Islamic Banks' Capital Buffers: Unique Risk Exposures and the Disciplining Effects of Charter Values

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Islamic Banks' Capital Buffers: Unique Risk Exposures and the Disciplining Effects of Charter Values*

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Abstract

In the aftermath of the recent financial crisis, the inherent linkages between banks' capital buffers and risk took center stage as policy makers promoted a more resilient global banking system. The growing recognition of Islamic banking as a viable alternative-banking model warrants the need to investigate the overall susceptibilities of Islamic banks' capital buffers to unique risks emanating from their operating environments. We examine this issue over the period 2005-2012 in the 18 countries where Islamic and conventional commercial banks coexist. We employ a panel model using dynamic Generalized Methods of Moments (GMM) on a data set comprising 128 commercial banks of which 44 are Islamic commercial banks. The search for alternative forms of prudential regulation over and above risk based capital guidelines has also shifted the attention of policy makers towards investigating the disciplining effects of banks' charter values on capital buffers. We test this issue for Islamic banks, and whether the relationship varies as a function of the size of the charter as implied by theory. We employ the cross-section threshold approach suggested by Hansen (2000) for 101 publicly listed commercial banks in the same countries. To the best of our knowledge, this study is the first attempt to examine empirically the aforementioned issues for Islamic banks. This study is expected to expose shortcomings in capital adequacy guidelines and raises distinct policy implications with regards to the regulation and supervision of Islamic banks in countries where both bank types co-exist.

Keywords: Islamic banks, capital buffers, risk management, charter values, nonlinear, policy implications.

JEL classification: G21, G28

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1. Introduction

1.1. Motivation and main objectives

With the advent of the recent financial crisis, the vulnerabilities of banks to adverse economic conditions were particularly exposed, as the consequential impairment of assets lead to losses and substantial capital depletion across the global banking system. In response to the crisis, governments were obligated to intervene through various programs including direct bank recapitalizations[1] in an effort to stabilize the international financial system. This was imperative given the pivotal role of banks in the financial intermediation process thereby supporting overall global investment and economic growth. As an outcome of this, increased scrutiny of bank capital ratios synonymous with their levels of solvency, has prompted the Basel Committee on Banking

[1] One such program is the Emergency Economic Stabilization Act of 2008 in the United States, commonly referred to as a bailout of the U.S. financial system, and whereby the law enacted in response to the crisis authorizing the United States Treasury to spend up to USD700 billion to purchase distressed assets, and supply cash directly to banks.

Supervision (BCBS) to propose new capital standards which would entail banks hold a higher quantity and quality of capital relative to requirements under the current Basel II rules.[2]

The prevalence of minimum capital requirements as a regulatory tool is based primarily on the assumption that banks are prone to engaging in excessive risk taking behaviour (Furlong and Keeley, 1989; Rochet, 1992). Effectively mitigating the problem of moral hazard via risk based capital standards is hampered however in the presence of a deposit insurance protection system which shields banks from the effects of market discipline. Along these lines for example, Merton (1977) demonstrates, in the presence of information asymmetries between banks and their depositors, any mispricing in deposit insurance costs give banks the incentive to decrease capital and increase asset risk at the detriment of other stakeholders. The incentives of bank managers to decrease capital and increase asset risk to the detriment of other stakeholders as depicted by moral hazard theory (Merton, 1977; Keeley, 1990), is however contested in practice. This is the case as banks maintain capital in excess of the regulatory minimum (capital buffers) in order to cushion potential negative shocks as they occur, and hence, reduce the costs associated with any regulatory violations (Milne and Whalley, 2001;Elizalde and Repullo, 2007). Capital buffer levels are therefore reflective of the risk profiles and outlooks of these financial institutions.

The promotion of a more resilient banking sector in a challenging global environment has recently shifted the attention of policy makers and scholars towards Islamic banking as a potentially viable alternative-banking model (Hasan and Dridi, 2010; Bourkhis and Nabi, 2013; Beck et. al, 2013). Theoretically, the nature of transactions and investment activities of Islamic banks differ as compared to the lending activities of conventional banks. Having said that, supervisory and competitive pressures in the market place in jurisdictions where both bank types (Islamic and conventional) co-exist result in significant divergences in the current practices of Islamic banks from the theoretical models that were initially envisaged (Rosly, 1999; Archer et. al, 2010; Farook et, al, 2012). Unique risks for Islamic banks emanating from the nature of their activities as well as the aforementioned pressures in the market place range from the rate of return (ROR) risk and displaced commercial risk (DCR) emanating from balance sheet mismatches, to equity investment risk resulting from the profit and loss sharing (PLS) nature of their financing activities.

In the banking literature, reasons associated with the presence of market discipline, market power, and adjustment costs amongst others have been suggested in order to justify why banks may hold capital above and beyond the minimum required levels (Keeley, 1990; Nier and Baumann, 2006; Fonseca and Gonzalez, 2010; Jokipii and Milne, 2011). Whilst a number of empirical studies have examined the determinants of capital buffers for conventional banks, to the best of our knowledge, comparable research for Islamic banks is lacking. In view of the above, our primary research question therefore comprises whether unique risk exposures emanating from their operating environments impact Islamic banks' capital buffers and their resulting risk outlooks.

We test this question using the generalized method of moments (GMM) estimator developed by Arellano and Bond (1991) (i.e. the difference GMM) and the system-GMM estimator suggested by Blundell and Bond (1998) both for dynamic panel data.

