighted in the literature (e.g., Abedifar et al.(2013); Beck et al. (2013)), Islamic banks are better capitalized (*Equity*) than conventional banks.

Turning to country-level variables, the average market share of Islamic banks (*ShareIB*) is 18.3% and the average value of Muslim population (*MPOP*) is 76.7%. The mean value of *HHI* is 0.19.

Table 1. Banking sector structure in sample countries

Country	IB	CB	ShareIB (%)	MPOP (%)	Lerner IB	Lerner CB	Lerner MKT	Inflation	GGDP	HHI
Bahrain	6	9	20.80	70.30	0.230	0.248	0.239	0.066	-0.002	0.188
Bangladesh	7	33	16.39	89.50	0.195	0.164	0.171	0.059	0.043	0.114
Egypt	3	21	6.53	90.00	0.139	0.118	0.119	0.088	0.022	0.149
Indonesia	7	66	1.30	87.20	0.139	0.261	0.259	0.105	0.040	0.102
Iraq	1	5	24.30	99.00	0.311	0.260	0.261	0.116	0.023	0.361
Jordan	3	10	7.52	97.20	0.246	0.271	0.270	0.050	0.029	0.389
Kenya	2	30	0.80	11.10	0.063	0.309	0.308	0.080	0.017	0.117
Kuwait	5	5	39.02	76.70	0.325	0.491	0.426	0.082	-0.002	0.193
Malaysia	19	28	12.68	61.30	0.190	0.309	0.300	0.036	0.033	0.093
Mauritania	1	3	14.09	100.00	0.337	0.264	0.254	0.069	0.020	0.191
Pakistan	9	23	14.70	96.40	0.254	0.220	0.224	0.110	0.020	0.151
Qatar	5	6	16.05	77.50	0.533	0.464	0.472	0.080	0.016	0.279
Saudi Arabia	5	7	38.41	99.00	0.463	0.524	0.500	0.058	0.025	0.116
South Africa	1	16	0.14	1.50	0.086	0.205	0.205	0.072	0.016	0.298
Sudan	4	1	72.06	99.00	0.159	0.239	0.216	0.148	0.040	0.335
Tunisia	1	10	6.96	99.10	0.262	0.280	0.288	0.036	0.026	0.149
Turkey	4	26	4.27	99.80	0.199	0.099	0.100	0.167	0.030	0.167
United Arab Emirates	10	17	17.35	76.00	0.322	0.456	0.433	0.065	-0.028	0.102
United Kingdom	3	66	0.01	4.40	-0.552	0.211	0.211	0.023	0.012	0.127
Yemen	2	4	28.04	99.10	0.325	0.337	0.213	0.119	-0.002	0.268
Total	98	386								
Average			18.27	76.71	0.231	0.291	0.278	0.082	0.019	0.194

Table 2. Descriptive statistics

	All sample					Islamic banks			Conventional banks			Diff.
Variable	Obs.	Mean	S.D.	Min	Max	Obs.	Mean	S.D.	Obs.	Mean	S.D.	
Deposit rate	2,869	0.042	0.034	0.000	0.245	525	0.038	0.035	2,344	0.042	0.033	-2.482**
Lerner	2,779	0.252	0.215	-0.751	0.694	499	0.245	0.251	2,280	0.254	0.207	-0.845
ROE	2,869	0.100	0.137	-0.702	0.535	525	0.091	0.130	2,344	0.102	0.138	-1.668
Liquidity	2,868	0.246	0.159	0.060	0.790	525	0.240	0.143	2,343	0.247	0.162	-0.914
LLR	2,841	0.051	0.065	0.001	0.460	518	0.050	0.072	2,323	0.051	0.064	-0.314
Equity	2,869	0.124	0.070	0.037	0.501	525	0.137	0.090	2,344	0.121	0.064	4.769***
Size	2,869	22,400	67,400	16.361	436,000	525	7,752	14,200	2,344	25,700	73,900	-5.541***
Listed	2,869	0.646	0.478	0.000	1.000	525	0.604	0.490	2,344	0.655	0.476	-2.207***

Note: The last column reports t-statistics of mean equality test between Islamic and conventional banks. ***, ** and * indicate significance at 1%, 5% and 10% levels respectively.

3. Empirical Results

3.1. Baseline regression

Table 3 displays the estimation results for Equation (1) over our two sub-samples of banks. Results are reported in columns (1) to (3) for the Islamic banks sub-sample and in columns (4) to (6) for the conventional banks sub-sample. As the correlation matrixes (Table B2 and B3 in Appendix B) indicate a significant correlation between our measure of bank market power (*Lerner*) and our PLS proxy (*ROE*) on both sub-samples, we first introduce *Lerner* and *ROE* separately (columns (1) and (2) for the Islamic banks sub-sample and columns (4) and (5) for the conventional banks sub-sample respectively). Columns (3) and (6) report the estimation results when simultaneously including *Lerner* and *ROE* for the Islamic and conventional banks sub-samples respectively.

Our results show notable differences in the drivers of deposit rates in Islamic and conventional banks and specifically regarding the effect of bank market power. While higher market power (higher value of *Lerner*) leads conventional banks to set lower deposit interest rates, this variable is not significant for Islamic banks. In other words, contrary to conventional banks, Islamic banks, who might benefit from a captive clientele, do not set lower deposit rates when gaining market power. This result is consistent with the view that Islamic banks' behavior is shaped by the moral obligation to set a fair price to their customers, possibly limiting their willingness to set lower prices. This result is also in line with the findings of Mollah and Zaman (2015) and Mollah et al. (2016) who highlight that the governance structure of Islamic banks

with the presence of a Shari'ah supervisory board might play a significant role in Islamic bank behavior.

Table 3. Determinants of Islamic and conventional banks' deposit rate setting behavior

This table displays the estimation results of Equation (1) for two sub-samples, Islamic banks (columns (1) to (3)) and conventional banks (columns (4) to (6)):

$$Deposit\ rate_{i,t} = \alpha_i + \alpha_t + \beta_1 Lerner_{i,t} + \varphi X_{i,t-1} + \gamma Z_{j,t} + \varepsilon_{i,t}$$

See Table B1 for variable definitions. Robust t-statistics are reported in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% respectively.

	Islamic banks			Conventional banks		
	(1)	(2)	(3)	(4)	(5)	(6)
Lerner	0.0142		0.0118	-0.0371***		-0.0386***
	(0.75)		(0.60)	(-5.34)		(-5.48)
ROE		0.0280**	0.0219*		0.000201	0.00763
		(2.07)	(1.67)		(0.04)	(1.49)
Liquidity	-0.00232	0.00352	-0.0000320	-0.0139*	-0.0147*	-0.0140*
	(-0.16)	(0.27)	(-0.00)	(-1.81)	(-1.78)	(-1.84)
LLR	0.108	0.132**	0.117*	-0.0329*	-0.0271	-0.0288
	(1.65)	(2.21)	(1.73)	(-1.86)	(-1.54)	(-1.62)
Equity	0.0659	0.0601	0.0634	-0.00994	-0.0192	-0.0119
	(1.37)	(1.35)	(1.37)	(-0.34)	(-0.61)	(-0.40)
Size	0.0152**	0.0127**	0.0132**	0.00988***	0.0100***	0.00963***
	(2.34)	(2.00)	(2.07)	(4.63)	(4.18)	(4.48)
Listed	0.00683	0.00232	0.0437***	0.0533***	0.0568***	0.0523***
	(1.63)	(0.76)	(2.75)	(7.35)	(7.95)	(7.03)
Inflation	0.0303*	0.0155	0.0293*	0.0168***	0.0161**	0.0166***
	(1.88)	(0.91)	(1.78)	(3.10)	(2.43)	(3.06)
HHI	0.0887	0.0945	0.0921	-0.0443*	-0.0241	-0.0447**
	(1.22)	(1.25)	(1.25)	(-1.95)	(-0.84)	(-1.99)
GGDP	-0.00714	-0.00155	-0.00940	-0.0198	-0.0279**	-0.0210*
	(-0.31)	(-0.07)	(-0.41)	(-1.63)	(-2.13)	(-1.71)
Constant	-0.231**	-0.188*	-0.197*	-0.0963***	-0.109***	-0.0924***
	(-2.04)	(-1.74)	(-1.82)	(-2.77)	(-2.85)	(-2.64)
Time effects	Yes	Yes	Yes	Yes	Yes	Yes
N Obs.	500	525	499	2281	2344	2280
N Banks.	96	98	96	380	386	380
R-Squared	0.240	0.229	0.247	0.310	0.249	0.311

We also find a negative relationship between the deposit rate and liquidity risk for conventional banks, indicating that conventional banks set lower deposit rates when they are more liquid, although at the 10% significance level only. This result is consistent with previous findings (Martinez-Peria and Schmukler, 2001; Nys et al., 2015). However, we do not find any

significant impact for Islamic banks. A positive relationship is obtained between the deposit rate and credit risk for Islamic banks, indicating that more risky banks set higher rates. Consistent with Nys et al. (2015), larger banks and listed banks set a higher deposit rate a result which holds for both Islamic and conventional banks in our sample. As expected, we find a positive and significant effect of our PLS proxy (*ROE*) on the deposit rates of Islamic banks, although at the 10% significance level only. Higher return to shareholders leads to an increase in the return provided to depositors. Finally, while inflation has a significant impact on deposit rates for conventional banks, regarding Islamic banks the coefficient is only significant at the 10% level.

All in all, while previous studies (e.g. Charap and Cevik (2011), Chong and Liu (2009), Saraç and Zeren (2014)) argue that the correlation between deposit rates of conventional and Islamic banks indicate that both types of finance do no significantly differ, our results provide evidence of significant differences in the way Islamic and conventional banks set their deposit rate.

3.2. Deposit rate, market power, and Islamic presence

We further investigate in this section whether the pricing behavior of Islamic and conventional banks is altered by the importance of Islamic presence, measured either by the share of Muslims in the population or by the market share of Islamic banks. Table 4A presents the estimation results of Equation (2) using alternatively $HighShareIB_{jt}$ (columns (1) and (3)) and $HighMPOP_j$ (columns (2) and (4)) as a measure of *Islamic presence*. Table 4B provides the impact of *Lerner* when Islamic presence is high (using alternatively $HighShareIB_{jt}$ (columns (1) and (3)) and $HighMPOP_j$ (columns (2) and (4)) and the impact of Islamic presence (using alternatively $HighShareIB_{jt}$ (columns (1) and (3)) and $HighMPOP_j$ (columns (2) and (4)) computed at different value of Lerner.

Our findings highlight significant differences in the impact of Islamic presence on deposit rates for Islamic and conventional banks. While higher market share of Islamic banks leads to an increase in deposit rates for both types of banks, higher share of Muslim population only impacts conventional banks' pricing behavior. In countries with a predominant Muslim population, conventional banks set higher deposit rates than in countries with a lower proportion of Muslim population, while Islamic banks' pricing behavior is not impacted. This result suggests that conventional banks might face strong difficulties to attract depositors in more religious environments. Moreover, the coefficient of the interaction term (*Lerner* x *Islamic presence*) is negative and significant, indicating that the impact of Islamic presence

(using both $HighShareIB_{jt}$ and $HighMPOP_j$) is stronger for conventional banks with lower market power. In countries with a predominant Muslim population or with a strong presence of Islamic banks, conventional banks set a higher deposit rate and even higher when their market power is lower.

Nevertheless, while our findings suggest that stronger market power allows Islamic banks to set higher deposit rates in countries where Islamic banks' market share is low (β_1 is positive and significant), we do not find any significant impact in countries where the market share of Islamic banks is high (($\beta_1+\beta_3$) is not statistically significant).

Our results so far suggest significant differences in Islamic and conventional banks' pricing behavior. While conventional banks set lower deposit rates when gaining market power, we do not observe such a behavior for Islamic banks. Moreover, we also highlight that stronger presence of Islamic banks or higher proportion of Muslims in the population shapes the relationship between deposit rate and market power at conventional banks. In predominantly Islamic environments, where depositors are more reluctant to own conventional banks' financial products which are not Sharia-compliant or when Islamic banks are highly present, conventional banks face stronger difficulties to attract depositors, strengthening the impact of bank market power on deposit rates.

3.3. Competition in dual banking market

In this section, we investigate how both types of banks react in terms of deposit rate setting depending on the competitiveness either of the whole banking market or of each banking segment (Islamic and conventional). We address whether competition occurs in possibly segmented markets (where Islamic and conventional banks compete for different depositors), in integrated markets (where Islamic and conventional banks compete for the same depositors) or, in the case of a one way/asymmetric competition where conventional banks are influenced by Islamic banks but not the other way round. We hence alternately replace the bank-level measures of market power by our different market-level competition indexes ($LernerIB_{jt}$, $LernerCB_{jt}$, $LernerMKT_{jt}$) and re-run the estimations of Equations (1) and (2). The results are presented in Tables 5, 6A and 6B. Table 5 reports the impact of competition on Islamic and conventional banks' deposit rates on the Islamic banking segment (columns (1) and (4)), on the conventional segment (columns (2) and (5)) and on the overall banking market (columns (3) and (6)).

Table 4A. Bank market power and Islamic presence

This table displays the estimation results of Equation (2) for two sub-samples, Islamic banks (columns (1) to (3)) conventional banks (columns (4) to (6)):

$$Deposit\ rate_{i,t} = \alpha_i + \alpha_t + \beta_1 Lerner_{i,t} + \beta_2 Islamic\ presence_{j,t} + \beta_3\ Lerner_{i,t} * Islamic\ presence_{j,t} + \varphi X_{i,t-} \gamma Z_{j,t} + \varepsilon_{i,t}$$

See Table B1 for variable definitions. We employ the fixed-effect (FE) estimator with standard errors clustered at the bank level for estimations reported in columns (1) and (3). We employ Hausman-Taylor (HT) estimator with robust jackknife standard errors for estimations reported in columns (2) and (4).

	Islamic banks		Conventional banks	
	(1)	(2)	(3)	(4)
Lerner	0.0356**	0.0223	-0.0324***	-0.0213***
	(2.05)	(0.40)	(-4.44)	(-2.63)
HighShareIB	0.0265***		0.0111***	
	(3.69)		(3.82)	
Lerner x HighShareIB	-0.0532***		-0.0146**	
	(-2.99)		(-1.98)	
HighMPOP		0.0204		0.0313***
		(1.18)		(7.24)
Lerner x HighMPOP		-0.0262		-0.0418***
		(-0.44)		(-3.94)
ROE	0.0191	0.0268*	0.00722	0.0106*
	(1.47)	(1.75)	(1.57)	(1.94)
Liquidity	0.00552	-0.00357	-0.0179**	-0.0112
	(0.34)	(-0.25)	(-2.30)	(-1.49)
LLR	0.106**	0.124	-0.0252	-0.0392**
	(2.03)	(0.96)	(-1.41)	(-2.21)
Equity	0.0474	0.0514	-0.0128	-0.0281
	(1.17)	(0.76)	(-0.44)	(-1.03)
Size	0.0120*	0.00691	0.00868***	0.00434**
	(1.87)	(1.06)	(4.07)	(2.53)
Listed	0.0445***	0.00493	0.0579***	0.0000928
	(2.84)	(1.16)	(6.73)	(0.08)
Inflation	0.0164	0.0267	0.0115**	0.0151***
	(1.09)	(1.52)	(2.10)	(2.70)
HHI	0.0897	0.0758	-0.0839***	-0.0525***
	(1.41)	(0.68)	(-3.44)	(-2.65)
GGDP	-0.00683	-0.00156	-0.0160	-0.0280**
	(-0.32)	(-0.05)	(-1.23)	(-2.20)
Constant	-0.191*	-0.110	-0.0760**	-0.0188
	(-1.84)	(-0.90)	(-2.21)	(-0.69)
Time effects	Yes	Yes	Yes	Yes
N Obs.	499	499	2257	2280
N Banks.	96	96	379	380
R-Squared	0.296		0.327	

Table 4B. Impact of Lerner and Islamic presence

	Islamic banks		Conventional banks	
	(1)	(2)	(3)	(4)
Impact of *Lerner* ($\beta_1 + \beta_3$) when Islamic banks market share is above the sample mean (columns (1) and (3)) and when Muslim population is above the sample mean (columns (2) and (4))				
	-0.0175	-0.0039	-0.047***	-0.063***
	(-1.18)	(-0.09)	(-5.74)	(-7.99)
Impact of *Islamic presence* ($\beta_2 + \beta_3$) when Islamic banks market share is above the sample mean (columns (1) and (3)) and when Muslim population is above the sample mean (columns (2) and (4)) computed at different value of *Lerner*				
25^{th}percentile	0.0196***	0.0169	0.0085***	0.0238***
	(3.38)	(1.54)	(4.23)	(7.30)
50^{th}percentile	0.0142***	0.0143	0.007***	0.0196***
	(2.74)	(1.75)	(4.00)	(6.44)
75^{th}percentile	0.0079	0.0111	0.006***	0.0167***
	(1.50)	(1.14)	(3.43)	(5.37)

Considering either the overall market ($LernerMKT_{jt}$) or each separated segment ($LernerIB_{jt}$, $LernerCB_{jt}$), stronger competition does not alter Islamic banks' deposit rate setting behavior. On the contrary, we find a significant influence of country-level market competition on conventional banks' deposit rate setting. Stronger market-level competition leads conventional banks to set higher deposit rates. Moreover, while stronger competition within the conventional banks' segment impacts conventional banks pricing behavior, market conditions on the Islamic banks segment have no impact at all.

We further find that the importance of Islamic presence significantly alters the behavior of conventional banks. Table 6A reports the results when investigating Islamic or conventional banks' reaction either to the competitiveness of their own segment (columns (1) and (2) and (7) and (8) respectively) or to the competitiveness of the other segment (columns (3) and (4) and (5) and (6) respectively). Table 6B provides the impact of our different market-level Lerner indexes when Islamic presence is high (using alternately $HighShareIB_{jt}$ (columns (1), (3), (5) and (7)) and $HighMPOP_j$ (columns (2), (4), (6) and (8)) and the impact of Islamic presence (using alternatively $HighShareIB_{jt}$ (columns (1), (3), (5) and (7)) and $HighMPOP_j$ (columns (2), (4), (6) and (8)) computed at different values of the Lerner index (25^{th}, 50^{th} and 75^{th} percentiles).

Table 5. Market-level competition and banks' deposit rate

This table displays the estimation results of Equation (1) for two sub-samples, Islamic banks (columns (1) to (3)) and conventional banks (columns (4) to (6)):

$$Deposit\ rate_{i,t} = \alpha_i + \alpha_t + \beta_1 Lerner_{i,t} + \varphi X_{i,t-1} + \gamma Z_{j,t} + \varepsilon_{i,t}$$

See Table B1 for variable definitions. Robust t-statistics are reported in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% respectively.

	Islamic banks			Conventional banks		
	(1)	(2)	(3)	(4)	(5)	(6)
LernerIB	-0.0270			-0.00516		
	(-1.62)			(-1.03)		
LernerCB		-0.0376			-0.0421***	
		(-1.45)			(-3.29)	
LernerMKT			-0.0342			-0.0454***
			(-1.63)			(-3.87)
ROE	0.0310**	0.0274**	0.0286**	-0.00153	0.000947	0.00114
	(2.30)	(2.08)	(2.17)	(-0.32)	(0.19)	(0.23)
Liquidity	0.00389	0.00627	0.00444	-0.0177**	-0.0158*	-0.0169**
	(0.30)	(0.48)	(0.33)	(-2.02)	(-1.90)	(-2.07)
LLR	0.135**	0.126**	0.130**	-0.0182	-0.0287	-0.0271
	(2.37)	(2.03)	(2.17)	(-1.06)	(-1.57)	(-1.48)
Equity	0.0550	0.0627	0.0608	-0.0105	-0.0203	-0.0195
	(1.26)	(1.41)	(1.37)	(-0.33)	(-0.63)	(-0.61)
Size	0.0118*	0.0123*	0.0121*	0.00917***	0.0105***	0.0106***
	(1.93)	(1.89)	(1.87)	(3.91)	(4.31)	(4.32)
Listed	0.00186	0.0223	0.00195	0.0571***	0.0510***	0.0507***
	(0.59)	(1.58)	(0.64)	(7.41)	(5.84)	(5.95)
Inflation	0.0110	0.0148	0.0129	0.0118*	0.0149**	0.0140**
	(0.64)	(0.88)	(0.76)	(1.75)	(2.45)	(2.29)
HHI	0.0929	0.0957	0.0976	-0.0502	-0.0335	-0.0335
	(1.23)	(1.24)	(1.30)	(-1.58)	(-1.16)	(-1.15)
GGDP	0.00133	0.0134	0.00900	-0.0390***	-0.0174	-0.0182
	(0.06)	(0.56)	(0.40)	(-2.78)	(-1.32)	(-1.39)
Constant	-0.166	-0.170	-0.168	-0.0924**	-0.102**	-0.103**
	(-1.59)	(-1.51)	(-1.51)	(-2.51)	(-2.49)	(-2.52)
Time effects	Yes	Yes	Yes	Yes	Yes	Yes
N Obs.	524	517	524	2278	2338	2338
N Banks.	97	97	97	384	386	386
R-Squared	0.236	0.232	0.234	0.270	0.257	0.258

Table 6A. Islamic and conventional banking segment competition and Islamic presence

This table displays the estimation results of Equation (2) for two sub-samples, Islamic banks (columns (1) to (4)) conventional banks (columns (5) to (8)):

$$Deposit\ rate_{i,t} = \alpha_i + \alpha_t + \beta_1 Lerner_{i,t} + \beta_2 Islamic\ presence + \beta_3\ Lerner_{i,t} * Islamic\ presence_{j,t} + \varphi X_{i,t-1} + \gamma Z_{j,} \varepsilon_{i,t}$$

See Table B1 for variable definitions. Robust z-statistics are reported in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% respectively.

	Islamic banks				Conventional banks			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
LernerIB	-0.0113	-0.00896			0.00132	0.00118		
	(-0.47)	(-0.51)			(0.27)	(0.21)		
LernerIB x HighShareIB	-0.0225				-0.025***			
	(-1.18)				(-3.04)			
LernerIB x HighMPOP		-0.0590**				-0.039***		
		(-2.33)				(-4.35)		
LernerCB			-0.0142	-0.0759*			-0.044***	-0.0312**
			(-0.41)	(-1.97)			(-3.21)	(-2.24)
LernerCB x HighShareIB			-0.0261				0.00943	
			(-0.96)				(0.71)	
LernerCB x HighMPOP				0.0120				-0.0358**
				(0.25)				(-2.30)
HighShareIB	0.0152*		0.0185*		0.0164***		0.00467	
	(1.97)		(1.96)		(5.84)		(1.02)	
HighMPOP		0.0337***		0.00907		0.0285***		0.0310***
		(4.24)		(0.50)		(7.11)		(5.20)
Constant	-0.152	-0.0743	-0.153	-0.0724	-0.0927**	-0.0184	-0.0779*	-0.0321
	(-1.46)	(-0.65)	(-1.37)	(-0.57)	(-2.49)	(-0.56)	(-1.90)	(-0.89)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N Obs.	524	524	517	517	2278	2278	2312	2338
N Banks.	97	97	97	97	384	384	385	386
R-Squared	0.249		0.246		0.280		0.269	

Table 6B. The impact of Lerner and Islamic presence

	Islamic banks				Conventional banks			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Impact of *Lerner* ($\beta_1 + \beta_3$) when Islamic banks market share is above the sample mean (columns (1), (3), (5) and (7)) and when Muslim population is above the sample mean (columns (2), (4), (6) and (8))								
	-0.033***	-0.067***	-0.0402*	-0.0638*	-0.023***	-0.038***	-0.0348**	-0.067***
	(-2.74)	(-2.95)	(-1.80)	(-1.81)	(-2.68)	(-4.77)	(-2.19)	(-4.81)
Impact of *Islamic presence* ($\beta_2 + \beta_3$) (columns (1), (3), (5) and (7)) when Islamic banks market share is above the sample mean and when Muslim population is above the sample mean (columns (2), (4), (6) and (8)) computed at different value of *Lerner*								
25thpercentile	0.0122**	0.0260***	0.0137**	0.0112	0.0131***	0.0233***	0.0063**	0.0245***
	(2.13)	(4.06)	(2.39)	(1.05)	(6.38)	(6.23)	(2.4)	(5.95)
50thpercentile	0.0100**	0.0201***	0.0111**	0.0124	0.0106***	0.0193***	0.0073***	0.0209***
	(2.17)	(3.23)	(2.34)	(1.66)	(6.13)	(5.11)	(3.57)	(5.72)
75thpercentile	0.0073*	0.0130*	0.0933*	0.0132**	0.0076***	0.0145***	0.0079***	0.0184***
	(1.81)	(1.79)	(1.90)	(2.04)	(4.16)	(3.54)	(3.84)	(4.96)

Our results suggest that both Islamic and conventional banks' behavior are impacted by the market conditions of their own segment. Conventional banks set higher deposit rates when the degree of competition in their segment is lower, whatever the share of Muslim population or the market share of Islamic banks (column (7) and (8)). However, while the strength of Islamic presence does not alter the behavior of conventional banks, it matters for Islamic banks. We find evidence of a positive effect of competition on Islamic banks' deposit rates only in countries with a predominantly Muslim population (column (2)). We also find a negative impact of competition in the conventional banks segment on Islamic banks' deposit rates, but only at the 10% level (column (4)).

Moreover, in countries with either a high share of Muslim population or a strong presence of Islamic banks, conventional banks set higher deposit rates when competition in the Islamic segment is stronger (columns (5) and (6)). Competitive conditions on the Islamic segment influence the pricing behavior of conventional banks but Islamic banks are insensitive to the conditions prevailing on the conventional segment (columns (3) and (4)). These results are consistent with the possible existence of an asymmetric competition between Islamic and conventional banks, which is dependent on the importance of Islamic presence.

The way that conventional banks set their deposit rate in response to Islamic presence is in line with previous papers highlighting the importance of religiosity in dual banking markets (Abedifar et al., 2016; Baele et al., 2014; Farook et al., 2012).

4. Further investigations and robustness tests

We address the impact of 2007-2009 financial crisis on deposit rate setting behavior of Islamic and conventional banks. We construct a dummy variable *Crisis* which equals one during the 2007-2009 period and zero otherwise. In order to address this issue, we estimate the following equation:

$$Deposit\ rate_{j,t} = \alpha_i + \alpha_t + \beta_1 Lerner_{i,t} + \beta_2\ Crisis_{j,t} + \beta_3\ Lerner_{i,t} * Crisis_{j,t} + \varphi X_{i,t-1} + \gamma Z_{j,t} + \varepsilon_{i,t} \quad (3)$$

Our results (Table 7) show that Islamic banks' behavior is not impacted by the financial crisis whereas conventional banks set a lower deposit rate during the financial crisis and even lower when their market power is weaker.

We further investigate whether the impact of market competition on deposit rates is altered by the degree of competition in the other segment. In order to capture this possible effect, we construct two dummy variables, $HighLernerIB_{jt}$ and $HighLernerCB_{jt}$ which take the value of one if the value of $LernerIB_{jt}$ and the value of $LernerCB_{jt}$ respectively are above the sample mean and zero otherwise. We estimate the following equations:

$$Deposit\ rate^{IB}_{j,t} = \alpha_i + \alpha_t + \beta_1 Lerner^{IB}_{j,t} + \beta_2\ HighLernerCB_{j,t} + \beta_3 Lerner^{IB}_{j,t} * HighLernerCB_{j,t} + \varphi X_{i,t-1} + \gamma Z_{j,t} + \varepsilon_{i,t} \quad (4)$$

$$Deposit\ rate^{CB}_{j,t} = \alpha_i + \alpha_t + \beta_1 Lerner^{CB}_{j,t} + \beta_2\ HighLernerIB_{j,t} + \beta_3 Lerner^{CB}_{j,t} * HighLernerIB_{j,t} + \varphi X_{i,t-1} + \gamma Z_{j,t} + \varepsilon_{i,t} \quad (5)$$

The results are provided in Table 8. While the degree of competition in the conventional banks segment does not influence Islamic banks' behavior, their deposit rates are significantly impacted by stronger competition in the Islamic banks segment. Stronger competition in the conventional banks segment leads to a higher deposit rate, but only in countries where the degree of competition in the Islamic banks segment is high (β_3 is positive and significant). In other words, stronger competition in the Islamic banks segment leads conventional banks to set higher deposit rates.

Table 7. Impact of the Global Financial Crisis (2007-2008)

This table displays the estimation results of Equation (3) for two sub-samples, Islamic banks (column (1)) and conventional banks (column (2)):

$$Deposit\ rate_{j,t} = \alpha_i + \alpha_t + \beta_1 Lerner_{i,t} + \beta_2\ Crisis_{j,t} + \beta_3\ Lerner_{i,t} * Crisis_{j,t} + \varphi X_{i,t-1} + \gamma Z_{j,t} + \varepsilon_{i,t}$$

See Table B1 for variable definitions. Robust z-statistics are reported in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% respectively.

	Islamic banks	Conventional banks
	(1)	(2)
Lerner	0.0129	-0.0355***
	(0.66)	(-4.99)
Crisis	-0.0140	-0.0164***
	(-1.03)	(-2.75)
Lerner x Crisis	-0.00849	-0.0184*
	(-0.84)	(-1.96)
ROE	0.0225*	0.00785
	(1.70)	(1.53)
Liquidity	0.0000991	-0.0140*
	(0.01)	(-1.85)
LLR	0.121*	-0.0291
	(1.83)	(-1.61)
Equity	0.0623	-0.0150
	(1.34)	(-0.50)
Size	0.0132**	0.00931***
	(2.06)	(4.36)
Listed	0.0437***	0.0521***
	(2.75)	(6.87)
Inflation	0.0322*	0.0213***
	(1.86)	(3.76)
HHI	0.0907	-0.0434*
	(1.23)	(-1.89)
GGDP	-0.0105	-0.0254**
	(-0.45)	(-2.09)
Constant	-0.197*	-0.0883**
	(-1.83)	(-2.53)
Time effects	Yes	Yes
N Obs.	499	2280
N Banks	96	380
R-squared	0.249	0.316
Impact of Lerner during the crisis period (β_1+ β_3)	0.0044	-0.0539***
	(0.20)	(-4.19)

Table 8. Reaction of Islamic and conventional banks to competitive conditions in the other market segment

This table displays the estimation results of Equations (4) and (5) for two sub-samples, Islamic banks (column (1)) and conventional banks (column (2)):

$$Deposit\ rate_{j,t}^{IB} = \alpha_i + \alpha_t + \beta_1 Lerner_{j,t}^{IB} + \beta_2\ HighLernerCB_{j,t} + \beta_3 Lerner_{j,t}^{IB} * HighLernerCB_{j,t} + \varphi X_{i,t-1} + \gamma Z_{j,t} + \varepsilon_{i,t}$$

$$Deposit\ rate_{j,t}^{CB} = \alpha_i + \alpha_t + \beta_1 Lerner_{j,t}^{CB} + \beta_2\ HighLernerIB_{j,t} + \beta_3 Lerner_{j,t}^{CB} * HighLernerIB_{j,t} + \varphi X_{i,t-1} + \gamma Z_{j,t} + \varepsilon_{i,t}$$

See Table B1 for variable definitions. Robust z-statistics are reported in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% respectively.

	Islamic banks	Conventional banks
	(1)	(2)
LernerIB	-0.0205	
	(-0.99)	
HighLernerCB	-0.00441	
	(-1.00)	
LernerIB x HighLernerCB	-0.00734	
	(-0.38)	
LernerCB		-0.0447***
		(-3.05)
HighLernerIB		-0.0106***
		(-3.06)
LernerCB x HighLernerIB		0.0313***
		(3.04)
Constant	-0.155	-0.0881**
	(-1.49)	(-2.16)
Controls	Yes	Yes
Time effects	Yes	Yes
N Obs.	517	2278
N Banks	97	384
R-squared	0.240	0.280
Impact of *Lerner* ($\beta_1 + \beta_2$) when the competition in the conventional banking segment is low (column (1)) and when the competition in the Islamic banking segment is low (column (2))		
	-0.0278	-0.01337
	(-1.42)	(-0.78)

As highlighted by the existing literature, market interest rates significantly impact Islamic banks' behavior. In contradiction with the interest-free principle, Ergeç and Arslan (2013) find evidence of a significant influence of market interest rates on deposit rates of Islamic banks in Turkey. Caporale et al. (2016) also highlight a significant impact of interest rate shocks on Islamic bank lending even though this effect is weaker than for conventional banks. We hence include in our regressions a short-term market interest rate (*Interest rate*).

Due to the high correlation between *Inflation* and *Interest rate*, we drop the variable Inflation when including *Interest rate*. Short term interest rate data are taken from the International Financial Statistics database of the International Monetary Fund[9]. As highlighted in the existing literature, we find a positive and significant impact of market interest rates on deposit rates for both IBs and CBs. We still find conventional banks to set higher deposit rates when their market power is lower and even lower in predominantly Islamic environment (($\beta_1+\beta_3$) is negative and significant) (Tables 9A and 9B).

We also conduct some robustness tests. We replace the return on equity (*ROE*) by the return on assets (*ROA*). Our main results remain identical (Tables 10A and 10B).

Following Rosen (2007) who argues that the presence of ROE in such models may lead to endogeneity issues, we also conduct our regressions by using the instrumental variables (IV) technique. One-year lagged ROE is instrumented by two-year lagged ROE, ROE Industry, and market development (the ratio of stock market capitalization to GDP per capita). The Kleibergen-Paap F-Statistics indicates that the instruments we use are strong. The non-significant value of the Hansen J-Statistics (over-identification test) indicates that our instruments are not correlated with the error term. Using IV leaves our main results unchanged (Table 11).

[9] Out of the 20 countries of our sample, there are two countries (Sudan and United Arab Emirates) for which short term interest rate data are not available over our sample period.

Table 9A. The impact of market interest rate

This table displays the estimation results of Equations (1) and (2) for two sub-samples, Islamic banks (columns (1) to (3)) and conventional banks (columns (4) to (6)), when we replace inflation by market (short-term) interest rates. See Table B1 for variable definitions. Robust z-statistics are reported in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% respectively.

	Islamic banks			Conventional banks		
	(1)	(2)	(3)	(4)	(5)	(6)
Lerner	0.0207	0.0298	0.0454	-0.0325***	-0.0303***	-0.0219***
	(1.11)	(1.64)	(0.79)	(-4.65)	(-4.21)	(-2.61)
HighShareIB		0.0126***			0.00205	
		(2.84)			(0.78)	
Lerner x HighShareIB		-0.0284*			-0.0149**	
		(-1.98)			(-2.00)	
HighMPOP			0.00691			0.00726
			(0.42)			(1.63)
Lerner x HighMPOP			-0.0460			-0.0264**
			(-0.81)			(-2.51)
Interest	0.00304***	0.00280***	0.00308***	0.00404***	0.00408***	0.00381***
	(5.44)	(5.17)	(4.54)	(11.35)	(11.27)	(12.87)
Constant	-0.102	-0.104	-0.0389	0.0287	0.0298	0.0470***
	(-1.16)	(-1.18)	(-0.53)	(1.23)	(1.27)	(2.97)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Time effects	Yes	Yes	Yes	Yes	Yes	Yes
N Obs.	438	438	438	2098	2072	2098
N Banks	81	81	81	363	361	363
R-squared	0.260	0.279		0.356	0.359	

Table 9B. The impact of Lerner and Islamic presence

	Islamic banks		Conventional banks	
	(1)	(2)	(3)	(4)
Impact of *Lerner* ($\beta_1 + \beta_3$) when Islamic banks market share is above the sample mean (columns (1) and (3)) and when Muslim population is above the sample mean (columns (2) and (4))				
	0.0014	-0.0005	0.04522***	-0.0482***
	(0.09)	(-0.01)	(-5.55)	(-6.41)
Impact of *Islamic presence* ($\beta_2 + \beta_3$) (columns (1) and (3)) when Islamic banks market share is above the sample mean and when Muslim population is above the sample mean (columns (2) and (4)) computed at different value of *Lerner*				
25thpercentile	0.0086	0.00047	-0.0007	0.0022
	(2.22)	(0.04)	(-0.49)	(0.67)
50thpercentile	0.00576	-0.0041	-0.0021	-0.0001
	(1.41)	(-0.46)	(-1.53)	(-0.04)
75thpercentile	0.0029	-0.0087	-0.0033**	-0.0022
	(0.62)	(-0.82)	(-2.29)	(-0.68)

Table 10A. Robustness: Alternative measure of PLS

This table displays the estimation results of Equation (1) and (2) for two sub-samples, Islamic banks (column (1), (2), and (3)) and conventional banks (column (4), (5), and (6)) when replacing ROE by ROA. See Table B1 for variable definitions. Robust z-statistics are reported in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% respectively.

	Islamic banks			Conventional banks		
	(1)	(2)	(3)	(4)	(5)	(6)
Lerner	0.00554	0.0172	0.0128	-0.0381***	-0.0359***	-0.0210***
	(0.30)	(0.94)	(0.26)	(-5.23)	(-4.94)	(-2.59)
HighShareIB		0.0166***			0.00609***	
		(3.08)			(2.64)	
Lerner x HighShareIB		-0.0305**			-0.00288	
		(-2.22)			(-0.44)	
HighMPOP			0.0183			0.0316***
			(1.14)			(7.16)
Lerner x HighMPOP			-0.0206			-0.0422***
			(-0.36)			(-3.86)
ROA	0.300***	0.262**	0.303**	0.0379	0.0262	0.0749*
	(2.87)	(2.55)	(2.42)	(0.85)	(0.60)	(1.72)
Constant	-0.184*	-0.181*	-0.101	-0.0949***	-0.0773**	-0.0208
	(-1.68)	(-1.71)	(-0.81)	(-2.70)	(-2.27)	(-0.76)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Time effects	Yes	Yes	Yes	Yes	Yes	Yes
N Obs.	499	499	499	2280	2257	2280
N Banks	96	96	96	380	379	380
R-squared	0.267	0.295		0.310	0.324	

Table 10B. The impact of Lerner and Islamic presence

	Islamic banks		Conventional banks	
	(1)	(2)	(3)	(4)
Impact of *Lerner* ($\beta_1 + \beta_3$) when Islamic banks market share is above the sample mean (columns (1) and (3)) and when Muslim population is above the sample mean (columns (2) and (4))				
	-0.0132	-0.0078	-0.0387***	-0.063***
	(-0.98)	(-0.17)	(-4.37)	(-7.4)
Impact of *Islamic presence* ($\beta_2 + \beta_3$) (columns (1) and (3)) when Islamic banks market share is above the sample mean and when Muslim population is above the sample mean (columns (2) and (4)) computed at different value of *Lerner*				
25^{th}percentile	0.0123***	0.0154	0.0055***	0.0235***
	(2.67)	(1.56)	(3.18)	(7.22)
50^{th}percentile	0.0092**	0.01335	0.0052***	0.0197***
	(2.06)	(1.69)	(3.05)	(6.42)
75^{th}percentile	0.0062	0.0112	0.0050***	0.0163***
	(1.29)	(1.18)	(2.68)	(5.17)

Table 11. Robustness: instrumental variable regression

This table displays the estimation results of Equations (1) and (2) for two sub-samples, Islamic banks (columns (1) and (2)) and conventional banks (columns (3) and (4)). See Table B1 for variable definitions. We conduct our regressions using the instrumental variables technique. We report the Hansen J-Statistics for the validity of our instruments and the Kleinbergen-Paap wald F-Statistics for the strength of our instruments. Standard errors are clustered at the bank level. Robust t-statistics are reported in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% respectively.

	Islamic banks		Conventional banks	
	(1)	(2)	(3)	(4)
Lerner	0.0106	0.0235	-0.0487***	-0.0441***
	(0.66)	(1.30)	(-6.43)	(-5.30)
HighShareIB		0.0168***		0.00728**
		(3.84)		(2.47)
Lerner x HighShareIB		-0.0440***		-0.00812
		(-3.13)		(-1.07)
ROE	0.0118	0.0315	0.0547***	0.0516***
	(0.39)	(1.10)	(4.30)	(4.09)
Liquidity	0.00738	0.00749	-0.0170**	-0.0201***
	(0.56)	(0.54)	(-2.56)	(-3.02)
LLR	0.0804**	0.0876**	-0.00704	-0.00387
	(2.17)	(2.52)	(-0.36)	(-0.20)
Equity	0.0841**	0.0816**	-0.0413	-0.0440*
	(2.28)	(2.42)	(-1.63)	(-1.74)
Size	0.0162***	0.0124**	0.00806***	0.00779***
	(2.98)	(2.33)	(4.59)	(4.39)
Listed	0.0258*	0.0207	0.0248***	0.0308***
	(1.70)	(1.34)	(5.55)	(6.00)
Inflation	0.0441***	0.0280**	0.0206***	0.0147**
	(2.91)	(2.11)	(2.93)	(2.16)
HHI	0.254***	0.260***	-0.0316	-0.0770***
	(3.64)	(3.83)	(-1.60)	(-4.01)
GGDP	-0.0359	-0.0322	-0.0238**	-0.0199*
	(-1.26)	(-1.14)	(-2.05)	(-1.78)
N Obs	413	413	2063	2041
N Banks	71	71	319	318
R-squared	0.361	0.396	0.247	0.266
Hansen J stat. (chi-sq.)	0.683	0.09	3.173	4.577
Hansen J stat. (p-value)	0.7106	0.9561	0.2046	0.1014
Kleibergen-Paap Wald F stat.	8.375***	12.743***	27.722***	27.946***
Impact of *Lerner* ($\beta_1 + \beta_3$) when Islamic bank market share is above the sample mean				
		-0.0205		-0.0522***
		(-1.79)		(-6.38)

5. Conclusion

This chapter investigates the impact of competition in dual banking markets and focuses on differences in deposit rate setting in Islamic and conventional banks. While, in theory, the specific nature of deposit accounts at Islamic banks should lead to significant differences compared with conventional banks' deposits, the literature has so far argued that Islamic and conventional banks deposit rates are closely pegged. We show that there are nevertheless notable differences in the determinants of deposit rates in the two types of institutions. Market power measured at the individual bank level by the Lerner index is only significant for conventional banks. Moreover, in predominantly Muslim countries or in countries with an important presence of Islamic banks, conventional banks set higher deposit rates and such rates are even higher for conventional banks with relatively lower market power. In such environments, conventional banks presumably face stronger difficulties to attract depositors, strengthening thereby the impact of competition. We further find that the conventional banks are sensitive to deposit rates offered by Islamic banks, while Islamic banks are only influenced by their peers and mostly in predominantly Muslim countries.

Our findings have important policy implications for the future of banking in dual markets where conventional and Islamic banks operate alongside and specifically in countries where Islamic banks are persistently gaining market shares. By providing some insights into the nature of competition in such dual markets, our work stresses the need to further investigate the degree of substitutability between the products and services provided by Islamic and conventional banks. The extent to which Islamic and conventional banks evolve in either segmented or integrated markets is of great importance for regulators in order to accurately measure market concentration in such dual banking markets. Moreover, because conventional banks are found to significantly react to stronger competition from Islamic banks, bank regulators and supervisors should carefully monitor price-setting behavior in both types of institutions in such dual markets to prevent possible destructive competition which could in turn jeopardize overall financial stability.

Appendix A: Lerner index computation

The Lerner index we compute here is consistent with Berger et al. (2009), Love and Martinez-Peria (2015), Turk-Ariss (2010) and Weill (2011). Total cost is estimated using the following trans-logarithm cost function:

$$\ln(\mathrm{TC}) = \propto_0 + \propto_1 \ln(\mathrm{TA}) + \frac{1}{2} \propto_2 (\ln \mathrm{TA})^2 + \sum_{j=1}^{3} \beta_j \ln(\mathrm{W_j}) + \sum_{j=1}^{3}\sum_{k=1}^{3} \beta_{jk} \ln(\mathrm{W_j}) \ln(\mathrm{W_k}) + \sum_{j=1}^{3} \gamma_j \ln(\mathrm{TA}) \ln(\mathrm{W_j}) + \varepsilon. \quad \text{(i)}$$

TC denotes total costs (sum of total interest expenses and total non-interest expenses) and TA is total assets. We use three input prices: (1) price of labor, W_1; price of capital, W_2; and price of funds, W_3. The price of labor is calculated by dividing personnel expenses to total assets. The price of capital is computed by calculating the ratio of other operating expenses to total assets. The price of funding is the ratio of interest expenses to total customer deposits. After we obtain all the coefficients from the cost function, we compute marginal cost by using equation (ii) as follows.

$$\mathrm{MC} = \frac{\mathrm{TC}}{\mathrm{TA}} \left(\propto_1 + \propto_2 \ln(\mathrm{TA}) + \sum_{j=1}^{3} \gamma_j \ln(\mathrm{W_j}) \right). \quad \text{(ii)}$$

$$\mathrm{Lerner_{it}} = \frac{\mathrm{Price_{it}} - \mathrm{MC_{it}}}{\mathrm{Price_{it}}}. \quad \text{(iii)}$$

Finally, the bank level Lerner index can be calculated using equation (iii). The Lerner index summarizes the differences between price of product and marginal costs, scaled by price. Price is the ratio of total revenue (sum of total interest income and total non-interest operating income) to total assets. Generally speaking, a higher value of the Lerner index indicates higher market power or lower market competition because banks are able to set the price above the marginal cost in less competitive markets. The value of the Lerner index ranges between 0 (high market power/lowly competitive market) and 1 (low market power/highly competitive market). However, the Lerner index can also be negative for inefficient banks (Soedarmono et al., 2011).

Appendix B: Correlation matrix

Table B2. Correlation matrix of Islamic banks' sub-sample

	Deposit rate	Lerner	Lerner IB	Lerner CB	Lerner MKT	High ShareIB	High MPOP	ROE	Liquidity	LLR	Equity	Size	ROA	Listed	Inflation	HHI	GGDP	Interest
Deposit rate	1.000																	
Lerner	-0.151	1.000																
LernerIB	-0.117	0.637	1.000															
LernerCB	-0.428	0.447	0.586	1.000														
LernerMKT	-0.407	0.462	0.635	0.984	1.000													
HighShareIB	-0.080	0.116	0.353	0.364	0.342	1.000												
HighMPOP	0.263	0.196	0.475	0.209	0.247	0.214	1.000											
ROE	0.031	0.564	0.444	0.160	0.193	0.072	0.233	1.000										
Liquidity	-0.152	-0.275	-0.321	0.016	0.003	-0.182	-0.273	-0.327	1.000									
LLR	0.100	-0.216	-0.256	-0.177	-0.190	-0.044	0.058	-0.298	0.197	1.000								
Equity	0.137	-0.067	0.052	0.221	0.229	0.080	0.133	-0.106	0.236	0.063	1.000							
Size	-0.351	0.520	0.424	0.451	0.446	0.268	0.108	0.327	-0.288	-0.172	-0.252	1.000						
ROA	0.115	0.606	0.516	0.220	0.254	0.096	0.235	0.642	-0.232	-0.334	0.127	0.342	1.000					
Listed	0.103	0.040	0.024	-0.026	-0.005	-0.251	0.008	0.065	0.261	-0.026	0.157	-0.171	0.107	1.000				
Inflation	0.247	-0.054	0.069	-0.101	-0.096	0.030	0.326	0.058	0.040	0.067	0.074	-0.156	0.074	0.275	1.000			
HHI	0.007	0.232	0.229	0.247	0.261	-0.093	0.199	0.002	0.130	0.117	0.320	-0.103	0.198	0.115	0.059	1.000		
GGDP	0.087	0.027	-0.045	-0.083	-0.089	-0.138	-0.045	0.131	-0.074	-0.026	-0.103	-0.036	0.038	-0.069	0.184	-0.179	1.000	
Interest	0.441	-0.177	-0.088	-0.483	-0.470	-0.002	0.406	0.002	-0.150	0.110	-0.117	-0.413	-0.069	0.019	0.406	-0.115	-0.034	1.000

Table B3. Correlation matrix of conventional banks' sub-sample.

	Deposit rate	Lerner	Lerner IB	Lerner CB	Lerner MKT	High ShareIB	High MPOP	ROE	Liquidity	LLR	Equity	Size	ROA	Listed	Inflation	HHI	GGDP	Interest
Deposit rate	1.000																	
Lerner	-0.377	1.000																
LernerIB	0.060	0.269	1.000															
Lerner CB	-0.285	0.479	0.399	1.000														
LernerMKT	-0.273	0.464	0.415	0.986	1.000													
HighShareIB	0.017	0.160	0.326	0.257	0.222	1.000												
HighMPOP	0.244	0.070	0.591	0.175	0.186	0.195	1.000											
ROE	0.013	0.444	0.203	0.134	0.138	-0.041	0.087	1.000										
Liquidity	-0.145	-0.023	-0.197	-0.097	-0.125	-0.096	-0.172	-0.064	1.000									
LLR	0.035	-0.092	0.156	-0.049	-0.059	0.148	0.190	-0.265	0.153	1.000								
Equity	0.008	0.125	0.204	0.139	0.146	0.050	0.111	-0.024	0.121	0.117	1.000							
Size	-0.255	0.208	-0.142	-0.014	-0.025	0.043	-0.128	0.096	-0.183	-0.214	-0.455	1.000						
ROA	-0.029	0.573	0.255	0.191	0.200	-0.009	0.111	0.760	-0.059	-0.240	0.197	-0.004	1.000					
Listed	0.055	-0.021	-0.130	-0.013	-0.005	-0.178	-0.035	0.041	0.132	0.081	-0.033	-0.029	-0.003	1.000				
Inflation	0.238	-0.043	0.256	-0.007	-0.002	0.047	0.337	0.066	-0.092	0.122	0.082	-0.180	0.097	0.230	1.000			
HHI	-0.167	0.093	0.061	0.048	0.046	-0.108	0.002	0.012	0.221	0.172	-0.002	0.002	0.017	0.189	-0.030	1.000		
GGDP	0.075	0.034	0.228	0.066	0.068	-0.080	0.232	0.132	-0.061	-0.060	0.112	-0.148	0.145	-0.042	0.174	-0.151	1.000	
Interest	0.580	-0.182	0.301	-0.268	-0.265	0.098	0.435	0.112	-0.129	0.196	0.055	-0.308	0.126	-0.028	0.446	-0.165	0.083	1.000

Chapter 2

Competition-stability nexus in the dual banking market

Abstract

This chapter examines the impact of market competition on the stability of Islamic and conventional banks in countries where these banks operate alongside one another. To investigate this issue, we use a sample of 100 Islamic and 390 conventional banks from 19 countries. Our baseline result shows that competition in a dual market erodes banks' stability. The heightened competitive pressure in a dual market encourages banks to engage in excessive risk-taking that can jeopardize their stability. However, the effect of competition is missing for Islamic banks, suggesting their superiority in having religious clients. Although our overall results support the 'competition-fragility' hypothesis, we find that competition can be beneficial for banks, especially at a low to medium competition level. Last, we also find that the adverse impact of competition can be reduced by having high capitalization, especially in the case of a conventional bank. Some policy implications are discussed in this study.

Keywords: Competition, stability, dual banking, Islamic banks, Z-score, Lerner index

1. Introduction

There is an intense debate in the banking literature on the relationship between competition and stability. A seminal paper by Keeley (1990) initiated the debate by showing that a high level of competition erodes the charter or franchise value (present value of future profitability), which therefore reduces banks' incentives to behave prudently. Under this 'competition-fragility' view, banks cannot earn monopoly rents in a competitive market and hence suffer from weaker profits and lower stability. This hypothesis is supported by some works (Hellmann et al., 2000; Jiménez et al., 2013; Repullo, 2004). Boyd and Nicoló (2005) challenge this argument by promoting the 'competition-stability' hypothesis. Increased competition in the banking market will force banks to give a lower loan rate to the borrower. Accordingly, banks' probability of default is reduced because borrowers have a higher probability of loan repayment. Boyd et al. (2006) and Schaeck et al. (2009), among others, support this view.

In the present study, we address the relationship between competition and stability in the dual banking market where Islamic and conventional banks operate alongside one another. This is a major issue in banking studies because, according to the data from the World Bank[1], the dual banking system is now adopted in more than 50 countries. The remarkable growth of Islamic banks in the dual market is likely to have an impact on banks' stability. Are Islamic banks more stable than conventional banks? Does the banking system respond positively to the intensified competition between the two bank types? This study aims to answer these questions. Additionally, the issue of competition and stability in a dual banking market is interesting because in this banking system, two types of banks compete to attract customers. Despite the fact that Islamic banks are relatively new to the market, conventional banks' behavior in the dual market has changed in reaction to this situation. A recent study by Meslier et al. (2017) shows that conventional banks counter Islamic banks' competitive pressure by setting higher deposit rates when their market power is lower. The behavior of conventional banks, in this case, could jeopardize their financial stability.

Despite the importance of the competition-stability issue in the dual banking system, previous studies in this area are surprisingly muted, many of which investigated competition and stability separately. On the one hand, some prior works highlight competitive conditions in a dual banking system. Using multiple countries data, Turk-Ariss (2010) and Hamza and

[1] http://go.worldbank.org/AE0U8AYQ20

Katchouli (2014) highlight that the Islamic banking market is less competitive compared to conventional banking, whereas Weill (2011) does not find significant differences between them. In a similar vein, Cupian and Abduh (2017), using a single country dataset, find that Islamic banks in Indonesia have high market power as an implication of the low degree of competition. On the other hand, a strand of literature has investigated Islamic banks' stability compared to its conventional counterparts. Cihak and Hesse (2010) begin the discussion by providing empirical evidence about Islamic banks' stability relative to their size. They find that small Islamic banks tend to be financially stronger than small conventional banks and large Islamic banks. Abedifar et al. (2013) confirm the finding by showing that small Islamic banks have lower credit risk and are more stable than conventional banks. Beck et al. (2013) highlight that even though Islamic and conventional banks are not different regarding their business model, Islamic banks are better capitalized, have higher asset quality, and are less likely to disintermediate during a crisis. The last finding was also supported recently by Fakhfekh et al. (2016), who observe that Islamic banks are more resilient than conventional banks, although the degree of resilience is heterogeneous and sample dependent.

A recent study by Kabir and Worthington (2017), to the best of our knowledge, is the only study that specifically investigates the impact of market competition on banks' stability in the context of the dual banking system. Their results support the 'competition fragility' hypothesis. They also find that the magnitude of the market power effect on stability is greater for conventional banks than Islamic banks. Although investigating the same issue, this work will be different in some respects and therefore contribute to the literature in several ways. First, we use different techniques and different variable measurements. Whereas Kabir and Worthington (2017) use panel vector autoregressive (PVAR) and two-stage quantile regression, this study will use fixed-effect (FE) and two-stages least squares (2SLS). Furthermore, in contrast to Kabir and Worthington (2017), who focus on both accounting (Z-score) and market-based measures of stability (distance-to-default), our approach only focuses on accounting measures because (1) it is directly related to the probability of banks' insolvency[2], (3) it is popular and widely used in the empirical banking study and is implemented as a time-varying measure in panel studies, and (3) it uses market-based measure stock price data to estimate volatility in the stock price data, but most Islamic banks are not listed in the equity market[3]. In addition, following Leon (2015), rather than using a bank-level

[2] For instance, the probability that the value of its assets becomes lower than the value of the debt.
[3] Since we only use accounting measures, we can cover more countries than Kabir and Worthington (2017).

Lerner index as in Kabir and Worthington (2017) to measure competition, we use a weighted average Lerner index at the country level. We believe that this measure will be more appropriate in our case since we investigate the impact of country-level market competition, not bank-level market power. We also use H-Statistics as another proxy of competition at the country level in the robustness section.

Second, in the present chapter, we go further by considering the moderating role of capitalization, crisis, and bank size. We investigate whether these conditions may alter the relationship between competition and stability. Our approach is motivated by some prior works highlighting the importance of capitalization, crisis, and bank size on banks' stability. Schliephake (2016) show that bank capitalization moderates the impact of competition on financial stability. Cihak and Hesse (2010) document that smaller Islamic banks have better stability than larger banks, even though Ibrahim and Rizvi (2017) have recently found that larger Islamic banks are stronger. Regarding financial crises, other works show that Islamic banks are more resilient than conventional banks during financial panics (Beck et al., 2013; Farooq and Zaheer, 2015; Hasan and Dridi, 2010; Olson and Zoubi, 2016).

To investigate the above-mentioned issues, we employ a dataset containing 100 Islamic and 390 conventional banks from 19 countries where the dual banking market applies. Our baseline result shows that competition between Islamic and conventional banks in the dual market erodes financial stability. This finding remains consistent after controlling for both bank- and country-specific variables. The finding is also robust either when we use the FE technique or consider the endogeneity problem by using the 2SLS technique. Our result confirms the 'competition-fragility' hypothesis in a dual market proposed by Kabir and Worthington (2017). The heightened competition between Islamic and conventional banks may encourage banks to take excessive risks that could threaten their financial stability. In the next analysis, we find that even though competition promotes financial fragility in the dual market, the impact for Islamic and conventional banks is different. Intensified dual market competition is not significant for Islamic banks where conventional banks are significantly impacted. This result is different from Kabir and Worthington (2017), who find a similar effect for two bank types but is in line with Meslier et al. (2017), who find the missing effect of competition on Islamic banks' deposit rate setting. Islamic banks might benefit from captive clients, making them more stable even in a highly competitive market. Moreover, we also observe in this study that the different level of competition will yield a different impact on conventional banks' stability. Whereas Islamic banks are not affected either by low or high competitive pressure,

conventional banks' stability increases when the competition is low, and conversely, it significantly shrinks when competition is high.

Regarding the further analysis, in the present work, we also find that the competition-stability nexus in the dual market is also altered by bank capitalization and size. Competition promotes financial fragility, but their effect diminishes when banks have high capital ratio (lower solvency risk). This result is consistent with Schliephake (2016). The detrimental effect of competition increases with an increase of the bank's size. It suggests that the competition-fragility nexus is more pronounced in large banks. Banks in the dual market appear to be more stable when operating on a small scale rather than a large scale. Our finding, therefore, supports Cihak and Hesse (2010). Additionally, we also find little evidence that Islamic banks' stability increases with the impact of competition during the crisis period, which is in line with the prior literature highlighting the superiority of Islamic banks during the financial crisis (Farooq and Zaheer, 2015; Hasan and Dridi, 2010; Olson and Zoubi, 2016).

Taking all of the results altogether, two policy implications can be offered from this chapter. First, regulators and supervisors should carefully monitor competitive conditions in the dual banking market. The heightened dual market competition could encourage banks, either Islamic or conventional banks, to take excessive risk that thus jeopardizes their financial stability. Regulators should also monitor banks' capitalization and size since it can moderate the adverse impact of competition. Second, even though we find that the impact of market competition differs for Islamic and conventional banks, it is not necessary to separate competition regulation for two bank types. Instead, countries with dual markets can establish an institution that specifically focuses on Islamic banking development to promote Islamic banks' position as a complement for conventional banks. This is important because one of the aims of Islamic banks in the dual market is to reach religious unbanked people who do not interact with interest-based financial institutions. When Islamic banks can play a role as a complement, it benefits in terms of more financial inclusion. An example of this institution is the Shariah Directorate in the central bank of Indonesia that is specifically supervising and promoting Islamic banking development (Choudhury and Harahap, 2009; Choudhury and Nurul Alam, 2013).

The structure of our chapter is as follows. Section 2 explains the data, variables, and methodology we use. Section 3 presents the result we obtain in this study, including further analysis and robustness tests. Section 4 concludes the chapter.

2. Data, variables, and methodology

2.1. Data

We extract all of our bank-level dataset from BvD Bankscope. We focus on countries with both Islamic and conventional banks. Following prior work in Islamic banking (Abedifar et al., 2013; Cihak and Hesse, 2010; Meslier et al., 2017), we correct the misclassification issues in Bankscope by cross-checking our Bankscope data, the World Bank dataset in Islamic banks, and each Islamic bank's website. After obtaining the correct Islamic and conventional banks' sample, we create the ratios, winsorize the extreme values at the 1st and 99th percentiles, and retain for banks with a minimum of 4 observations. Our final sample covers 100 Islamic and conventional banks with a total 3458 observations. Regarding country-level data, we obtain the inflation rate and the growth of GDP from the World Bank website. We also use the measure of law enforcement (rule of law) and government efficiency obtained from the world governance indicators (WGI) dataset. Table 1 provides details of the number of banks in each country and some country-level variables.

2.2. Dependent variable: Z-score

We use the Z-score, which has been extensively applied in the banking literature to measure bank stability. The Z-score measures the standard deviation that the banks' return has to diminish to deplete equity. The Z-score is computed as follows.

$$Z_{it} = \frac{ROA_{it} + EQTA_{it}}{SDROA} \quad \dots \quad (1)$$

where ROA is return on assets for bank *i* and year *t*, EQTA is the capital asset ratio for bank *i* and year *t*, and SDROA is the standard deviation of ROA calculated over the full sample. According to Lepetit and Strobel (2013), the Z-score computation method, as seen in equation (1), are practical because it provides a time-varying z-score without requiring initial observations to be dropped as in the rolling approach. The standard deviation of ROA ($SDROA_{it}$) that was computed over the full sample as in equation (1), after being tested by Lepetit and Strobel (2013), also provides a lower average RMSE (Root Mean Squared Error) than the rolling moment method. Moreover, our approach in equation (1) has also been used by many works previously (Beck et al., 2013; Cihák and Hesse, 2007; Fiordelisi and Mare, 2014; Fu et al., 2014; Laeven and Levine, 2009)[4]. Because the distribution of the Z-score is

[4] Lepetit and Strobel (2013) also propose a new method of Z-score computation. We will use it in the robustness section.

highly skewed, we use a natural logarithm of the Z-score (Anginer et al., 2014; Laeven and Levine, 2009). A higher value of the Z-score means a lower probability of insolvency risk and therefore better bank stability.

Table 1. The number of banks in sample countries and some country-level variables.

Country	Islamic banks	Conv. banks	LernerMkt	HSTAT	HHI	Law	GovEff
Bahrain	12	9	0.192	n.a.	0.158	0.487	0.504
Bangladesh	5	27	0.208	0.634	0.085	-0.827	-0.760
Egypt	2	21	0.135	n.a.	0.146	-0.325	-0.581
Indonesia	3	64	0.281	0.425	0.097	-0.672	-0.277
Iraq	1	3	0.292	n.a.	0.157	-1.555	-1.163
Jordan	3	9	0.282	0.390	0.373	0.364	0.130
Kenya	1	29	0.320	0.386	0.109	-0.887	-0.544
Kuwait	9	5	0.444	n.a.	0.186	0.561	0.082
Malaysia	16	25	0.291	0.386	0.091	0.502	1.085
Pakistan	7	22	0.256	n.a.	0.106	-0.853	-0.640
Qatar	3	6	0.486	n.a.	0.270	0.798	0.716
Saudi Arabia	6	7	0.467	0.194	0.115	0.175	-0.134
South Africa	1	15	0.204	0.564	0.288	0.100	0.507
Sudan	14	2	0.214	n.a.	0.301	-1.340	-1.315
Tunisia	1	8	0.318	n.a.	0.116	0.051	0.292
Turkey	4	25	0.146	0.434	0.122	0.076	0.290
United Arab Emirates	8	17	0.448	0.501	0.102	0.530	0.948
United Kingdom	2	93	0.219	0.442	0.128	1.682	1.672
Yemen	2	3	0.274	n.a.	0.284	-1.144	-1.051
Total	100	390					
Mean			0.274	0.438	0.139	0.181	0.343

2.3. Independent variable: Lerner index

The degree of competition in the banking market can be proxied through a traditional industrial organization or newer empirical approaches. The former approach investigates the extent of market competition indirectly through the structural-conduct-performance (SCP) hypothesis, which explains that the level of market power of the bank can be examined through the bank performance. Researchers usually use the concentration ratio, market share, or Herfindahl-Hirschman Index (HHI). The latter approach originated from the inadequacy of traditional measurements because the measures of bank performance that measure SCP theory do not appropriately indicate the degree of bank market power (Claessens and Laeven, 2004). Therefore, the level of bank competition should be measured endogenously (Soedarmono et

al., 2011). The popular measurements in a newer empirical approach are the Panzar-Rosse model and the Lerner index. In the present study, we employ the Lerner index to measure market competition[5]. We do not use traditional measurements of competition (concentration ratios) because prior studies report that bank concentration is an insufficient and ambiguous measure (Berger et al., 2009, 2004)[6].

The Lerner index corresponds to banks' strength in influencing the price of their banking products. Typically, the Lerner index is a markup of the banks' price of the product over their marginal costs. A higher value Lerner index indicates greater market power. We follow the previous work of Meslier et al. (2017), Turk-Ariss (2010) and Weill (2011) to create the index. The index is computed by the following equation.

$$\text{Lerner}_{it} = \frac{\text{Price}_{it} - \text{MarginalCost}_{it}}{\text{Price}_{it}} \quad \dots \quad (2)$$

Price is the ratio of total banks' revenue to total assets. Marginal cost is the first difference of the trans-log cost function as follows.

$$\text{MarginalCost} = \frac{\text{TotalCosts}}{\text{TotalAssets}}\left(\propto_1 + \propto_2 \ln\text{TotalAssets} + \sum_{j=1}^{3} \gamma_j \ln(W_j)\right) \quad \dots \quad (3)$$

$$\ln\text{TotalCosts} = \propto_0 + \propto_1 \ln\text{TotalAssets} + \frac{1}{2} \propto_2 \ln\text{TotalAssets}^2 + \sum_{j=1}^{3} \beta_j \ln(W_j) + \sum_{j=1}^{3}\sum_{k=1}^{3} \beta_{jk} \ln(W_j) * \ln(W_k) + \sum_{j=1}^{3} \gamma_j \ln\text{TotalAssets} * \ln(W_j) + \varepsilon \quad \dots \quad (4)$$

where W_j corresponds to (1) W_1: the price of labor: the ratio of personnel expenses to total assets; (2) W_2: the price of capital: the ratio of other non-interest expenses to fixed assets; and (3) W_3: the price of the fund: the ratio of interest expense to total banks' funding. The cost function in equation (5) is estimated at the country level using a fixed-effect estimator.

Since we focus on the market-level competition, following Leon (2015) and Meslier et al. (2017), we use the weighted average value of the Lerner index to create a country-level Lerner index (LernerMkt_{jt}). Therefore, the Lerner index can be interpreted directly as a degree of banking market competition instead of bank-level market power. A greater LernerMkt implies lower competition because when competition is high, most of the banks (on average) are not supposed to have strong market power.

[5] The Panzar-Rosse model will be also used in this paper in the robustness check.
[6] Instead, we will use HHI in the controls to consider the market concentration.

2.4. Controls

We also include a set of bank-level and country-level controls in our analysis. First, we use net interest margins (NIM_{it}). To calculate NIM, we follow Trinugroho et al. (2014) by employing a ratio of net interest income to total earning assets. According to Fu et al. (2014), it is necessary to employ NIM because we need to control banks' profitability, especially regarding a bank's investing and lending activities. Second, we use LLR_{it} (ratio of loan loss reserve to total assets) to control banks' credit risk. Soedarmono et al. (2011) note that one of the most important determinants of bank stability is a credit risk. Third, we employ $EQTA_{it}$ (capitalization). Abedifar et al. (2013) mention that banks with high capital ratio can have a higher capacity of risk taking, which therefore may influence their financial stability. Schliephake (2016) also find the different effect of competition between high and low capitalized banking sectors. We also control bank size using a log of total assets ($LnTA_{it}$) as seen in Čihák and Hesse (2010), who observe the different performances of small and large Islamic and conventional banks in dual markets. To control the macroeconomic differences, we use inflation ($INFL_{jt}$), GDP Growth ($GGDP_{jt}$), and the 2008-2009 financial crisis period ($Crisis_{jt}$). The summary of our variable explanations is provided in Table 2. We also provide the descriptive statistics and correlation matrix in Tables 3 and 4.

2.5. Methodology

To investigate the impact of market competition on banks' stability, we construct the following equation:

$$\mathrm{LnZROA_{it}} = \alpha_0 + \beta \mathrm{LernerMkt_{jt}} + \varphi \mathrm{X_{it-1}} + \gamma \mathrm{Z_{jt}} + \varepsilon_{i,t} \quad \ldots \quad (5)$$

where subscripts *i*, *j*, and *t* correspond to bank *i*, country *j*, and year *t*. $LnZROA_{jt}$ is bank stability, $LernerMkt_{jt}$ is the average value of the Lerner index as our measure of market competition, X_{it-1} is a vector of bank-level variables (NIM, LLR, EQTA, Size) in a one-year lagged period, and Z_{jt} is a vector of country-level variables (INFL, GGDP, Crisis). Equation (5) will be estimated using fixed-effect estimators with the robust standard error clustered at the bank levels.

Table 2. Variables description.

Variable	Definition	Primary references	Source
LnZ_{it}	Log of Z-score to measure bank stability.	(Beck et al., 2013; Fu et al., 2014)	Bankscope, Authors calculation
$LnAltZ_{it}$	An alternative measurement of the Z-score	(Lepetit and Strobel, 2013)	Bankscope, Authors calculation
$LernerMkt_{jt}$	The country weighted-average value of banks' Lerner index to measure market competition. The Lerner index is calculated using a trans-log cost function with three input prices.	(Leon, 2015; Meslier et al., 2017)	Bankscope, Authors calculation
$AltLernerMkt_{jt}$	An alternative measurement of the Lerner index. It is a weighted average of banks' Lerner index that is calculated using the trans-log cost function with two input prices.	(Fu et al., 2014)	Bankscope, Authors calculation
$HSTAT_{jt}$	H-statistic derived from the Panzar and Rosse model.	(Turk-Ariss, 2010a)	Bankscope, Authors calculation
NIM_{it-1}	Lag value of net interest margins to proxy banks' profitability. It is a ratio of net interest income to total earning assets.	(Fu et al., 2014; Trinugroho et al., 2014)	Bankscope, Authors calculation
LLR_{it-1}	Lag value of the ratio of loan loss reserve to total assets to measure credit risk.	(Soedarmono et al., 2011)	Bankscope, Authors calculation
$EQTA_{it-1}$	Lag value of the capital asset ratio to measure banks' solvency.	(Abedifar et al., 2013; Schliephake, 2016)	Bankscope, Authors calculation
$Size_{it-1}$	Lag value of the natural logarithm of total assets to measure banks' size.	(Cihak and Hesse, 2010)	Bankscope, Authors calculation
HHI_{jt}	Herfindahl Hirschman index to proxy market concentration.	(Berger et al., 2009)	Bankscope, Authors calculation
$INFL_{jt}$	Inflation	(Soedarmono et al., 2011)	World bank
$GGDP_{jt}$	Growth of GDP	(Soedarmono et al., 2011)	World bank
$Crisis_{jt}$	Crisis	(Cihak and Hesse, 2010)	
Law_{jt}	The rule of law index. Ranges from -2.5 (weak) to 2.5 (strong).	(Kaufmann et al., 2010, 2005)	Worldwide governance indicator (WGI) dataset
$GovEff_{jt}$	Government efficiency index. Ranges from -2.5 (weak) to 2.5 (strong).	(Kaufmann et al., 2010, 2005)	Worldwide governance indicator (WGI) dataset

Table 3. Descriptive statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
LnZ_{it}	3892	1.6171	0.5584	0.2812	3.1734
LnAltZ	3892	1.6405	0.4996	0.7014	3.0557
$LernerMkt_{jt}$	3892	0.2833	0.1094	-0.0215	0.5931
$AltLernerMkt_{jt}$	3890	0.2656	0.1601	-0.3203	0.4709
$HSTAT_{jt}$	3022	0.4359	0.1854	0.0911	0.8424
NIM_{it-1}	3892	0.0380	0.0253	-0.0144	0.2118
LLR_{it-1}	3892	0.0529	0.0684	0.0008	0.4737
$EQTA_{it-1}$	3892	0.1314	0.0871	0.0368	0.5028
$Size_{it-1}$	3892	14.7372	2.0117	9.6159	19.7465
HHI_{jt}	3892	0.1359	0.0823	0.0425	0.7715
$INFL_{jt}$	3892	0.0672	0.0650	-0.2422	0.3742
$GGDP_{jt}$	3892	0.0191	0.0357	-0.1734	0.1431
$Crisis_{jt}$	3892	0.1680	0.3739	0.0000	1.0000
Law_{jt}	3892	0.1957	0.9217	-1.7715	1.8869
$GovEff_{jt}$	3892	0.3555	0.8802	-1.5569	1.9000

Note: Please see Table 2 for the variable descriptions.

Table 4. Correlation matrix

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1)	LnZ_{it}	1									
(2)	$LernerMkt_{jt}$	0.269	1								
(3)	NIM_{it-1}	0.329	0.012	1							
(4)	LLR_{it-1}	0.161	-0.034	0.082	1						
(5)	$EQTA_{it-1}$	0.832	0.167	0.243	0.224	1					
(6)	$Size_{it-1}$	-0.382	0.119	-0.280	-0.232	-0.401	1				
(7)	HHI_{jt}	0.033	-0.056	-0.016	0.131	0.029	-0.100	1			
(8)	$INFL_{jt}$	0.118	0.018	0.191	0.074	0.052	-0.167	0.045	1		
(9)	$GGDP_{jt}$	-0.037	-0.095	0.130	-0.017	-0.059	-0.120	-0.022	0.158	1	
(10)	$Crisis_{jt}$	-0.020	-0.041	0.027	-0.059	-0.013	0.026	-0.047	-0.020	-0.370	1

Note: Please see Table 2 for the variable descriptions.

The prior literature also considers the possible endogeneity problem between banks' market power and stability (Beck et al., 2006; Berger et al., 2004; Schaeck and Cihak, 2010; among others). On the one hand, a bank with a high degree of market power will also have better stability because they are able to determine the price of their product, which is far from their marginal cost. On the other hand, if a bank increases its risk-taking, they will have a higher expected return, which can be converted into higher market power. To address this issue, we will also estimate equation (5) using two-stages least squares (2SLS). Three instruments are used: the lagged value of our competition proxy ($LernerMKT_{jt-1}$), the rule of law index (Law_{jt}),

and government efficiency ($GovEff_{jt}$). Law_{jt} and $GovEff_{jt}$ are compiled by Kaufmann et al. (2010, 2005) and have also been used by Cihak and Hesse (2010) to manipulate market competition.[7] These variables are available online in the World Governance Indicator (WGI) dataset.[8]

3. Empirical results

3.1. Baseline regression

We estimate equation (5) to test the competition-stability nexus in a banking market that adopts a dual banking system. We provide the result in Table 5. In column (1), using the fixed-effect technique, we find a positive sign of the country-level Lerner index (LernerMkt), indicating that the higher banks' market power on average (lower competition) is associated with higher banks' stability. This result is confirmed in column (2) when we use the 2SLS estimator. The significant value of LernerMkt is supported by tests of weak identification and over-identification of the instruments we use. We see that the Kleibergen-Paap F Statistics are highly significant (272.6***), confirming that instruments we use in this study are strong enough to explain LernerMkt. The non-significant value of the Hansen J-Statistics (0.147) suggests that our instruments are valid (not correlated with the error term).

Our finding therefore supports the 'competition-fragility' hypothesis, in line with Kabir and Worthington (2017). In dual banking markets, Islamic banks have to compete with both Islamic and conventional banks. Likewise, conventional banks also compete with their conventional and Islamic peers. This condition implies that the degree of competition in the dual banking market has been relatively high. Some studies either indirectly or directly show that heightened competition in the dual market influences Islamic or conventional banks' behavior. For instance, Cihak and Hesse (2010) highlight that a higher presence of Islamic banks in banking sectors tends to weaken Islamic banks' own stability. As a response to the competitive pressure of conventional banks, other studies show that Islamic banks adjust their rates of deposit for the sake of competition (Charap and Cevik, 2015; Chong and Liu, 2009; Ito, 2013; Saraç and Zeren, 2014). On the other hand, another study reports that conventional banks' efficiency is also affected by the presence of large Islamic banks in the market (Abedifar et al., 2016). Meslier et al. (2017) document that conventional banks' deposits in the dual

[7] The government effectiveness index has also been used by Doumpos et al. (2017) as a determinant of the financial strength index. Similar to Cihak and Hesse (2010), Soedarmono et al. (2011) also use rule of law for instrument market competition.
[8] http://info.worldbank.org/governance/wgi/index.aspx#home

banking market are influenced by Islamic banks' market power. Meslier et al. (2017) also argue that conventional banks' response to Islamic banks' competitive pressure could jeopardize their financial stability, especially when they intend to offer higher deposit rates than when their market power is lower.

Table 5. Banks' stability in the dual banking market

	FE	2SLS
	(1)	(2)
$LernerMkt_{jt}$	0.449***	0.491***
	(4.44)	(3.07)
NIM_{it-1}	1.731***	1.720***
	(3.49)	(3.39)
LLR_{it-1}	0.158	0.161
	(1.05)	(1.34)
$EQTA_{it-1}$	3.284***	3.283***
	(18.79)	(18.93)
$Size_{it-1}$	-0.0652***	-0.0660***
	(-3.62)	(-4.16)
HHI_{jt}	-0.624***	-0.618***
	(-3.97)	(-4.94)
$INFL_{jt}$	0.287***	0.287***
	(3.06)	(3.14)
$GGDP_{jt}$	0.280	0.265*
	(1.56)	(1.81)
$Crisis_{jt}$	0.0432	0.0402
	(1.33)	(1.31)
N obs	3892	3892
N group	490	490
R-sq.	0.339	
KP F-Stat.		272.6***
Hansen J-Stat.		0.147

Notes: This table provides the estimation results of equation (5) using fixed effect (FE) and two-stages least squares (2SLS) techniques. The validity of the instruments is tested using KP (Kleibergen Paap) F-Statistics and Hansen J-Statistics. Please refer to Table 2 for a description of the variables. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Turning to the control variables, we observe the significant result of NIM, EQTA, Size, HHI, and INFL. NIM positively affects banks' stability, meaning that the higher profitability of banks will reduce banks' fragility. Banks that can generate more money from their investment and lending activities will be more stable. EQTA is positively related to stability. Banks with more capital ratio, possibly with a higher capital buffer, will be less likely to fail when facing intensified competition in the dual market. Size shows a negative sign, suggesting

that banks in the dual market are more stable when they are small. Small banks might be more conservative, whereas larger banks may take more risks. The negative sign is also shown by HHI. In a market with a high concentration (high HHI), banks' stability will be reduced. This suggests that high concentration is not associated with low competition, a similar finding to Fu et al. (2014). Inflation surprisingly shows a positive impact on banks' stability. It might be associated with the rate offered to clients by the banks. In a high inflation period, banks charge high rates from their customers. The interest income will therefore increase, in addition to the profitability. This condition will result in a lower volatility of profitability (better stability).

3.2. Islamic and conventional banks subsample

Since prior studies highlight the possible differences between Islamic and conventional banks' stability (Abedifar et al., 2013; Beck et al., 2013; Cihak and Hesse, 2010, among others), we are interested in seeing whether the impact of competition is also different between two bank types. We then estimate equation (5) within each type of bank separately. The results are presented in Table 6.

The results in column (1) and (2) indicate that market competition in the dual banking system is not important for Islamic banks' stability. On the other hand, we see that market competition still erodes conventional banks' stability, as displayed in columns (3) and (4). Our results are robust across the estimation techniques (FE and 2SLS) we use.

As documented by Meslier et al. (2017), the way in which Islamic banks compete in the dual banking market is not necessarily similar to that of conventional banks. Meslier et al. (2017) show a form of asymmetric competition in which Islamic banks only compete with other Islamic banks but conventional banks compete with both Islamic and conventional banks. This is because the existence of Islamic banks is mainly to fulfill the need of religious customers who hesitate to use conventional banking products (Demirgüç-Kunt et al., 2013; Gheeraert, 2014). Conventional banks will face difficulties in finding religious depositors even after reducing their prices. Conversely, Islamic banks are able to attract both religious and conventional (non-religious) clients, especially when Islamic banks provide better prices. Ariff (2014) highlights that Islamic banks at present do not only focus on Muslims. Some Islamic banks even have non-Muslim clientele at approximately 40% (Ariff, 2014).

Table 6. The impact of market competition on Islamic and conventional banks' stability.

	Islamic banks		Conventional banks	
	FE	2SLS	FE	2SLS
	(1)	(2)	(3)	(4)
$LernerMkt_{jt}$	0.189	0.325	0.492***	0.448**
	(0.95)	(0.70)	(4.49)	(2.49)
NIM_{it-1}	-0.462	-0.481	2.259***	2.275***
	(-0.56)	(-0.33)	(3.60)	(4.30)
LLR_{it-1}	0.249	0.250	0.198	0.195
	(0.84)	(1.13)	(1.20)	(1.44)
$EQTA_{it-1}$	3.471***	3.476***	3.128***	3.131***
	(9.52)	(10.10)	(15.85)	(15.77)
$Size_{it-1}$	-0.0338	-0.0305	-0.0703***	-0.0693***
	(-0.69)	(-0.82)	(-3.53)	(-3.92)
HHI_{jt}	-0.488**	-0.520***	-0.795***	-0.815***
	(-2.58)	(-2.81)	(-3.15)	(-3.77)
$INFL_{jt}$	0.612***	0.611***	0.146*	0.146*
	(3.01)	(3.12)	(1.71)	(1.74)
$GGDP_{jt}$	0.664*	0.626*	0.115	0.133
	(1.89)	(1.95)	(0.66)	(0.88)
$Crisis_{jt}$	0.111	0.0921	0.0319	0.0344
	(1.24)	(0.98)	(0.90)	(1.05)
N obs.	640	640	3252	3252
N banks	100	100	390	390
R-sq	0.410		0.342	
KP F-Stat.		25.01***		258.5***
Hansen J-Stat.		0.347		0.201

Notes: This table provides the estimation results of equation (5) using fixed effect (FE) and two-stages least squares (2SLS) techniques. The validity of the instruments is tested using KP (Kleibergen Paap) F-Statistics and Hansen J-Statistics. Please refer to Table 2 for a description of the variables. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

3.3. The different level of market competition

Motivated by Gheeraert (2014), who finds that the Islamic banking sector plays a role as a complement in dual markets when the Islamic sector reaches a medium penetration level[9], in this sub-section, we will investigate whether the impact of competition on Islamic and conventional banks' stability will be different in the different level of market competitiveness. We divide our proxy of market competition (LernerMkt) into low (Low LernerMkt, below the

[9] Accordingly, Imam and Kpodar (2013) also document that Islamic banks appear to complement rather than substitute for conventional banks.

25th percentile), medium (Medium LernerMkt, between the 25th and 75th percentile), and high (High LernerMkt, above 75th percentile). We regress the Islamic banks' stability at each level of the Lerner index we create. The estimation results are presented in Table 7. The results suggest that the impact of market competition on banks' stability depends on the intensity of the competition. However, this provides mixed results. We observe that especially in conventional banks' cases, the 'competition-fragility' hypothesis only occurs when the degree of competition is high because a positive sign of our competition proxies appear only in columns (11) and (12). On the contrary, competition favors conventional banks' stability at the low and medium competition levels, as displayed in columns (7) to (10). In the Islamic banks subsample, we also find some evidence in column (3) that banks' stability increases as the market becomes more competitive. This result support 'competition-stability' view. Dual market competition could be an advantage for both Islamic and conventional banks because, according to Boyd and Nicoló (2005), it will force banks to offer a lower loan rate to the borrower. This condition will be good for banks' stability because a lower loan rate will make entrepreneurs less eager to take excessive risks and thus increase the probability of entrepreneurs' loan repayment (Boyd and Nicoló, 2005). However, note that the benefits of competition occur only at the low to medium competition level. At the high level, competition will deteriorate the banks' stability.

3.4. Further analysis: Capitalization, crisis, and size of banks.

The preceding studies on financial stability underline the importance of bank capitalization, the financial crisis period, and bank size. Schliephake (2016) theoretically show that, by looking at the regulatory perspective, imposing capital requirements without considering the competitive environment can have adverse effects on stability. It is also documented that the competitive market does not play a role in well-capitalized banking sectors (Schliephake, 2016). In other words, bank capitalization moderates the impact of competition on bank stability. Therefore, we complement the theoretical work of Schliephake (2016) by testing whether there is a possible interaction effect between bank capitalization and competition regarding the competition-stability nexus. Our econometric setup is as follows.

$$\mathrm{LnZROA}_{it} = \alpha_0 + \beta_1 \mathrm{LernerMkt}_{jt} + \beta_2 \mathrm{EQTA}_{it} + \beta_3 \mathrm{LernerMkt}_{jt} * \mathrm{EQTA}_{it} + \varphi \mathrm{X}_{it-1} + \gamma \mathrm{Z}_{jt} + \varepsilon_{i,t} \quad \dots \quad (6)$$

Table 7. The impact of different market competition levels on banks' stability

	Islamic banks						Conventional banks					
	FE	2SLS	FE	2SLS	FE	2SLS	FE	2SLS	FE	2SLS	FE	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Low LernerMkt$_{jt}$	0.0355	-0.0981					-0.0283*	-0.179**				
	(1.08)	(-0.61)					(-1.84)	(-2.18)				
Med LernerMkt$_{jt}$			-0.0388*	0.138					-0.0201*	-0.198		
			(-1.66)	(0.51)					(-1.80)	(-1.25)		
High LernerMkt$_{jt}$					0.0300	0.269					0.0732***	0.235***
					(0.77)	(0.72)					(4.53)	(2.80)
NIM$_{it-1}$	-0.419	-0.484	-0.464	-0.336	-0.473	-0.762	2.394***	2.172***	2.458***	2.656***	2.409***	2.350***
	(-0.50)	(-0.34)	(-0.55)	(-0.24)	(-0.57)	(-0.47)	(3.71)	(4.01)	(3.75)	(4.52)	(3.74)	(4.47)
LLR$_{it-1}$	0.254	0.235	0.260	0.212	0.253	0.283	0.179	0.232*	0.167	0.148	0.187	0.226
	(0.87)	(1.05)	(0.87)	(0.89)	(0.86)	(1.19)	(1.08)	(1.67)	(1.00)	(1.05)	(1.13)	(1.64)
EQTA$_{it-1}$	3.478***	3.425***	3.501***	3.331***	3.481***	3.617***	3.148***	3.081***	3.165***	3.194***	3.140***	3.095***
	(9.58)	(9.27)	(9.63)	(6.94)	(9.53)	(9.51)	(15.80)	(15.33)	(15.61)	(15.32)	(15.59)	(15.17)
Size$_{it-1}$	-0.0403	-0.0333	-0.0381	-0.0397	-0.0366	-0.0218	-0.0624***	-0.0795***	-0.0593***	-0.0606***	-0.0680***	-0.0876***
	(-0.85)	(-0.90)	(-0.80)	(-1.02)	(-0.75)	(-0.55)	(-3.15)	(-4.11)	(-2.99)	(-3.35)	(-3.39)	(-4.29)
HHI$_{jt}$	-0.409**	-0.539**	-0.446**	-0.435***	-0.474**	-0.722*	-0.946***	-0.615**	-1.043***	-1.354***	-0.975***	-0.902***
	(-2.18)	(-2.48)	(-2.40)	(-2.65)	(-2.48)	(-1.73)	(-3.70)	(-2.22)	(-4.03)	(-3.81)	(-3.77)	(-4.49)
INFL$_{jt}$	0.630***	0.569***	0.648***	0.491*	0.627***	0.730***	0.147*	0.137	0.157*	0.232**	0.175**	0.231**
	(3.11)	(2.84)	(3.18)	(1.69)	(3.09)	(2.69)	(1.72)	(1.56)	(1.86)	(2.20)	(2.06)	(2.55)
GGDP$_{jt}$	0.703**	0.751**	0.670*	0.882*	0.691**	0.490	0.328*	0.433***	0.265	-0.119	0.202	-0.0343
	(1.99)	(2.22)	(1.88)	(1.75)	(1.99)	(1.21)	(1.94)	(2.94)	(1.56)	(-0.31)	(1.21)	(-0.19)
Crisis$_{jt}$	0.146*	0.115	0.129	0.168	0.124	0.0166	0.0491	-0.00527	0.0704**	0.168*	0.0730**	0.103***
	(1.79)	(1.42)	(1.58)	(1.62)	(1.47)	(0.09)	(1.40)	(-0.12)	(1.97)	(1.77)	(2.04)	(2.93)
N obs.	640	640	640	640	640	640	3252	3252	3252	3252	3252	3252
N banks	100	100	100	100	100	100	390	390	390	390	390	390
R-sq.	0.410		0.411		0.410		0.335		0.335		0.340	
KP F-Stat.		7.284***		1.689		1.809		24.47***		3.830***		27.08***
Hansen J-Stat.		0.344		0.341		0.365		0.104		0.0369		0.738

Notes: This table provides estimation results of equation (5) using fixed effect (FE) and two-stages least squares (2SLS) techniques. The validity of the instruments is tested using KP (Kleibergen Paap) F-Statistics and Hansen J-Statistics. Please refer to Table 2 for a description of the variables. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

In studies on Islamic banks, another work by Cihak and Hesse (2010) shows the significance of banks' size on Islamic banks' stability. They document that Islamic banks are more stable when operating at a small scale and less stable when operating at a large scale. However, recently, Ibrahim and Rizvi (2017) find an opposite result. They suggest that larger Islamic banks are more stable, at least when they surpass a certain threshold size. To refine the two contradictory findings, we construct the following equation containing the interaction effect $LernerMkt_{jt}$*$Size_{it}$.

$$LnZROA_{it} = \alpha_0 + \beta_1 LernerMkt_{jt} + \beta_2 Size_{it} + \beta_3 LernerMkt_{jt} * Size_{it} + \varphi X_{it-1} + \gamma Z_{jt} + \varepsilon_{i,t} \quad \dots \quad (7)$$

The next investigation in this section is about the banking crisis. Some studies claim that Islamic banks perform better during the financial crisis. Hasan and Dridi (2010) find that Islamic banks on average showed stronger resilience during the financial crisis. Accordingly, Beck et al. (2013) document that Islamic banks are less likely to disintermediate during the crisis. Alqahtani et al. (2016), using GCC data, highlight that Islamic banks are more cost efficient in comparison to conventional banks. Olson and Zoubi (2016) observe that Islamic banks initially weathered the onslaught of the global financial crisis better than their conventional peers. Farooq and Zaheer (2015) find that by using data from Pakistan, Islamic banks are more resilient during financial crises. We therefore construct the following equation to investigate specific effects of the financial crisis.

$$LnZROA_{it} = \alpha_0 + \beta_1 LernerMkt_{jt} + \beta_2 Crisis_{jt} + \beta_3 LernerMkt_{jt} * Crisis_{jt} + \varphi X_{it-1} + \gamma Z_{jt} + \varepsilon_{i,t} \quad \dots \quad (8)$$

Table 8 shows the impact of the above-mentioned three variables in the competition-stability nexus. The result is as follows. First, from columns (1) and (7), the negative interaction coefficients suggest that bank capitalization (EQTA) reduces the impact of market competition on banks' stability. In the marginal effect rows, we can also see that market competition has positively affected banks stability both in low and medium bank capitalization, but the coefficients become lower (Low 0.542*** > Medium 0.447***). The coefficient even becomes insignificant (0.0895) when EQTA is high, suggesting that the impact of market competition diminishes for banks with a high capital ratio. Our results are in line with Schliephake (2016). In other words, the detrimental impact of market competition can be reduced when banks possess a high capital ratio. This evidence is seen in conventional banks and in all samples.

Second, regarding the impact of a financial crisis, in column (5), we find a little evidence that the crisis period moderates the impact of dual market competition on Islamic

banks' stability (β_3 = -0.457*), even though the impact of market competition is statistically insignificant, both in the crisis period ($\beta_1 + \beta_3$ = -0.240) and in the non-crisis period (β_1 = 0.217). In the conventional bank subsample, although competition positively affects stability both in the crisis ($\beta_1 + \beta_3$ = 0.422***) and non-crisis periods (β_1 = 0.499***), there is no statistical support that a crisis alters the competition-stability nexus (β_3 = -0.0577). Our result generally supports the prior literature highlighting the superiority of Islamic banks during the crisis than conventional banks.

Third, we find that a higher bank size will strengthen the detrimental impact of competition on banks' stability. This is depicted in columns (3), (6) and (9). In the conventional bank sample, the marginal effect of coefficients increase in accordance with bank size (Low = 0.390*** > Med = 0.485*** > High = 0.719***), suggesting that the detrimental impact will be higher when the bank size is larger. In Islamic banks, we only find a significant effect of competition when Islamic banks become large ($\beta_1 + \beta_3$ (High) = 0.678**). This partially confirms the previous findings of Cihak and Hesse (2010). They find that Islamic banks are better when operating at a small scale.

3.5. Robustness checks

To improve the validity of our results, some robustness tests are conducted in this work. First, we change our stability proxy by a Z-score measurement proposed by Lepetit and Strobel (2013). They claim that their method is more robust and free from potentially 'spurious' volatility related to the construction of time-varying Z-scores. This measure is calculated using mean and standard deviation estimates of ROA that are calculated over the full sample and combines these with the current values of CAR. The result is presented in Table 9. It still supports the 'competition-fragility' hypothesis. Second, as explained earlier, for a robustness check, we also use another non-structural measurement of competition: H-Statistic. Similar to the Lerner index, the greater value of the H-Statistic is associated with the more competitive market. We follow the method proposed by Turk-Ariss (2010) to compute H-Statistics. Our result, as depicted in table 10, is also similar. Third, instead of using three input cost functions to calculate the Lerner index, we use two input cost functions following Fu et al. (2014). In the emerging market studies, the two-cost function is more popular due to the data unavailability because it only needs the data of total interest expense (W_1) and total noninterest expense (W_2). However, our results remain unchanged using both the FE and 2SLS methods, as depicted in Table 11.

Table 8. Lerner index, capitalization, crisis, and size

	All sample			Islamic banks			Conventional banks		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$LernerMkt_{jt}$ (β_1)	0.697***	0.466***	-0.462	0.514*	0.217	-1.326	0.764***	0.499***	-0.514
	(4.64)	(4.53)	(-0.86)	(1.75)	(1.07)	(-1.17)	(4.71)	(4.47)	(-0.89)
$EQTA_{it-1}$ (β_2)	3.835***	3.284***	3.272***	4.295***	3.482***	3.491***	3.712***	3.126***	3.107***
	(11.77)	(18.82)	(18.71)	(7.21)	(9.58)	(9.73)	(10.23)	(15.86)	(15.72)
$Crisis_{jt}$ (β_2)	0.0440	0.0896**	0.0433	0.137	0.250**	0.0843	0.0315	0.0482	0.0332
	(1.36)	(2.06)	(1.34)	(1.50)	(2.10)	(0.95)	(0.89)	(1.05)	(0.94)
$Size_{it-1}$ (β_2)	-0.0639***	-0.0658***	-0.0843***	-0.0408	-0.0329	-0.0658	-0.0689***	-0.0706***	-0.0911***
	(-3.56)	(-3.65)	(-3.93)	(-0.88)	(-0.68)	(-1.17)	(-3.49)	(-3.54)	(-3.88)
LernerMkt*EQTA (β_3)	-2.038**			-2.449			-2.284**		
	(-2.25)			(-1.60)			(-2.25)		
LernerMkt*Crisis (β_3)		-0.163			-0.457*			-0.0577	
		(-1.57)			(-1.82)			(-0.56)	
LernerMkt*Size (β_3)			0.0629*			0.111			0.0681*
			(1.79)			(1.43)			(1.81)
Marginal effect									
$\beta_1 + \beta_3$ (Low)	0.542***		0.373***	0.328		0.143	0.590***		0.390***
	(4.98)		(3.20)	(1.48)		(0.67)	(5.04)		(3.06)
$\beta_1 + \beta_3$ (Med)	0.477***		0.461***	0.250		0.297	0.518***		0.485***
	(4.73)		(4.58)	(1.23)		(1.54)	(4.74)		(4.39)
$\beta_1 + \beta_3$ (High)	0.0895		0.677***	-0.216		0.678**	0.0832		0.719***
	(0.48)		(4.57)	(-0.70)		(1.97)	(0.39)		(4.49)
Wald test									
$\beta_1 + \beta_3$		0.303**			-0.240			0.442***	
		(2.34)			(-0.78)			(3.27)	
N obs.	3892	3892	3892	640	640	640	3252	3252	3252
N banks.	490	490	490	100	100	100	390	390	390
R-sq.	0.341	0.340	0.340	0.414	0.415	0.413	0.344	0.342	0.343

Notes: This table provides estimation results for equations (6), (7), and (8) using the fixed effect (FE) technique. Please refer to Table 2 for a description of the variables. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 9. Robustness: Alternative proxy of Z-Score ($LnAltZ_{it}$) following Lepetit and Strobel (2013)

	All sample		Islamic banks		Conventional banks	
	FE	2SLS	FE	2SLS	FE	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)
$LernerMkt_{jt}$	0.301***	0.437***	0.110	0.161	0.361***	0.503***
	(3.84)	(3.35)	(0.64)	(0.43)	(4.33)	(3.28)
NIM	0.961**	0.927**	-0.450	-0.457	1.293***	1.242***
	(2.53)	(2.43)	(-0.77)	(-0.69)	(2.62)	(2.81)
LLR	0.274**	0.282***	0.212	0.212	0.331**	0.340***
	(2.29)	(2.86)	(1.01)	(1.38)	(2.48)	(3.01)
EQTA	3.223***	3.218***	3.360***	3.362***	3.044***	3.034***
	(19.96)	(21.31)	(11.20)	(13.47)	(16.40)	(17.07)
Size	-0.0490***	-0.0515***	0.0270	0.0282	-0.0649***	-0.0681***
	(-3.05)	(-3.84)	(1.23)	(1.30)	(-3.84)	(-4.46)
HHI_{jt}	-0.369***	-0.351***	-0.265*	-0.277*	-0.549***	-0.487***
	(-3.22)	(-3.68)	(-1.94)	(-1.86)	(-2.99)	(-2.82)
$INFL_{jt}$	0.197***	0.196***	0.337***	0.336***	0.165***	0.164***
	(3.48)	(3.46)	(2.89)	(3.09)	(2.75)	(2.59)
$GGDP_{jt}$	0.0320	-0.0135	0.243	0.229	-0.0473	-0.103
	(0.28)	(-0.13)	(1.40)	(1.02)	(-0.35)	(-0.84)
$Crisis_{jt}$	0.0661***	0.0566**	0.0632	0.0561	0.0630**	0.0551**
	(2.60)	(2.30)	(0.97)	(0.74)	(2.32)	(2.12)
N obs.	3892	3892	640	640	3252	3252
N banks.	490	490	100	100	390	390
R-sq.	0.421		0.519		0.419	
KP F-Stat.		180.2***		14.76***		175.6***
Hansen J-Stat.		0.487		0.166		0.218

Notes: This table provides estimation results of equation (5) using fixed effect (FE) and two-stages least squares (2SLS) techniques. The validity of the instruments is tested using KP (Kleibergen Paap) F-Statistics and Hansen J-Statistics. Please refer to Table 2 for a description of the variables. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 10. Robustness: Using H-Statistics from the Panzar-Rosse model

	All samples		Islamic banks		Conventional banks	
	FE	2SLS	FE	2SLS	FE	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)
$HSTAT_{jt}$	0.0748***	0.682***	0.00153	1.271	0.0759***	0.443**
	(2.76)	(2.62)	(0.02)	(0.93)	(2.70)	(2.07)
Lag NIM	2.100***	2.153***	-0.611	1.609	2.237***	2.236***
	(3.27)	(3.72)	(-0.35)	(0.49)	(3.20)	(3.83)
Lag LLR	0.372**	0.307*	0.404	0.0878	0.377**	0.330**
	(2.07)	(1.93)	(1.08)	(0.16)	(2.02)	(1.98)
Lag EQTA	3.164***	3.238***	3.103***	3.843***	3.126***	3.151***
	(15.75)	(16.24)	(6.46)	(4.32)	(14.37)	(15.16)
Lag Size	-0.0466**	-0.0244	0.0131	0.0872	-0.0478**	-0.0380*
	(-2.17)	(-1.10)	(0.24)	(0.77)	(-2.13)	(-1.85)
HHI_{jt}	-1.126***	-0.734***	-0.279	1.695	-1.249***	-1.042***
	(-3.98)	(-2.66)	(-0.47)	(0.76)	(-4.15)	(-4.34)
$INFL_{jt}$	0.0932	0.0395	0.121	0.745	0.0985	0.0512
	(1.00)	(0.37)	(0.56)	(0.95)	(0.95)	(0.45)
$GGDP_{jt}$	0.384**	0.494***	0.699**	0.665	0.372*	0.460**
	(2.07)	(2.71)	(2.31)	(1.21)	(1.71)	(2.41)
$Crisis_{jt}$	-0.0223	-0.0211	-0.00555	-0.341	-0.0226	-0.00772
	(-0.62)	(-0.60)	(-0.05)	(-0.84)	(-0.76)	(-0.28)
N obs.	3022	3022	334	334	2688	2688
N banks	360	360	49	49	311	311
R-sq.	0.350		0.413		0.354	
KP F-Stat.		8.253***		0.576		9.419***
Hansen J-Stat.		0.166		0.455		0.0862

Notes: This table provides the estimation results of equation (5) using fixed effect (FE) and two-stages least squares (2SLS) techniques. The validity of the instruments is tested using KP (Kleibergen Paap) F-Statistics and Hansen J-Statistics. Please refer to Table 2 for a description of the variables. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 11. Robustness: Alternative proxy of LernerMkt using a two-factor input price following Fu et al. (2014)

	All sample		Islamic banks		Conventional banks	
	FE	2SLS	FE	2SLS	FE	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)
$AltLernerMkt_{jt}$	0.238***	0.322***	0.0641	0.253	0.332***	0.316***
	(2.82)	(3.28)	(0.42)	(1.12)	(3.60)	(2.91)
Lag NIM	1.805***	1.792***	-0.430	-0.407	2.341***	2.346***
	(3.60)	(3.55)	(-0.52)	(-0.29)	(3.67)	(4.44)
Lag LLR	0.117	0.113	0.233	0.235	0.150	0.151
	(0.77)	(0.94)	(0.79)	(1.06)	(0.90)	(1.11)
Lag EQTA	3.304***	3.305***	3.506***	3.542***	3.129***	3.130***
	(18.70)	(18.94)	(9.23)	(9.96)	(15.64)	(15.74)
Lag Size	-0.0615***	-0.0630***	-0.0379	-0.0340	-0.0677***	-0.0673***
	(-3.42)	(-4.01)	(-0.79)	(-0.88)	(-3.39)	(-3.84)
HHI_{jt}	-0.673***	-0.667***	-0.446**	-0.483***	-0.931***	-0.936***
	(-3.96)	(-5.39)	(-2.43)	(-3.11)	(-3.63)	(-4.68)
$INFL_{jt}$	0.279***	0.275***	0.609***	0.604***	0.128	0.129
	(2.97)	(3.03)	(3.00)	(3.10)	(1.50)	(1.54)
$GGDP_{jt}$	0.307*	0.260*	0.661*	0.561*	0.129	0.139
	(1.68)	(1.76)	(1.79)	(1.72)	(0.75)	(0.91)
$Crisis_{jt}$	0.0543	0.0471	0.127	0.101	0.0358	0.0369
	(1.64)	(1.59)	(1.51)	(1.27)	(0.99)	(1.16)
N obs.	3890	3890	639	639	3251	3251
N banks	490	490	100	100	390	390
R-sq.	0.336		0.409		0.339	
KP F-Stat.		292.6***		33.87***		309.8***
Hansen J-Stat.		0.168		0.341		0.241

Notes: This table provides the estimation results of equation (5) using fixed effect (FE) and two-stages least squares (2SLS) techniques. The validity of the instruments is tested using KP (Kleibergen Paap) F-Statistics and Hansen J-Statistics. Please refer to Table 2 for a description of the variables. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

4. Conclusion

This chapter investigates the role of competition on the stability of Islamic and conventional banks in countries where the two banks operate alongside one another. This work is motivated by the heightened competitive condition in the dual market that may encourage either Islamic or conventional banks' willingness to take excessive risks. This condition might jeopardize their stability, as suggested in some studies. To investigate the issue, we use a sample of 490 Islamic and conventional banks from 19 countries. We employ a market-level Lerner index to proxy market competitiveness and the Z-score to measure banks' stability. Our

main result shows that market competition erodes banks' stability, giving support to the 'competition-fragility' nexus. This condition is robust after controlling for bank and country-specific variables. Our result also remains consistent across the estimation techniques we use. In the second analysis, however, we find that the 'competition-fragility' hypothesis does not hold for Islamic banks. The effect of competition on Islamic banks is missing. On the other hand, Islamic banks are not affected by competitive pressure in the dual market, possibly because of the religious clients they have. In addition, when we repartition our competition variable into low, medium, and high, we find that the 'competition-fragility' hypothesis only occurs in the high competition market. Competition can favor financial stability, especially when they are at low or medium levels.

In a further analysis, we find that the detrimental impact of market competition can be reduced when banks possess a high capital ratio, especially for conventional banks. We also find a negative impact of bank size on the 'competition-fragility' nexus. The adverse impact of competition will be stronger for large banks than small banks. It appears that banks in the dual market are better operating at a small scale. Last, we find little evidence that a crisis period moderates the impact of dual market competition on Islamic banks' stability. Islamic banks appear to be stronger than conventional banks during a crisis period, as also suggested by some prior studies.

This chapter offers two policy implications. First, both regulators and supervisors should carefully monitor competitive conditions in the dual market to avoid excessive risk taking from either Islamic or conventional banks. Second, it might be necessary for each country adopting a dual banking system to establish an institution specifically focusing on Islamic bank development. By doing this, the development of Islamic banks could be monitored more efficiently. Thus, Islamic banks could serve as a complement for conventional banks, and therefore, greater financial inclusion can be achieved.

Chapter 3

Islamic banks' equity financing, *Shariah* supervisory board, and banking environments

Abstract

Although equity financing is a core value in Islamic finance, it is rarely used by Islamic banks which prefer other instruments such as markup or leasing contracts. The purpose of this chapter is to investigate the potential determinants of equity financing. *Shariah* supervisory board (SSB) is regarded as crucial in promoting equity financing. We use hand-collected data on equity financing and governance structure of 88 Islamic banks in 16 countries between 2009 and 2014. Our findings reveal that Islamic banks' equity financing is influenced by the characteristics of SSB. Specifically, the duality of SSB members positively affects equity financing whereas the existence of a *Shariah* department within banks has a negative impact. We also find that the role of SSB in Islamic banks is influenced by the characteristics of the board of directors (BOD) and the banking environments. The impact of SSB on equity financing is reduced in the better banking environment, possibly suggesting substitution role between SSB and institutional and Islamic environment.

Keywords: Profit and loss sharing, equity financing, governance, *Shariah* supervisory board, environment, Islamic banks

1. Introduction

Islamic banking has expanded rapidly in the last decades. Islamic banks play a major in the Muslim-dominated countries, but they also operate in some European countries (United Kingdom, France, Luxembourg) and South Africa even though those countries have a relatively low share of Muslim population (Hussain and Turk-Ariss, 2015). Islamic banks are projected to grow side-by-side with conventional banks to promote economic development and financial inclusion. This is because Islamic banks mainly target Muslims who decline conventional finance because of religious beliefs. Kammer et al. (2015) argue that Islamic banks have the potential for further contribution to the economy at least in three dimensions. First, they could foster greater financial inclusion as they target unbanked Muslims. Second, Islamic banks emphasize on asset-backed financing and risk-sharing features that can support the growth of small and medium enterprises (SME). Third, the risk-sharing nature of contracts and the prohibition of speculation imply that Islamic banks may pose less systemic risk than conventional banks.

Risk sharing is one of the main principles of Islamic banks (Ibrahim and Alam, 2017). It is embedded in the profit and loss sharing (PLS) contracts where any profit and losses will be shared between the banks and entrepreneurs or depositors. The relationship between banks and clients is therefore not debt-based but equity-based. Through the PLS principle, on the liability side, Islamic banks act as a fund manager while depositors are considered as investors or investment account holders. Unlike conventional depositors, Islamic depositors cannot claim a fixed return because this return will depend on the banks' ex-post profit from financing activities. Oppositely, on the asset side, Islamic banks act as investors who provide funds to their clients who will share ex-post profit or losses from their business activities with the bank. This mechanism, therefore, is viewed as the backbone of Islamic banking activities making Islamic banking different from conventional banking because of the prohibition of interest.

However, after more than three decades of operation, the risk sharing features are not successfully applied in most of the Islamic banking activities. The proportion of Islamic deposits using PLS arrangements is diminishing (Islamic Financial Service Board, 2016) while Islamic financing with risk-sharing features (PLS financing or equity financing) are rarely used due to their complexities. Abedifar et al. (2013) mention that, for example, to employ equity financing, Islamic banks need to discuss and determine a pre-agreed sharing ratio with the entrepreneurs. This can be very complicated because clients' characteristics (especially for small businesses who cannot obtain a loan from conventional banks, therefore, seeking equity

financing) are usually opaque and difficult to quantify (Aysan et al., 2017). Equity financing also implies that bank's return is not guaranteed and this could have a detrimental effect on the stability of Islamic banks (Hamza and Saadaoui, 2013). The complexity of Islamic banks' financial products especially equity financing is exacerbated by the lack of regulatory harmonization between countries (Kammer et al., 2015). Although specific standards have been developed by specialized standard-setting bodies, Kammer et al. (2015) argue that in many jurisdictions regulators do not grasp the unique risks inherent in the PLS mechanism or other Islamic banks' products.

Nevertheless, although the principles of equity financing are difficult to apply in practice in the real banking world today, some banks do actually use such mechanisms possibly because it allows them to diversify their asset portfolio. Moreover, in some countries, equity financing is significantly present. For example, the Indonesian Islamic bank, Bank Muamalat, provides 39 percent of its lending in the form of PLS contracts but 56 percent of its lending in the form of *murabaha* agreement (Wolters, 2005, in Visser, 2009). This is in line with Abedifar et al. (2013) who highlight that PLS mode of finance in Indonesia accounted for more than 30% of total financing provided by Islamic banks, pointing out that PLS method in Indonesia is among the highest compared to other countries. El-Hawary et al. (2007) document that, in Sudan, *musharaka-based financing* ranges between 23 and 32 percent and *mudaraba-based financing* between 4.6 and 5.7 percent respectively. Additionally, Khan (1995) highlight that in Iran, PLS financing represents 37% of Islamic banks' assets. Therefore, why some Islamic banks extensively use this type of contract while others definitely prefer non-equity financing remain a puzzle.

In this study, we investigate the determinants of PLS practice in Islamic banks. Surprisingly, the empirical works in the area of Islamic lending or financing are very sparse. Prior literature has put much attention on the liability side of banks' balance sheets and specifically on Islamic depositors, the so-called investment account holders (e.g., Cevik and Charap, 2011; Chong and Liu, 2009; Ergeç and Arslan, 2013; Haron et al., 2008; Ito, 2013; Meslier et al., 2017; Saraç and Zeren, 2014) where most of them conclude little differences between Islamic and conventional deposits. Even though some empirical papers focus on the financing or lending of Islamic banks (e.g., Abdul Karim et al., 2014; Amidu and Wolfe, 2013; Aysan et al., 2017; Caporale et al., 2016; Ibrahim, 2016; Minhat and Dzolkarnaini, 2017), works which focus on PLS or equity financing are very limited. Most of the papers concentrate on the theoretical features of equity financing and its implementation in practice (e.g., Abdul-Rahman et al., 2014; Aggarwal and Yousef, 2000). To the best of our knowledge, Alam and

Parinduri (2017) is the only study who empirically investigate equity financing in Islamic banks. They examine whether equity financing activities in Islamic banks is influenced by the characteristics of the institutional environment. The authors highlight that better institutional environment does not significantly influence the use of equity financing by Islamic banks.

In this work, we conjecture that Islamic banks' governance characteristics, particularly the presence and characteristics of *Shariah* board or of *Shariah* Supervisory Board (SSB), play a vital role in determining the extent of equity-based financing. Indeed, Islamic banks has a different organizational structure than conventional banks with a 'multi-layer' governance system (Mollah and Zaman, 2015) which may lead to different agency conflicts between bank's stakeholder than in conventional banks (Farag et al., 2017). While the first layer, the board of director (BOD), is the same than in conventional banks, the specific feature of Islamic banks' governance is the existence of a second layer, the SSB. The former focuses on performance while the latter has a role in monitoring *Shariah* practices. The SSB is composed of experts in Islamic jurisprudence who also have sufficient knowledge of contemporary finance (Hamza, 2013) as well as accounting practices (Grais and Pellegrini, 2006). They play a supervisory role to ensure that all the bank's products and services offered to customers and investors comply with the *Shariah* principles (Quttainah et al., 2013). This is generally accomplished by evaluating transactions made by the bank in one business year and releasing a *Shariah* report to stakeholders (in the Islamic banks' annual report). The SSB also plays an advisory role in the Islamic banks. They could also provide some advice or recommendations to the BOD and the executive management (CEO) on all aspects related to the implementation of *Shariah* principles in the bank, including which contracts should be used or avoided (Ginena and Hamid, 2015; Quttainah et al., 2013; Song and Oosthuizen, 2014). In this sense, the SSB has a role in recalling BOD and management on the core of Islamic finance, ethics which translates into PLS arrangements (Mollah and Zaman, 2015). The SSB is hence expected to recommend less usage of markup financing because many Islamic scholars argue that markup financing could open a backdoor to interest (Aggarwal and Yousef, 2000). Islamic banks should, in theory, possess attributes that are distinguishable from conventional financing instruments through PLS financing (Ayub, 2007; Minhat and Dzolkarnaini, 2017).

In order to examine how the presence of SSB matters for Islamic banks' equity financing, we focus on the impact of some SSB characteristics. The first characteristic we consider in this study is the size of SSB. AAOIFI as a standard-setting organization in Islamic financial institutions recommend Islamic banks to have at least three SSB members (Ginena and Hamid, 2015) but in practice, Islamic banks could have two, three, four, or more. On one

hand, having larger SSB could be beneficial for the banks because it will decrease Islamic banks' agency costs (Farag et al., 2017), effectively monitor managers, deter earning managements (Quttainah et al., 2013), and increase the overall Islamic banks performance (Mollah and Zaman, 2015). On the other hand, one might also argue that because a *Shariah* decision has to be made collectively, accomplishing this task is not easy when the number of SSB member is high. This is because each board member could come from a different background, countries, and school jurisprudence (El-Hawary et al., 2007; Hamza, 2013) and thus could have a different argument about *Shariah* practices. For example, some members might argue that equity financing is indispensable for Islamic banks while other members could promote the use of markup contracts, which is Sharia-compliant, to deal with banking market competition. Besides, other characteristics such as the duality of SSB and the existence of *Shariah* department could also influence the PLS activities in Islamic banks. Although SSB is expected to be independent in order to perform its duties independently (Ginena and Hamid, 2015; Mollah and Zaman, 2015; Safieddine, 2009), some Islamic banks in fact could have one or more SSB members who also sit in the BOD or who are executive member of the bank (Nathan Garas, 2012). It could be argued that this duality might trigger Islamic banks to decrease their PLS activities because SSB has lost their independence. Oppositely, SSB could also strongly influence BOD to use equity financing. More duality in Islamic banks could then favor the use of PLS activities. The third SSB characteristic we investigate in this chapter is the existence of *Shariah* department. Some Islamic banks establish a *Shariah* department in the banks with the purpose to assist SSB in conducting their duties. The impact of this department is also interesting to be taken into account because it could have two opposite effects. On the one hand, *Shariah* department could positively influence PLS activities including equity financing because since the department are working with the SSB, the implementation of SSB decisions on equity financing will also be more effective. On the other hand, because *Shariah* department members are hired by the banks as other employees, their independence to provide *Shariah* assistance might be questioned, and they might easily agree with BOD's decision for not using equity financing.

We use data on 88 Islamic banks across 16 countries for the 2007-2014 period. For the purpose of our study, we manually collect data on equity financing and governance characteristics from annual reports. Our empirical investigation reveals that some characteristics of SSB significantly affect the extent to which equity financing is actually used by Islamic banks. First, while the size of SSB does not significantly impact the extent of equity financing, the duality of SSB members (members who sit both in the BOD and in the SSB)

positively affects equity financing. This result might indicate that, when members of BOD are also members of SSB, they could have more influence on bank manager to use equity financing. Second, we also find that the existence of a *Shariah* department in Islamic banks negatively impacts equity financing. In line with Ginena and Hamid (2015), *Shariah* department members who are hired by the bank might face difficulties to provide an independent *Shariah* review and monitoring.

We also further investigate whether the impact of SSB on equity financing might be influenced by other governance characteristics as well as banking environment. Although SSB is expected to be independent, SSB decision to promote or not equity financing might be influenced by the presence of BOD because SSB members are appointed by the BOD and are remunerated by the bank (Ginena and Hamid, 2015; Grais and Pellegrini, 2006; Hamza, 2013; Oseni et al., 2016). SSB's role to promote PLS financing activities could also be altered by some characteristics of the banking environment such as the market share of Islamic banks in the country or the share of Muslims in the population. On the one hand, we might expect that the influence of SSB on the use of PLS in Islamic banks could be stronger in predominantly Muslim environments. On the other hand, stronger Islamic environment may also act as a substitute to SSB influence to promote equity financing. Moreover, in an environment characterized by higher asymmetric information, Islamic banks may be less eager to use PLS financing (Abdul-Rahman et al., 2014). While we expect that in countries with a better institutional environment, Islamic banks might be more willing to use equity financing than in countries weaker institutional environment (Alam and Parinduri, 2017), we conjecture that the influence of SSB on bank's decision to provide equity financing is stronger such environment. By providing a monitoring role of bank practices as well as some advice and recommendations to the BOD and the executive management (CEO) on the implementation of *Shariah* principles, SSB may reduce asymmetric information problems and then act as a substitute to the better institutional environment.

Our results show that that the impact of SSB characteristics on equity financing is also affected by some of the characteristics of BOD. We also show that equity financing in Islamic banks could be altered by the condition of institutional and Islamic environments. In better environments, the impact of SSB on equity financing decrease, suggesting a substitute role of banking environment regarding its association with Islamic banks' PLS lending activities.

The contribution of this study is twofold. First, to the best of our knowledge, this is the first study investigating equity financing and its relationship with the characteristics of SSB in Islamic banks. As explained earlier, the literature on equity financing is essentially normative

or theoretical. We fill the gaps by performing an empirical investigation based on a hand-collected dataset of various types of Islamic financing instruments (*mudaraba*, *musharaka*, *murabaha*, etc.) and the characteristics of SSB. Second, whereas prior empirical work on equity financing only focuses on the impact of institutional settings (Alam and Parinduri, 2017), we complement our analysis by accounting for both the institutional and Islamic environment in which banks operate.

The rest of the chapter is organized as follows. Section 2 briefly reviews related literature. Section 3 presents the data and the econometric specification. Section 4 reports the estimation results. Further analyses are carried out in section 5. Section 6 provides some robustness checks and section 7 concludes.

2. Review of related literature

2.1. Islamic banks' financing contracts: a short overview

Islamic banks conduct their financing activities in several ways. The different contracts are deep-rooted in Islamic law and applied in the contemporary banking world under different forms. On the whole, Islamic financing contracts can be divided into two categories: PLS (or equity) contracts and non-PLS (or non-equity) contracts. PLS consists either in *mudaraba* (profit-sharing) or *musharaka* (partnership) while non-PLS refers to *murabaha* (cost-plus financing), *ijara* (leasing), *diminishing musharaka* (partnership with gradual ownership process)[1], *qard* (benevolent loan), and other contracts.[2]

Mudaraba financing is considered as the main contract in Islamic banks which makes them different from conventional banks. The short translation of *mudaraba* is profit sharing because by using this contract, Islamic banks provide the fund (capital) for their clients to conduct their project and then any profit generated from the clients' project will be shared between the bank and the client according to a pre-agreed ratio. In this case, Islamic banks act as a fund provider whereas clients are entrepreneurs. The second equity financing is *musharaka*. The idea behind *musharaka* is typically similar to *mudaraba*. The only difference is that in *musharaka*, both banks and clients contribute to the equity (capital) of the project. This is why it is called a 'partnership'. *Murabaha* is a trade with mark up or cost-plus sale. The assets (either for business or consumption) are purchased on behalf of customers and resold at

[1] Although it has word '*musharaka*' (partnership), at the practice this contract is not used for productive financing (mostly for housing loans) and therefore never share any profit and loss. For this reason, *diminishing musharaka* are not considered in the equity financing.
[2] *Salam*, *Istishna*, *Rahn*, and many other contracts.

a pre-determined price. Clients therefore make a payment of the assets either in a lump sum or several installments. The bank holds the ownership of the assets until the full payments are made. *Ijara* is an operational or financial leasing contract. Banks purchase assets on behalf of the clients and allows clients to rent the assets for a fixed price. Even though the ownership remains at the financier it can also be transferred to the clients gradually. *Diminishing musharaka* is a financing contract where clients promise to buy the share of the assets (purchased by the bank on behalf the clients) gradually until the title of ownership of the assets is completely transferred to the clients. *Qard* is a benevolent loan or financing without interest. After using the funds, clients return them to the bank at a similar amount, without any additional fee or interest. This contract is usually used for a short-term loan granted to the banks' employees.

For various reasons, in today's banking world, most of the Islamic banks prefer to use Non-PLS financing. First, PLS contracts are vulnerable to agency problems as entrepreneurs might have less incentive to put more effort into their business and they are more likely to report lower profits, compared to self-financed entrepreneurs (Abdul-Rahman et al., 2014; Dar and Presley, 2000). Second, Islamic banks have to sort many issues in the PLS arrangement: collateral, control, monitoring, etc. For instance, in *mudaraba*, banks do not have control rights over the assets given to the entrepreneur (Errico and Farahbaksh, 1998). Any losses from the project will be borne by the banks (El-Hawary et al., 2007).[3] Even if, for instance, banks decide to use *musharaka*, banks need to spend more on monitoring cost in the entrepreneurs' project. Third, PLS contracts require a well-defined contracting environment to function efficiently. Most Islamic banks operate in developing countries where financial markets are generally less transparent than in developed countries and prone to rent-seeking behavior (Abdul-Rahman et al., 2014; Aggarwal and Yousef, 2000; Alam and Parinduri, 2017; Dar and Presley, 2000).

Markup contracts have therefore become solutions to the above-mentioned problems. Markup contracts allow Islamic banks to be less concerned with agency problems and asymmetric information (Shaban et al., 2014). Moreover, the markup contract, especially *Murabaha*, also called 'collateral-by-contract', allows entrepreneurs to obtain funds without providing any collateral (Shaban et al., 2014). This is because the banks retain ownership of the assets and can seize them in cases of default (Aggarwal and Yousef, 2000).

[3] Except a loss caused by misconduct or negligence.

2.2. Islamic banks' equity financing and the role of SSB

Islamic banks in theory are part of an Islamic economic system. Errico and Farahbaksh (1998) indicate that:

"*To understand Islamic banking is to realize that its banks and their operations are considered to be an integral part of a complete economic system, which is based upon the codification of injunctions outlined in the Koran and the traditions of Prophet Mohammed, that is Islamic Shariah.*"

In theory, Islamic banks have a different objective than conventional banks. They are expected not simply to seek profits but also to promote social welfare and economic growth. The environment of Islamic banks is considered as a context where social solidarity and belonging to the community are center values (Daly and Frikha, 2016). Ethical behavior is expected to be at the root of Islamic banking, a key manifestation of which is the adoption of profit and loss sharing (PLS) schemes and the prohibition of interest (Mollah et al., 2016). The prohibition of interest is not an objective of Islamic banks. It is nevertheless a rule to help Islamic banks contribute to a world governed by Islamic principles (Weill, 2011). Therefore, in the Islamic financial system, Islamic banks should emphasize the use of PLS or equity contracts because they can better support entrepreneurs to create or run a business (Khan, 1995). PLS is also one of the core elements of Islamic banking (Errico and Farahbaksh, 1998). PLS could also increase the value of Islamic banks and make them more resilient to crises (Abdul-Rahman et al., 2014). Even though non-PLS contracts especially markup contracts are allowed under Islamic law (*Shariah* compliant) their acceptability is questioned by some Islamic scholars because mark-up financing implies a fixed return for the bank (Aggarwal and Yousef, 2000). It is therefore argued that markup contracts should be avoided or at least restricted because markup financing could open a "back door" to interest (Aggarwal and Yousef, 2000) (Ayub, 2007; Minhat and Dzolkarnaini, 2017). Additionally, Islamic scholars are economically worried that markup financing may stunt economic growth by constraining entrepreneurs from investing in new projects (Aggarwal and Yousef, 2000). SSB is hence expected to play an important role to promote the use of PLS over markup contracts.

The role of SSB is extremely important for Islamic banks and their existence along standard BOD makes their governance structure very different from those of conventional banks. Their function as a second layer in Islamic banks' organizational structure allows them

to monitor and supervise Islamic banks regarding *Shariah* implementation.[4] Such function is vital to maintain clients' confidence about Islamic banks' activities since SSB confirms the compliance of these activities with *Shariah* or Islamic law (Abdullah et al., 2015). Failing to maintain this confidence could jeopardize the sustainability of Islamic banks because stakeholders (deposit account holders or shareholders) can withdraw their investments at any time (Ginena and Hamid, 2015; Quttainah et al., 2013). Moreover, according to Nathan Garas and Pierce (2010), the role of SSB in Islamic banks is not just monitoring or supervising but also advising Islamic banks in all of the *Shariah*-related matters. This advisory role could take to form of suggesting BOD or management which Islamic contracts should be used or avoided. This is because SSB has a supreme authority to cancel any product or investment that does not comply with *Shariah,* even though it could deprive Islamic banks from potential investment and reduces their market share (Nathan Garas and Pierce, 2010). SSB's task also includes giving an opinion, for instance, to prohibit the bank engaging in a particular profitable transaction (Grais and Pellegrini, 2006). Additionally, SSB could issue a recommendation on how the institution could best fulfill its social role as well as promote Islamic finance (Grais and Pellegrini, 2006) and make them different from the conventional counterparts (Mollah and Zaman, 2015).

3. Data and Method

3.1. Sample

For the purpose of our study, we use a hand-collected dataset combining data from various sources. We manually collect the data on equity financing and all governance variables from the Islamic banks' annual reports. Other bank-specific data (balance sheet and income statement date) are collected from BankScope while country-level data are retrieved from the World Bank database, Pew Research Center, and the Heritage Foundation. Our dataset therefore is limited to the banks that: (1) report the types of Islamic financing in the annual reports; (2) have an SSB report and all related governance reports in their annual reports; (3) their data are available in BankScope. After winsorizing extreme values at the 1% and 99% levels, our final sample comprises 381 observations from 88 banks and 16 countries between

[4] Grais and Pellegrini (2006) highlight five main roles of SSB: certifying permissible financial instruments through *fatwa* (ex-ante Shariah audit), verifying that transaction comply with issued *fatwa* (ex-post *Shariah* audit), calculating and paying *Zakat*, deposing non-Shariah compliant earning, and advising on the distribution of income or expenses among shareholders and investment account holders.

2007 and 2014. Table 1 presents our variables, their definition as well as their descriptive statistics.

3.2. Equity financing across the sample

Table 2 illustrates several types of financing contracts used by Islamic banks. Based on our sample, equity (PLS) financing which consists of *mudaraba* (trustee financing) and *musharaka* (equity participation) represents a tiny portion in Islamic banks' financing portfolios. The average value of *mudaraba* is 2.7% while *musharaka* is 4.8%. Even though equity financing is not popular among Islamic banks, its proportion is substantially high in Indonesia (*musharaka* 30%), Iran (*mudaraba* 23%; *musharaka* 26%), and Yemen (*mudaraba* 24%). Our statistics are consistent with those provided in Wolters (2005) in Visser (2009), Abedifar et al. (2013), and Khan (1995). Table 2 also shows that *murabaha* (markup contract/ resale with a stated profit) is the most popular type of financing in Islamic banking. Islamic banks, on average, allocate more than a half of their financing using *murabaha* contracts. *Ijara* (leasing) is the second most popular financing type of contract with average values reaching 17% across our sample.

3.3. Econometric specification

In order to investigate how SSB characteristics influence equity financing in Islamic banks, we develop the following econometric model:

$$EqFin_{it} = \alpha + \beta_1 SSB_{it} + \beta_2 ROA_{it-1} + \beta_3 EQTA_{it-1} + \beta_4 LLP_{it-1} + \beta_5 Size_{it} + \beta_6 INFL_{jt} + \beta_7 GGDP_{jt} + \beta_8 HHI_{jt} + \beta_9 GDP_{jt} + \varepsilon_{it}. \quad (1)$$

where i, j, and t represent bank, country, and time respectively. *EqFin* is our dependent variable. It is defined as the ratio of equity financing to total financing (*EqFinTL*). We also employ *EqFinTA* (equity financing to total assets) and *EqFinNon* (equity financing to non-equity financing) for robustness.

SSB is a vector of variables which characterized the structure of SSB in Islamic banks. These characteristics encompass the size of SSB (*Size_SSB*) measured by the number of *Shariah* board members, the duality of SSB members (*Duality_SSB*) and the existence of a *Shariah* audit or *Shariah* department in Islamic banks (*ShariahDept_SSB*). We use a dummy variable for all three SSB variables. Specifically, *Size_SSB* is a dummy variable equals to 1 if the size of SSB is above its mean and 0 otherwise. The value of 1 in *Duality_SSB* (*ShariahDept_SSB*) refers to the existence of SSB member duality (the department of *Shariah*) within Islamic bank, whereas 0 otherwise.

Table 1. Descriptive statistics and variable explanations

Variable	Explanation	Sources	N	Mean	S.D.	Min	Max
Panel A: Dependent variables (Islamic banks' equity financing)							
EqFinTL	Ratio of equity financing to total financing	Banks' annual report	381	0.076	0.148	0	0.781
EqFinTA	Ratio of equity financing to total assets	Banks' annual report	381	0.052	0.107	0	0.524
EqFinNon	Ratio of equity financing to non-equity financing	Banks' annual report	381	0.151	0.477	0	3.569
Panel B: Governance variables							
Size_SSB	Dummy variable equals to 1 if the number of *Shariah* Supervisory Board (SSB) member in the bank above its mean and 0 otherwise	Banks' annual report	389	0.568	0.496	0	1
Duality_SSB	Dummy variable equals to 1 if one or more member of SSB are also BOD or executive member and 0 otherwise	Banks' annual report	388	0.124	0.330	0	1
ShariahDept_SSB	Dummy variable equals to 1 if an Islamic bank have a *Shariah* Department or Shariah Audit in their organizational structure and 0 otherwise	Banks' annual report	387	0.382	0.487	0	1
Size_BOD	Dummy variable equals to 1 if the number of BOD member above its mean and 0 otherwise	Banks' annual report	389	0.602	0.490	0	1
Duality_BOD	Dummy variable equals to 1 if one or more member of SSB are also Executive member and 0 otherwise	Banks' annual report	388	0.701	0.458	0	1
Meeting_BOD	Dummy variable equals to 1 if the number of BOD meetings above its mean and 0 otherwise	Banks' annual report	289	0.332	0.472	0	1
Indep_BOD	Dummy variable equals to 1 if the number of independent BOD above its mean and 0 otherwise	Banks' annual report	305	0.390	0.489	0	1
Panel C: Institutional & Islamic environments							
ResInsolv	Dummy variable equals to 1 if resolving insolvency index in the doing business index is above its mean and 0 otherwise	Doing business index (The World bank)	389	0.620	0.486	0	1
GetCredit	Dummy variable equals to 1 if getting credit index in the doing business index is above its mean and 0 otherwise	Doing business index (The World bank)	389	0.617	0.487	0	1
EnfContract	Dummy variable equals to 1 if enforcing contract index in the doing business index is above its mean and 0 otherwise	Doing business index (The World bank)	389	0.481	0.500	0	1
StartBuss	Dummy variable equals to 1 if starting a business index in the doing business index is above its mean and 0 otherwise	Doing business index (The World bank)	389	0.676	0.469	0	1
ShareIB	Dummy variable equals to 1 if the share of Islamic banks in the market above its mean and 0 otherwise	Bankscope,	389	0.201	0.401	0	1
MPOP	Dummy variable equals to 1 if the percentage of Muslims in the market above its mean and 0 otherwise	CIA Worldfactbook	389	0.396	0.490	0	1
Panel D: Bank-specific & country-specific variables							
ROA	Return on assets (ratio of net income to total assets) to proxy profitability	Bankscope	389	0.008	0.020	-0.139	0.062
EQTA	Equity to total assets to proxy solvency risk.	Bankscope	389	0.152	0.114	0.052	0.651
LLP	Loan loss provision to total loan to proxy credit risk.	Bankscope	389	0.016	0.049	-0.084	0.801
Size	Logarithm of banks' size to proxy bank size	Bankscope	389	14.849	1.501	10.650	18.045
INFL	Inflation	The World Bank	389	0.061	0.091	-0.242	0.367
GGDP	Growth of GDP	The World Bank	389	0.014	0.039	-0.173	0.094
HHI	Herfindahl Hischmann index to proxy market concentration.	Bankscope	389	0.134	0.078	0.045	0.551
GDP	Gross Domestic Product	The World Bank	389	25.538	1.145	23.011	28.603

Table 2. Percentage of Islamic financing (scaled by total financing) across countries

		Equity (PLS) financing		Mark-up and other (Non-PLS) financing				
Country	# Banks	*Mudaraba*	*Musharaka*	*Murabaha*	*Ijara*	*Diminishing Musharaka*	*Qard*	Others
		(1)	(2)	(3)	(4)	(5)	(6)	(7)
Bahrain	9	4.76	6.43	64.54	22.74	0.00	0.00	1.54
Bangladesh	6	1.01	0.11	62.20	4.46	13.65	2.18	52.14
Brunei Darussalam	1	0.00	0.46	83.80	10.49	0.00	0.04	78.03
Indonesia	8	9.46	30.09	56.00	0.30	0.00	3.67	0.47
Islamic Republic of Iran	4	23.01	25.82	15.32	1.16	9.11	2.27	11.95
Jordan	3	0.28	0.54	68.90	28.12	0.00	0.27	1.90
Kuwait	5	0.00	0.00	86.96	12.95	0.00	0.00	0.09
Malaysia	17	0.11	3.90	48.05	24.20	0.00	0.04	56.19
Pakistan	10	0.56	0.74	34.88	25.15	22.90	0.01	15.75
Qatar	4	1.08	0.47	68.53	19.87	0.04	0.00	10.01
Saudi Arabia	3	0.00	2.39	94.66	0.87	0.00	0.00	20.86
Sudan	6	2.69	6.23	74.24	2.72	0.00	0.00	14.12
Tunisia	1	0.00	0.00	70.56	1.59	0.00	0.17	27.68
United Arab Emirates	6	5.13	3.06	54.29	24.34	0.00	0.89	12.30
United Kingdom	4	0.44	0.66	87.79	1.26	0.00	0.00	9.85
Yemen	1	24.25	8.04	57.64	1.38	0.00	0.00	8.69
Total	88							
Average		2.77	4.88	57.99	17.29	3.78	0.43	23.38

Note: *mudaraba* = profit-sharing; *musharaka* = partnership; *murabaha* = cost-plus financing; *ijara* = leasing; diminishing *musharaka* = partnership with gradual ownership process; *qard* = benevolent loan.

Prior literature uses SSB size to measure the strength of SSB (Abdullah et al., 2015; Mollah and Zaman, 2015). *Size_SSB* in this study is an indicator of how collective decision-making is taken in Islamic banks. Banks that put more emphasis on collective decision-making related to *Shariah* issues should have a stronger tendency to use equity contracts rather than markup and other contracts. Nevertheless, we could also expect a negative impact of *Size_SSB*, because collective decision-making could take times or opinions could be very different because of a higher diversity of the board. As discussed in Goodstein et al. (1994), larger board are less likely to take strategic decisions due to the development of coalitions and factions.

Duality_SSB indicates that one or more members of the SSB are also a board of director or executive board member. Such a situation could lead to a conflict of interest because the decision and review by the SSB should be independent from both management or the BOD (Ginena and Hamid, 2015). On the one hand, we might expect a negative impact of *Duality_SSB* since members who have a dual position could lose their independence regarding their *Shariah* role. In such cases, the SSB might be more inclined towards non-equity contracts since those contracts are also *Shariah*-compliant, safer and more appropriate either for the issuer (Islamic banks) or user (entrepreneurs). However, in the opposite, by having a dual position, *SSB* could strongly influence BOD policies including PLS activities because they are more able to influence the decision of bank's managers to use PLS contracts. Therefore, *Duality_SSB* could either have a positive or a negative impact on the Islamic banks' PLS financing activities.

ShariahDept_SSB indicates if the bank has a *Shariah* department or has implemented a *Shariah* audit in Islamic banks. Some Islamic banks have this department mainly to assist SSB in ensuring *Shariah* compliance in Islamic banks (Ginena and Hamid, 2015). Unlike SSB that do not intensively monitor the banks, *Shariah* department can monitor Islamic banks regarding *Shariah*-related activities on the daily basis because *Shariah* department employees are hired by the bank for a long-term contract. Ginena and Hamid (2015) highlight that some duties of the *Shariah* department or *Shariah* audit are: (1) examine *Shariah* controls, level of compliance with SSB policies, procedures, and *fatwa* through objective *Shariah* audits; (2) participate in enhancing Shariah compliance, including training for the employees. *Shariah* department usually will give a monthly or quarterly report of *Shariah* practice to be evaluated by the SSB. The SSB therefore will provide an opinion on the report in order to inform the management whether their practices are complying to *Shariah*. Like SSB, *Shariah* department is also allowed to issue a *fatwa*. This function will be beneficial for Islamic banks because in the fluid business situations when Islamic banks need to develop a product to respond competitive

environment, they could ask *Shariah* department about the compliance of the product. This way will be better than asking *fatwa* from SSB because SSB members usually are very busy. Most of SSB members sit in more than one bank and hold many positions outside Islamic banks (Oseni et al., 2016). Therefore, since the *Shariah* department has a vital role to assist the SSB in conducting regular monitoring, we expect a positive coefficient for *ShariahDept_SSB*. Nevertheless, there could also be an adverse impact of *Shariah* department. As the members of Sharia department are banks' employees, this might then be more difficult for them to provide independent monitoring or review. *Shariah* department decisions therefore could be influenced by the pressure from the bank's management. In this case, Islamic banks could be exposed to fatwa risk or the occurrence that a *fatwa* is vague, incorrect, or complicated (Ginena and Hamid, 2015). The incorrect *fatwa* definitely will affect Islamic banks' reputation and it could also diminish stakeholders' trust about the *Shariah* compliance.

We also add several bank-specific control variables in our regressions. Except for banks' size, all bank-level variables are lagged to mitigate potential endogeneity problems. *ROA* is the return on assets which is introduced as a proxy for profitability. Banks with higher profitability are more likely to have a solid balance sheet (Kim and Sohn, 2017) and therefore more inclined to diversify their financing portfolio by employing equity financing which is riskier. However, non-profitable banks could also be more eager to use such contracts to attract more entrepreneurs. This is because from the entrepreneurs' point of view, equity contract is more attractive than debt contract, especially for those who just started a business (Khan, 1995). Small businesses usually have a high revenue volatility making them less eager to choose debt financing. By offering PLS financing, Islamic banks could also reach entrepreneurs who do not get access from the conventional credit (Aggarwal and Yousef, 2000). Abedifar et al. (2013) note that Islamic banks could have greater credit risk than conventional banks due to the complexity of Islamic loan contracts, limited default penalties, and moral hazard incentives caused by PLS arrangements. We hence introduce *LLP* (ratio of loan loss provision to total loan) in our regressions to consider the impact of credit risk. A positive value of *LLP* means higher credit risk, and hence bank will decrease PLS lending activities. Nevertheless, in the dual banking market with a highly competitive pressure, banks with a greater credit risk could also be more willing to use equity financing to magnetize more customers. *EQTA* is the ratio of equity to total assets and taken into account to capture the impact of leverage. A higher value of *EQTA* will indicate higher lower solvency and might encourage banks to increase the proportion of equity financing because in such circumstances banks have an ability to increase risk-taking by using PLS contracts. Again, the opposite sign could also be expected. Islamic

banks with a better solvency could have less incentive to use equity financing. This is because they are less risky, and they do not need to use PLS contract to attract entrepreneur. *Size* is banks' size, measured by the natural logarithm of banks' total assets. We also expect a positive impact of *Size*, as Cihak and Hesse (2010) argue that the proportion of equity financing could be higher in large banks because they are usually less risky than small banks, enabling them to take more risk on PLS activities. However, smaller banks could also have higher PLS activities in order to attract more clients.

We also control for the macroeconomic environment using inflation (*INFL*), the growth of gross domestic product/GDP (*GGDP*) and *GDP*. We also use the Herfindahl index (*HHI*) to control for market concentration. In the concentrated market, Islamic banks might decrease PLS financing because they face less competition, or because they do not need to attract customers or entrepreneurs using PLS. However, a negative association could also be expected since concentration is not always positively associated with market competition (e.g., see: Berger et al., 2009, 2004).

4. Empirical results

Table 3 presents the regression results using equation (1). The size of SSB (*Size_SSB*) is not significant indicating that banks in which more members are appointed on the SSB do not behave differently than other banks regarding promoting PLS contracts. Conversely, the duality of SSB (*Duality_SSB*) has a positive impact on the proportion of equity financing, even though it is only significant at the 10% level. Banks in which one or more members sit on both the SSB and the BOD exhibit a higher share of equity financing. By also having a position on the BOD, SSB members will have more power to influence the decision of bank's managers to use PLS contracts. The presence of a *Shariah* department (*ShariahDept_SSB*) in Islamic banks has a negative impact on the proportion of equity financing. Because *Shariah* department members are employed by the bank usually for a long contract (similar to other employees), it would also be difficult for them to provide independent *Shariah* monitoring. Therefore, a *fatwa* issued by *Shariah* department could be because of the pressure from the management or BOD. In this case, a *fatwa* risk, or the possibility that *fatwa* is incorrect, vague, or overly complicated will be higher. In the broader perspective, the *fatwa* risk could become the *Shariah* risk. *Shariah* risk is a form of operational risk, as the risk of financial losses that an Islamic bank may experience as a result of non-compliance with *Shariah* percepts in activities (Ginena, 2014).

Table 3. Impact of SSB on equity financing

	EqFinTL			*EqFinTA*			*EqFinNon*		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Size_SSB	0.0303			0.0195			0.0300		
	(1.53)			(1.43)			(0.59)		
Duality_SSB		0.0748*			0.0376**			0.118*	
		(1.90)			(2.00)			(1.94)	
ShariahDept_SSB			-0.0890***			-0.0375***			-0.316***
			(-4.61)			(-2.95)			(-8.69)
Lag ROA	-0.128	-0.0398	-0.102	-0.00338	0.0467	0.0165	-0.702	-0.585	-0.709
	(-0.39)	(-0.16)	(-0.31)	(-0.02)	(0.31)	(0.10)	(-0.88)	(-0.82)	(-0.90)
Lag EQTA	-0.0281	-0.00370	-0.00493	-0.0504	-0.0353	-0.0361	-0.174	-0.147	-0.143
	(-0.42)	(-0.06)	(-0.07)	(-1.03)	(-0.74)	(-0.76)	(-0.92)	(-0.81)	(-0.79)
Lag LLP	0.0570	0.0871	0.0611	0.0771	0.0930	0.0799	0.208	0.253	0.210
	(0.46)	(0.85)	(0.49)	(1.12)	(1.44)	(1.15)	(0.80)	(1.11)	(0.83)
Size	0.0354	0.0405	0.0416	0.0247	0.0278	0.0281	0.0882	0.0940	0.100*
	(1.50)	(1.60)	(1.63)	(1.56)	(1.63)	(1.63)	(1.52)	(1.60)	(1.73)
INFL	0.0891***	0.0799**	0.0734**	0.0493*	0.0432*	0.0403	0.222*	0.214*	0.194
	(2.66)	(2.38)	(2.26)	(1.94)	(1.68)	(1.60)	(1.81)	(1.73)	(1.61)
GGDP	-0.102	-0.0855	-0.0960	-0.0999	-0.0894	-0.0939	-0.277	-0.260	-0.295
	(-0.93)	(-0.79)	(-0.85)	(-1.03)	(-0.92)	(-0.95)	(-0.99)	(-0.93)	(-1.05)
HHI	-0.0356	0.0131	0.0148	0.0293	0.0610	0.0619	-0.297	-0.250	-0.249
	(-0.30)	(0.10)	(0.11)	(0.37)	(0.69)	(0.70)	(-0.62)	(-0.50)	(-0.50)
GDP	0.0129	-0.0195	0.00360	0.0566	0.0385	0.0498	-0.0700	-0.114	-0.0699
	(0.19)	(-0.26)	(0.04)	(1.13)	(0.69)	(0.81)	(-0.37)	(-0.60)	(-0.36)
Constant	-0.771	-0.0217	-0.582	-1.746	-1.329	-1.604	0.729	1.750	0.680
	(-0.41)	(-0.01)	(-0.26)	(-1.30)	(-0.88)	(-0.99)	(0.15)	(0.37)	(0.14)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	381	381	381	381	381	381	381	381	381
R-squared	0.09	0.11	0.07	0.09	0.09	0.07	0.05	0.06	0.06

Note: This table is estimation results from equation (1) using fixed-effect method. Please see Table 1 for the description of variables. Robust t-statistics are in parentheses. ***, **, and * denotes significance in 1%, 5%, and 10% levels respectively.

We now switch to the control variables. We do not find any significant impact of bank-level characteristics. Regarding macroeconomic controls, we find a positive and significant impact of inflation.

5. Further analysis

5.1. The link between SSB and BOD

In most cases, SSB members are appointed by the BOD and remunerated by the banks, causing a conflict of interest between them (Ginena and Hamid, 2015; Grais and Pellegrini, 2006; Hamza, 2013; Oseni et al., 2016). Therefore, even though they are expected to play an independent role, SSB members behavior could be influenced by the BOD. While SSB members are encouraged to promote Islamic values through equity financing, the BOD might prefer to use markup or non-PLS contracts which are less risky and easier to implement. In other words, SSB decision to promote equity financing could be impacted by the characteristics of the BOD. To investigate this issue, we construct the following interaction model.

$$EqFin_{it} = \alpha + \beta_1 SSB_{it} + \beta_2 BOD_{it} + \beta_3 SSB_{it} * BOD_{it} + \beta_4 ROA_{it} + \beta_5 EQTA_{it} + \beta_6 LLP_{it} + \beta_7 Size_{it} + \beta_8 INFL_{jt} + \beta_9 GGDP_{jt} + \beta_{10} HHI_{jt} + \beta_{11} GDP_{jt} + \varepsilon_{it}. \quad (2)$$

Where BOD is a vector of four variables: the number of directors in the board (*Size_BOD*$_{it}$), the duality of directors (*Duality_BOD*$_{it}$), the number of meetings held by the board in one financial year (*Meeting_BOD*$_{it}$), and the independence of directors (*Indep_BOD*$_{it}$). Specifically, *Size_BOD*, *Indep_BOD*, and *Meeting_BOD* are dummy variables equals to 1 if they are above their mean and 0 otherwise. *Duality_BOD* is a dummy variable equals to 1 if a CEO is also sit in the BOD.

While there is few literature examine the impact of BOD on equity financing, large studies highlight how BOD structure affect firm performance (Adams and Mehran, 2012; Chou et al., 2013; Liang et al., 2013; Vallascas et al., 2017; Yang and Zhao, 2014). Taking from these results and applied on the link between BOD characteristic and equity financing, we could also expect that larger BOD could give a positive impact on equity financing because they have more people to give different perspectives about such mode of financing. The presence of independent BOD member should also positively impact on the PLS activities because independent members are less beholden to management. Higher meeting attendance by the

directors could also increase PLS financing activities because failure to regularly attend board meeting could be seen as directors' unwillingness to fulfill his/her monitoring and supervising duties. The duality of CEO could negatively impact with equity financing as he or she has more significant influence over bank decision making.

Table 4 presents the estimation results for equation (2). Whereas in the baseline regression we do not find significant impact of the size of SSB, from columns (1), (2), and (3), we could see that size of SSB matters especially when BOD size is small, when Islamic banks have duality structure of BOD, or when Islamic banks have frequent BOD meetings. We do not find any significant impact of SSB duality when BOD size is small (column (6)) and when BOD has a high number of the meeting (column (7)). The negative effect of *Shariah* department diminishes when BOD size is large (column (9)), but it still consistently shows negative impact regardless other BOD characteristics (columns (10), (11), and (12)). Our empirical results in overall suggest that the impact of SSB on PLS activities in Islamic banks is also affected by some of the characteristics of BOD. Although SSB is supposed to be entirely independent, in reality it seems to be difficult because they are appointed and remunerated by the banks.

Table 4. The interaction of SSB and BOD

	'BOD' =											
	Number_ BOD	Duality_ BOD	Meetings BOD	Indep_ BOD	Number_ BOD	Duality_ BOD	Meeting_ BOD	Indep_ BOD	Number_ BOD	Duality_ BOD	Meeting_ BOD	Indep_ BOD
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Size_SSB (β_1)	0.0432*	0.0324*	0.0576*	0.0191								
	(1.71)	(1.72)	(1.81)	(1.65)								
Duality_SSB (β_1)					0.0377	0.0803***	0.131**	0.0660***				
					(1.64)	(2.83)	(2.25)	(2.71)				
ShariahDept_SSB (β_1)									-0.0890***	-0.0889***	-0.0906***	-0.0854***
									(-4.67)	(-4.60)	(-4.34)	(-4.24)
'BOD' (β_2)	0.0291	0.0178	0.0307*	-0.0569	0.00507	0.0123	0.0172*	-0.0106	0.00156	0.0129	0.00123	-0.00462
	(1.17)	(1.17)	(1.70)	(-1.41)	(0.39)	(0.84)	(1.74)	(-0.73)	(0.22)	(1.35)	(0.17)	(-0.37)
Size_SSB'BOD'*	-0.0248	-0.00161	-0.0398	0.0621								
(β_1*β_2)	(-0.96)	(-0.05)	(-1.16)	(1.49)								
Duality_SSB'BOD'*					0.0714**	-0.00712	-0.144**	0.0101				
(β_1*β_2)					(2.01)	(-0.22)	(-2.37)	(0.25)				
ShariahDept_SSB'BOD'*									0.0423	-0.0164	0.0470**	0.0123
(β_1*β_2)									(1.19)	(-0.80)	(2.52)	(0.89)
Constant	-0.381	-0.877	1.315	2.222	-0.292	-0.0438	-0.115	0.867	-0.610	-0.656	0.0159	0.371
	(-0.21)	(-0.47)	(0.58)	(1.16)	(-0.14)	(-0.02)	(-0.04)	(0.32)	(-0.27)	(-0.28)	(0.00)	(0.12)
Wald test												
1. $\beta_1 + (\beta_1$*$\beta_2)$	0.0184	0.0308	0.0178	0.0812**	0.109***	0.0731*	-0.0132	0.0760*	-0.0467	-0.105***	-0.0436***	-0.0731***
	(0.87)	(1.04)	(1.35)	(2.00)	(2.92)	(1.60)	(-0.75)	(1.46)	(-1.52)	(-3.39)	(-4.15)	(-4.36)
2. $\beta_2 + (\beta_1$*$\beta_2)$	0.00428	0.0162	-0.00905	0.00519	0.0765**	0.0052	-0.127**	-0.0005	0.0438	-0.00355	0.0482***	0.00769
	(0.45)	(0.58)	(-0.43)	(0.52)	(2.12)	(0.19)	(-2.10)	(-0.01)	(1.27)	(-0.20)	(2.88)	(1.57)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N obs.	381	381	282	303	381	381	282	303	381	381	282	303
N banks	83	83	61	65	83	83	61	65	83	83	61	65
R-sq.	0.11	0.10	0.17	0.19	0.14	0.11	0.17	0.16	0.09	0.07	0.11	0.11

Note: This table is estimation results from equation (2) using fixed-effect method. Please see Table 1 for the description of variables. Bank-level and country level controls are not shown to save space. Robust t-statistics are in parentheses. ***, **, and * denotes significance in 1%, 5%, and 10% levels respectively.

5.2. SSB and institutional and Islamic environments

Equity financing is not widely used among Islamic banks nowadays because of its complexity and risk. Equity financing even becomes less prevalent because many countries where Islamic banks operate are characterized by a high degree of market imperfection. In such environments, Islamic banks are not able to take an optimal financing decision due to asymmetric information and a strong moral hazard problem (Abdul-Rahman et al., 2014; Aggarwal and Yousef, 2000). Alam and Parinduri (2017) therefore argue that under better institutional environments, equity financing could be more applicable. To examine this issue, we use the following specification:

$$EqFin_{it} = \alpha + \beta_1 SSB_{it} + \beta_2 Environment_{it} + \beta_3 SSB_{it} * Environment_{it} + \beta_4 ROA_{it} + \beta_5 EQTA_{it} + \beta_6 LLP_{it} + \beta_7 Size_{it} + \beta_8 INFL_{jt} + \beta_9 GGDP_{jt} + \beta_{10} HHI_{jt} + \beta_{11} GDP_{jt} + \varepsilon_{it.} \qquad (3)$$

where *Environment* is either institutional environment (*InstEnv*) or Islamic environment (*IslamicEnv*). To capture the different dimension of the institutional environment, we follow Alam and Parinduri (2017) and use four proxies from the doing business index (World Bank, 2017). Those are resolving insolvency ($ResInsov_{it}$), getting credit ($GetCredit_{it}$), enforcing a contract ($EnfContract_{it}$), and starting a business ($StartBuss_{it}$). Resolving insolvency is an index associated with the time, cost, outcome, and recovery rate for a commercial insolvency and the strength of legal framework for insolvency. Getting credit is an index which relates to movable collateral laws and credit information systems. The Enforcing contract index relates to the time and cost to resolve a commercial dispute and the quality of judicial processes. Starting a business is an index associated with the procedures, time, cost and minimum paid-in capital to start a limited liability company. All of the index ranges from 0-100 with the higher value indicates better institutional environment. In this study, we convert those measurements to the dummy variables to the ease of interpretation: 1 if the value of the index above its mean and 0 otherwise.

Regarding Islamic environment, we follow Abedifar et al. (2016) and Meslier et al. (2017) by using the market share of Islamic banks (*ShareIB*) and the percentage of Muslims in the country (*MPOP*). Similar to the institutional environment, we also convert *ShareIB* and *MPOP* into dummy variables. The value of 1 of *ShareIB* or *MPOP* indicates better Islamic environment (having greater Islamic banks market share or higher share of Muslims) whereas 0 indicate poor Islamic environment.

The results for the impact of the institutional environment are presented in Table 5 whereas Islamic environment is depicted in table 6. We find evidence that institutional environment characteristics significantly alter the influence of *Shariah* board on equity financing. While in countries with a weaker institutional environment, size of SSB does not significantly affect PLS financing (β_1 is not significant), we find a positive influence in countries with a better institutional environment ($\beta_1 + (\beta_1 * \beta_2)$). We further find that institutional environment significantly alters the influence of SSB duality on equity financing. We find negative effects of the coefficient of the interactive term ($\beta_1 * \beta_2$), indicating that the positive effect of SSB duality on equity financing is reduced when the institutional environment is getting better. Through the duality of its members, SSB could act as a substitute to a weak institutional environment to influence the decision of bank's manager to use PLS financing by providing monitoring and advisory activities, leading to a reduction of asymmetric information problems. We do not find any significant impact of institutional environment on the role of *Shariah* department.

Regarding Islamic environment, Table 6 shows that the role of SSB size and SSB duality on equity financing are reduced in countries with a high market share of Islamic banks ($\beta_1 * \beta_2$ is negative and significant). While we find a positive of SSB size column (1) and of SSB duality column (2) on equity financing in countries with a weaker Islamic environment, this effect turns to be negative when Islamic environment becomes stronger. Again, similarly to our previous findings, this might indicate that SSB presence acts as a substitute to a weak Islamic environment. In other words, when the Islamic environment is stronger, through either a higher share of Muslim population or a higher share of Islamic banks, there is less need to convince bank's manager to use PLS activities in Islamic banks, reducing the positive impact of SSB duality. Our overall results therefore are not in line with (Alam and Parinduri, 2017) findings. Whereas they do not find a significant impact of institutional environment, our empirical results show that equity financing in Islamic banks could be altered by the condition of institutional and Islamic environments. We also show that better environments play a substitute role for SSB regarding its association with Islamic banks' PLS lending activities.

Table 5. The SSB and institutional environments

	'*InstEnv*' =											
	ResInsolv (1)	*GetCredit* (2)	*EnfContract* (3)	*StartBuss* (4)	*ResInsolv* (5)	*GetCredit* (6)	*EnfContract* (7)	*StartBuss* (8)	*ResInsolv* (9)	*GetCredit* (10)	*EnfContract* (11)	*StartBuss* (12)
Size_SSB (β_1)	0.0174	0.00192	0.00664	0.0354								
	(0.55)	(0.07)	(0.12)	(0.79)								
Duality_SSB (β_1)					0.113***	0.151***	0.139***	0.123***				
					(2.81)	(3.61)	(3.43)	(2.97)				
ShariahDept_SSB (β_1)									-0.088***	-0.0673**	-0.090***	-0.092***
									(-4.71)	(-2.16)	(-4.62)	(-4.57)
'InstEnv' (β_2)	-0.0157	-0.0258	-0.0461	-0.0192	-0.00466	-0.00377	-0.0123	-0.0104	-0.00790	-0.00169	-0.0376**	-0.00521
	(-0.67)	(-1.54)	(-1.37)	(-0.90)	(-0.40)	(-0.31)	(-0.62)	(-0.86)	(-0.50)	(-0.16)	(-2.34)	(-0.40)
Size_SSB x InstEnv' (β_1*β_2)	0.0172	0.0405	0.0266	-0.0055								
	(0.57)	(1.39)	(0.53)	(-0.15)								
Duality_SSB x InstEnv' (β_1*β_2)					-0.039***	-0.102**	-0.0890**	-0.0672*				
					(-2.85)	(-2.17)	(-2.12)	(-1.75)				
ShariahDept_SSB x InstEnv' (β_1*β_2)									0.000764	-0.0231	0.00500	-0.0267
									(0.04)	(-1.09)	(0.22)	(-1.10)
Constant	-0.290	0.468	-0.464	-0.564	0.0685	-0.520	-0.204	-0.148	-0.505	-0.387	-0.322	-0.434
	(-0.15)	(0.24)	(-0.26)	(-0.30)	(0.03)	(-0.26)	(-0.10)	(-0.07)	(-0.23)	(-0.17)	(-0.15)	(-0.20)
Wald test												
$\beta_1 + (\beta_1$*$\beta_2)$	0.0346*	0.0424**	0.0332*	0.0299	0.0742*	0.0488*	0.0501*	0.0555*	-0.087***	-0.090***	-0.085***	-0.068***
	(1.77)	(2.09)	(1.84)	(1.59)	(1.90)	(1.74)	(1.85)	(1.96)	(-2.97)	(-4.61)	(-3.05)	(-2.72)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N obs.	381	381	381	381	381	381	381	381	381	381	381	381
N banks	83	83	83	83	83	83	83	83	83	83	83	83

Note: This table is estimation results from equation (2) using fixed-effect method. Please see Table 1 for the description of variables. Bank-level and country level controls are not shown to save space. Robust t-statistics are in parentheses. ***, **, and * denotes significance in 1%, 5%, and 10% levels respectively.

Table 6. The SSB and Islamic environments

	'IslamicEnv' =					
	ShareIB	*MPOP*	*ShareIB*	*MPOP*	*ShareIB*	*MPOP*
	(1)	(2)	(3)	(4)	(5)	(6)
Size_SSB (β_1)	0.0389**	0.0473**				
	(2.23)	(2.37)				
Duality_SSB (β_1)			0.0643*	0.0704*		
			(1.66)	(1.80)		
ShariahDept_SSB (β_1)					-0.0299*	0.0462
					(-1.71)	(1.37)
'IslamicEnv' (β_2)	0.280***	0.167***	0.0867	0.139***	0.100	0.166***
	(3.72)	(3.34)	(1.33)	(3.16)	(1.16)	(3.29)
*Size_SSB * 'IslamicEnv'* (β_1*β_2)	-0.344***	-0.112**				
	(-8.14)	(-2.08)				
*Duality_SSB * 'IslamicEnv''* (β_1*β_2)			-0.150**	-0.199***		
			(-2.01)	(-3.09)		
*ShariahDept_SSB * 'IslamicEnv''* (β_1*β_2)					-0.0821	-0.132***
					(-0.75)	(-2.74)
Lag ROA	-0.0488	-0.104	0.0987	0.0381	0.0385	0.00848
	(-0.17)	(-0.37)	(0.43)	(0.17)	(0.13)	(0.03)
Lag EQTA	-0.0698	-0.0778	-0.0558	-0.0354	-0.0565	-0.0306
	(-1.10)	(-1.24)	(-0.90)	(-0.59)	(-0.90)	(-0.51)
Lag LLP	0.000851	0.0449	0.0485	0.0680	0.0236	0.0538
	(0.01)	(0.47)	(0.60)	(0.82)	(0.25)	(0.54)
Size	0.000362	0.0136	0.00632	0.0159	0.00870	0.0179
	(0.03)	(1.03)	(0.45)	(1.06)	(0.62)	(1.22)
INFL	0.0762**	0.0796**	0.0720**	0.0684**	0.0702**	0.0587*
	(2.46)	(2.42)	(2.31)	(2.19)	(2.28)	(1.95)
GGDP	-0.134	-0.114	-0.104	-0.105	-0.105	-0.112
	(-1.25)	(-1.05)	(-0.97)	(-0.98)	(-0.95)	(-1.02)
HHI	-0.0371	0.00716	-0.0187	0.00895	-0.0338	0.0295
	(-0.42)	(0.08)	(-0.17)	(0.09)	(-0.31)	(0.28)
GDP	0.0242	0.0214	0.0237	0.0227	0.0204	0.0265
	(1.53)	(1.34)	(1.43)	(1.48)	(1.23)	(1.54)
Constant	-0.548	-0.712	-0.612	-0.770	-0.543	-0.910*
	(-1.25)	(-1.47)	(-1.34)	(-1.55)	(-1.16)	(-1.69)
Wald test						
1. $\beta_1 + (\beta_1*\beta_2)$	-0.305***	-0.0643	-0.0852	-0.128***	-0.112	-0.087***
	(-8.03)	(-1.30)	(-1.40)	(-2.99)	(-1.07)	(-2.94)
2. $\beta_2 + (\beta_1*\beta_2)$	-0.0638	0.0552	-0.0628***	-0.0602*	0.0181	0.0343
	(-1.54)	(1.19)	(-1.02)	(-0.97)	(0.27)	(0.77)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N obs.	381	381	381	381	381	381
N banks	83	83	83	83	83	83
R-sq.	0.21	0.07	0.02	0.03	0.03	0.05

Note: This table is estimation results from equation (3) using random-effect method. Please see Table 1 for the description of variables. Robust t-statistics are in parentheses. ***, **, and * denotes significance in 1%, 5%, and 10% levels respectively.

6. Robustness checks

We employ several robustness tests to test the consistency of our results. First, we replace our bank-fundamental variables by other indicators in our model specification. We do this because all of our bank-level controls are statistically insignificant. Table 7 shows the results. In columns (1)-(3) we replace ROA by ROE (return on equity, net income scaled by total equity) but the results remain same. ROE as another proxy for profitability does not show a significant impact. We replace EQTA by ZROA in the next analysis. ZROA is the Z-score of ROA, measuring the probability of banks' insolvency. Following Fu et al. (2014), it is calculated as $Z_{it} = (ROA_{it} + EQTA_{it})/\sigma ROA$. Z-Score shows the number of standard deviation that banks' return has to fall below its expected value to deplete equity and make the bank insolvent. Our results in column (4)-(6) remain the same, suggesting that equity financing is not statistically affected by Islamic banks' insolvency risk. The remaining columns show results when we change the proxy for credit risk. Instead of using LLP, we use a ratio of loan loss reserve to total loan (LLR). Again, we do not find statistically significant results when LLP is replaced by LLR. Equity financing is actually not affected by Islamic banks' financials. In all our alternative specifications, the significance of the SSB governance variables is unaltered.

Second, we consider the degree of competition in the Islamic banking market by including a Lerner index in our model. As emphasized earlier from Table 2, some countries exhibit a considerable ratio of equity financing (Indonesia, Iran, Yemen) whereas it is very low in other countries (Kuwait and Saudi Arabia). How Islamic banks compete with each other could also impact PLS financing. An Islamic bank might decide to employ PLS financing when there is a high degree of market competition on the Islamic banking market. We follow Meslier et al. (2017) by creating a Lerner index within the Islamic banking market (*LernerIB*). A Higher index indicates lower market competition and vice versa. Our result in Table 8, columns (1)-(3), show that *LernerIB* negatively influences equity financing, meaning that higher Islamic banking market competition (Lower *LernerIB*) is associated with a higher ratio of equity financing, consistent with our prediction. After incorporating *LernerIB* in the equation, our results generally do not change. Even though we lost significance for *Duality_SSB*, it still has a positive value. *ShariahDept_SSB* is also significant at the 5% level.

Table 7. Robustness: Changing bank-fundamental control variables

	EqFinTL								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Size_SSB	0.0300			0.0304			0.0246		
	(1.53)			(1.53)			(1.23)		
Duality_SSB		0.0753*			0.0747*			0.0423*	
		(1.88)			(1.87)			(1.74)	
ShariahDept_SSB			-0.0869***			-0.0893***			-0.0841***
			(-4.51)			(-4.63)			(-4.30)
Lag ROE	0.0165	0.0230	0.0124						
	(0.56)	(0.84)	(0.42)						
Lag LnZROA				-0.0104	-0.00683	-0.00733			
				(-0.72)	(-0.49)	(-0.53)			
Lag LLR							-0.0472	-0.0229	-0.0261
							(-1.17)	(-0.73)	(-0.82)
Lag EQTA	-0.0319	-0.00670	-0.00856				-0.0186	-0.00705	-0.00617
	(-0.47)	(-0.10)	(-0.13)				(-0.25)	(-0.10)	(-0.08)
Lag LLP	0.0913	0.107	0.0877	0.0660	0.0938	0.0683			
	(1.02)	(1.33)	(0.99)	(0.50)	(0.85)	(0.52)			
L.ROA				-0.0527	0.0108	-0.0466	-0.0688	-0.0193	-0.0205
				(-0.13)	(0.03)	(-0.12)	(-0.51)	(-0.16)	(-0.17)
Constant	-0.870	-0.0634	-0.663	-0.897	-0.196	-0.765	-0.795	-0.332	-0.755
	(-0.48)	(-0.03)	(-0.30)	(-0.44)	(-0.09)	(-0.32)	(-0.42)	(-0.16)	(-0.34)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N obs.	381	381	381	378	378	378	370	370	370
N banks	83	83	83	82	82	82	81	81	81
R-sq.	0.094	0.12	0.07	0.10	0.12	0.07	0.10	0.09	0.09

Note: This table is robustness test results from equation (1) using fixed-effect method. Please see Table 1 for the description of variables. Robust t-statistics are in parentheses. ***, **, and * denotes significance in 1%, 5%, and 10% levels respectively.

Table 8. Robustness: Islamic banking market competition, country fixed effect, and random effect technique

	EqFinTL								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Size_SSB	0.0268			0.0303			0.0244		
	(1.19)			(1.53)			(1.26)		
Duality_SSB		0.0375			0.0747*			0.0617	
		(1.07)			(1.90)			(1.61)	
ShariahDept_SSB			-0.0542**			-0.0890***			-0.0437**
			(-2.60)			(-4.61)			(-2.40)
LernerIB	-0.102**	-0.101*	-0.0953*						
	(-2.29)	(-1.87)	(-1.87)						
Constant	0.304	0.812	0.584	-0.769	-0.0230	-0.583	-0.525	-0.560	-0.422
	(0.17)	(0.42)	(0.29)	(-0.41)	(-0.01)	(-0.26)	(-1.15)	(-1.25)	(-0.95)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	No	No	No	Yes	Yes	Yes	No	No	No
Bank-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N obs.	312	312	312	381	381	381	381	381	381
N banks	73	73	73	83	83	83	83	83	83
R-sq.	0.14	0.12	0.12	0.10	0.12	0.07	0.08	0.10	0.06

Note: This table is robustness test results from equation (1) using fixed-effect method for column (1)-(3) and random-effect method for column (4)-(9). Please see Table 1 for the description of variables. Robust t-statistics are in parentheses. ***, **, and * denotes significance in 1%, 5%, and 10% levels respectively.

Third, we consider country fixed effects because PLS financing might be dependent on the country characteristics that cannot be captured by country-level variables in our equation. Results from columns (4)-(6) in Table 8 show that using country fixed effects in the estimations do not change the results. Fourth, we estimate our model by using random effects instead of fixed effects. Some papers in the area of bank governance prefer the former (Mollah et al., 2016; Mollah and Zaman, 2015). One of the reasons is that because governance variables are rarely changing over time, the fixed effect technique could be inappropriate (Abdullah et al., 2015; Mollah and Zaman, 2015). However, even when employing random-effect estimators, our results remain consistent, as depicted in columns (7) to (9).

7. Conclusion

After more than three decades of Islamic banking, the risk sharing features of equity financing is not successfully applied in Islamic banking activities. Due to its complexity, Islamic financing with risk-sharing features is rarely used in practice. This study investigates some potential drivers of equity financing. We focus on the role of the SSB because this board is not just supervising the *Shariah* practices in Islamic banking but also advising the BOD and management on how Islamic banks can contribute to economic development and promote the core values of Islamic banking. These can be accomplished by using equity financing and limiting mark-up financing.

We find that the extent to which equity financing actually used by Islamic banks is not affected by the size of SSB. We also find that duality of SSB is positively associated with equity financing. A member of the SSB who also sits on the BOD might have a greater power to influence policies and decisions in the bank particularly regarding the use or not of equity financing. We also find that the existence of *Shariah* department decreases the use of equity financing. Because *Shariah* department members are appointed by the bank's manager, they might be less independent from the board. Moreover, they are subject to *fatwa* risk. Additionally, we also show that the institutional and Islamic environments matter for equity financing in Islamic banks.

This study has two important policy implications. First, regulator and supervisor should carefully monitor the use of PLS in Islamic banks' activities because of the risks and complexities inherent in this contract. The failure of the use of equity financing could increase the Islamic banks' financial instability because Islamic banks might be willing to use PLS contract to attract more customers especially in the competitive market. Second, we suggest

SSB be integrated within BOD as we find that the SSB will have a better influence if they also hold a position in BOD. In fact, although the SSB has a role to monitor and advising *Shariah* issue in Islamic banks, the responsibility of *Shariah* applications are in the hand of BOD and management. Therefore, if SSB is united with BOD, SSB could also have responsibility and not just provide *Shariah* monitoring. The authority to give independent *Shariah* report and review could be moved into a country-level organization (central bank, financial service authority) or even private institution as applied in some countries.

General conclusion

The substantial increase of Islamic finance both in Muslim and non-Muslim countries over the last decade has raised important issues on competition and governance. In most of countries, with the exception of Iran and Sudan, Islamic and conventional banks operate alongside on dual banking markets. This dissertation contains three chapters that mainly focus on the competitive behavior in the dual banking market. The first chapter studies how competition shapes the deposit behavior, the second chapter highlights the impact of competition on banking stability, and the third chapter focuses on Islamic banks' equity financing activities.

In the first chapter of this dissertation, we investigate the impact of dual market competition and focus on the differences in deposit rate setting in Islamic and conventional banks. Islamic banks, in theory, have a different mechanism of setting the rate of deposit than its conventional peers. As Islamic banks follow the Profit and Loss Sharing (PLS) principle, Islamic depositors cannot claim a fixed rate of return on their deposits and the rate depend on the bank's actual ex-post profit. We show that there are notable differences in the determinants of deposit rates in the two types of institution. Market competition has a significant impact on deposit rate of conventional banks but not Islamic banks. This suggests that Islamic banks' deposit rate setting is not affected by market competition, differently from conventional banks that increase (decrease) the rate when the market competitiveness higher (lower). Also, in countries with a greater presence of Islamic banks, conventional banks set higher rate and even higher when their market power is lower. A similar result is also observed from countries with a predominantly Muslim population. In this type of market, Islamic banks possibly have advantages compared to their conventional peers. Oppositely, conventional banks might face difficulties to attract depositors. Our result, in general, suggests that although many studies show the mimicking behavior of Islamic banks deposit, the way Islamic banks sets their deposit is different from their conventional counterparts. Although Islamic banks' deposit seems to be similar than conventional banks, their determinants are different.

In the second chapter, we continue our investigations by looking at the competition-stability issue. Does competition between Islamic and conventional banks increase banks' stability or fragility? Does the heightened competitive pressure in the dual market encourage

Islamic and conventional banks' willingness to take the excessive risk? Our main finding supports 'competition-fragility' hypothesis. Higher competition in dual banking market is not beneficial for banks' stability. In the dual banking markets, Islamic banks have to compete with both Islamic and conventional banks. Likewise, conventional banks also compete with their conventional and Islamic peers. This condition implies that the degree of competition in dual banking market has been relatively high. Nevertheless, our result does not hold when we split our sample. We find that market competition only matters for conventional banks. Islamic banks' stability is not affected by competitive pressure in the dual market. This result is also in line with what we find in the first chapter. However, even though competition erodes conventional banks' stability, our analysis also shows that it could be also beneficial for them when the degree of competition is either low or medium.

In the third chapter of this dissertation, we focus on the way Islamic banks' lending activities are influenced by bank's governance, issues which under-explored in the literature We analyze the role of *Shariah* Supervisory Board (SSB) on banks' PLS or equity financing. SSB, in theory, should have more rules than supervising because Islamic banks is a part of Islamic economics. In this sense, SSB should promote ethical behavior in Islamic banks by adopting PLS mechanism. To do this, we use a hand-collected data on equity financing and governance characteristics we obtained from annual reports and combined it with the data from BankScope and other sources. Our baseline result shows that Islamic banks' equity financing is influenced by some characteristics of SSB. SSB duality, or the presence of SSB member in the BOD or executive member, have a positive impact on equity financing. By having a dual position, SSB is closer to BOD, and therefore SSB could have a greater power to influence final Islamic banking decisions particularly regarding the use or not of equity financing. We also observe that the existence of a *Shariah* department in Islamic banks decreases the proportion of equity financing. This might be because *Shariah* department members are hired by the banks as other employees. Thus it might be difficult for them to provide independent reviews on *Shariah*-related matters. Another finding we obtain in this chapter is that equity financing is affected by institutional and Islamic environment. SSB's impact is reduced in the better banking environment, suggesting a substitution role between SSB and the banking environments.

Our findings have important policy implications for the future of Islamic banking. First, our result suggests that the degree of competition in the dual market could turn to a destructive competition that therefore jeopardizes Islamic and conventional banks' stability. Hence, regulators and supervisors should carefully monitor the price-setting behavior in the dual

market. Second, besides increasing role of regulators and supervisors to monitor dual market competition, it might be necessary for each country adopting dual banking system to establish an institution specifically focus on Islamic banking development. This institution might help regulators to create conditions for Islamic banks to act as a complement to conventional banks in order to promote greater financial inclusion. Third, regulators should develop specific rules and practical guidance regarding equity financing. This is because even though this mode of finance is believed to be a backbone of Islamic finance, the application is difficult, and it could even harm Islamic banks' financial condition. Fourth, we suggest no separation between BOD and SSB, as we find that the duality of SSB could increase PLS financing activities. The country-level organization such as central bank or financial service authority or private institution could also replace the SSB's role in giving independent *Shariah* review to the bank.

We suggest some directions for further research. First, in the first and second chapter, we evaluate how competition affect deposit rate setting and financial stability of Islamic banks vis-à-vis conventional banks whereas in the third chapter we study Islamic banks in the more detailed perspective. Therefore, we suggest to further explore Islamic banks' behavior and characteristics, such as their governance structure or their equity financing as we have done in the third chapter, rather than comparing performance and stability between Islamic banks and their conventional rivals that has been addressed in many prior studies. Second, if we want to focus specifically on Islamic banking research, we should also consider the unique datasets which could be obtained from hand-collecting processes and survey. Managing this kind of data might not be easy and need a lot of time but the result will significantly contribute to the development of Islamic banking literature because a unique dataset has a potential to answer some specific research questions that cannot be addressed using the widely-used database.

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Abstract

This dissertation highlights three important issues in Islamic banks. In the first chapter, we investigate the impact of dual market competition on the differences in deposit rate setting in Islamic and conventional banks. We show that there are notable differences in the determinants of deposit rates in the two types of institution. Market competition has a significant impact on deposit rate of conventional banks but not Islamic banks. Our result, in general, suggests that although Islamic banks' deposit seems to be similar than conventional banks, their determinants are different. In the second chapter, we continue our investigations by looking at the competition-stability issue. Does competition between Islamic and conventional banks increase banks' stability or fragility? Our main finding suggests that competitive dual banking market is not beneficial for banks' stability. In line with the result from the first chapter, in the next investigation, dual market competition only matters for conventional banks. In the third chapter of this dissertation, we analyze the role of *Shariah* Supervisory Board (SSB) on banks' equity financing. Our result shows that Islamic banks' equity financing is influenced by some characteristics of SSB. The presence of SSB member in the Board of Directors (BOD) or executive member has a positive impact on equity financing whereas the existence of a *Shariah* department in Islamic banks decreases the proportion of equity financing.

Keywords: Islamic banks, competition, deposit, stability, equity financing, *Shariah* supervisory board

Résumé

Cette thèse met en lumière trois questions importantes au regard des banques Islamiques. Dans le premier chapitre, nous examinons l'impact de la concurrence sur les différences de fixation des taux de dépôt dans les banques Islamiques et conventionnelles. Nous montrons qu'il existe des différences notables dans les déterminants des taux de dépôt dans les deux types d'institutions. La concurrence du marché a un impact significatif sur le taux de dépôt des banques conventionnelles mais pas des banques Islamiques. Notre résultat, en général, suggère que bien que le dépôt des banques Islamiques semble être similaire à celui des banques conventionnelles, leurs déterminants sont différents. Dans le deuxième chapitre, nous poursuivons nos enquêtes en examinant la question de la concurrence et de la stabilité. La concurrence entre banques Islamiques et conventionnelles augmente-t-elle la stabilité ou la fragilité des banques ? Notre principale constatation suggère que le marché concurrentiel des deux banques n'est pas bénéfique pour la stabilité des banques. Conformément au résultat du premier chapitre, lors de la prochaine enquête, la concurrence sur deux marchés ne concerne que les banques conventionnelles. Dans le troisième chapitre de cette dissertation, nous analysons le rôle du Conseil de surveillance de la Charia sur le financement par capitaux propres des banques. Notre résultat montre que le financement par capitaux propres des banques Islamiques est influencé par certaines caractéristiques de la Conseil de surveillance de la Charia. La présence d'un membre de la Conseil de surveillance de la Charia au Conseil d'administration ou d'un membre de l'exécutif a un impact positif sur le financement par actions tandis que l'existence d'un département de la Charia dans les banques Islamiques diminue la proportion de financement par capitaux propres.

Mots-clés : banques Islamiques, concurrence, dépôt, stabilité, financement par capitaux propres, Conseil de surveillance de la Charia