The search for alternative forms of prudential regulation over and above risk based capital guidelines has also motivated the theoretical literature in the field (Hellmann et. al, 2000; Blum, 2002), with attention shifting particularly towards examining the influence of banks' charter value[3]

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[2] Through the Basel III initiative, the BCBS has proposed a number of new capital, leverage, and liquidity standards to strengthen regulation, supervision, and risk management in the banking sector.

[3] The charter value is the net present value of future rents. As explained by Stolz (2007), the charter value would be lost

on capital buffers (Keeley, 1990; Milne and Whalley, 2001;Elizalde and Repullo, 2007). Within the charter (franchise) value literature, Keeley (1990) for example brought forth the various anticompetitive restrictions that endowed banks with market power (monopoly rents) making banking charters valuable. Along these lines, and with reference to the works of Merton (1977), banks would therefore not have an incentive on the margin to increase default risk (through a reduction in the capital to assets ratio or an increase in asset risk) as long as the expected loss of charter value exceeds the gain to the bank from the enhanced value of the deposit insurance put option. Hellmann et al. (2000) and Elizalde and Repullo (2007) also examine the impact of competition on banks' franchise values and economic capital. The capital buffer theory introduced by Milne and Whalley (2001) on the other hand offers a unique perspective in this field. This dynamic approach suggests two opposing forces can govern the relationship between banks' charter values and their optimal capital buffers, namely a "charter value" effect and a "moral hazard" effect. Within this framework, one of these two regimes is expected to influence this relationship at any point in time, with the size of the charter acting as the regime-switching trigger. The implications of the capital buffer theory with regards to banks' capital and risk adjustment decisions are therefore that the relationship between capital buffers and charter values is non-linear and a function of the size of the charter.

Empirical studies that examine the functional form of the relationship between charter (franchise) values and banks' capital buffers, and whether in line with theory, are relatively scarce (Stolz, 2007; Jokipii, 2009)[4]. To the best of our knowledge, comparable research for Asian banks and Islamic banks in particular is also lacking. In view of the above, our second research question involves investigating whether Islamic banks' charter values have a disciplining effect on their risk-taking incentives (capital buffers) and whether this relationship is a function of the size of the charter (non-linear) as implied by theory. We test this issue following the cross-section threshold approach suggested by Hansen (2000).

1.2. Significance of the study

This study is expected to make several contributions relative to the empirical literature in the field. First, it aims to fill the gap in the Islamic banking and finance literature by providing insight into the overall susceptibilities of Islamic banks' capital buffers to unique risks emanating from their operating environments. Second, this study is expected to be the first to compare Islamic and conventional banks' risk exposures in the 18 countries where both bank types co-exist. Third, in line with recent soundings for viable incentives that could moderate banks' excessive risk taking behaviour, this study also examines the effects of banking market structures on the relationship between charter values and capital buffers for both bank types in the aforementioned countries. This in turn provides insight as to whether policy measures that promote competition contribute to the stability of the banking sector as a whole. In summary, we expect our findings to further enhance the risk management capabilities of Islamic banks, and in that sense, contribute to the resilience and sustainability of the Islamic financial system going forward.

1.3. Organization

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in the case of bankruptcy and, hence, represents banks' private cost of failure.

[4] It is also important to note that both Stolz (2007) and Jokipii (2009) determine the functional form of the relationship between charter values and capital buffers for European and US banks respectively using only spline estimation techniques.

We proceed in the next section with a review of the theoretical and empirical literature associated with our research objectives. In section 3, we detail our main research questions, followed by a description of the proposed model specifications and estimation methods used in this study. In section 4, we present the descriptive statistics and report some of our empirical results. In section 5, we conclude with some final remarks.

2. Literature review

This section provides an overview of the theoretical and empirical literature associated with our stated research questions and hypotheses. In section 2.1, we begin our analysis by reviewing the theoretical underpinnings that form the basis of this study followed by a review of the empirical literature linked to the critical issues at hand for both conventional and Islamic banks.

2.1. Theoretical underpinnings

Theory suggests banks maintain capital in excess of the regulatory minimum (capital buffers) in order to cushion potential negative shocks as they occur and reduce the costs associated with any regulatory violations (Milne and Whalley, 2001;Elizalde and Repullo, 2007). In the banking literature, the influence of the cost of deposits on banks' capital buffers is contingent on the strength of market discipline (Flannery, 1998; Gropp and Vesala, 2004; Nier and Baumann, 2006). Having said that, the generosity of deposit insurance schemes plays a prominent role in providing a moral hazard for excessive risk taking by banks (Merton, 1977; Demirguc-Kunt and Huizinga, 2004; Cubillas et. al, 2012). Insured depositors consequently lose the incentive to monitor bank shareholders, as they demand a risk-free flat rate, regardless of the risk of deposits. This adversely impacts capital buffers due to the inherent linkages between capital decisions and banks' risk choices. The ability of subordinated debt to enhance market discipline also seems to be contingent on whether a bank is able to credibly commit to a level of risk (Blum, 2002). In the event that a bank is unable to do this, correctly priced subordinated debt may in fact aggravate banks' risk taking incentives.

Within the charter (franchise) value literature, Keeley (1990) and Hellmann et al. (2000) also bring forth the various anti-competitive restrictions that endow banks with market power (monopoly rents) making banking charters valuable. Along these lines, banks are expected to reduce their risk taking incentives through higher capital buffers in order to preserve their valuable charters. Within this context, Hellmann et al. (2000) also demonstrates a negative relationship between the level of financial market liberalization and banks' capital buffers. Milne and Whalley (2001) also offer a unique perspective in this area. In their dynamic model, banks hold capital buffers based on the trade-off of having to choose between the fixed cost of recapitalization in the event of violating minimum regulatory capital requirements and the potential loss of charter value when the supervisor discovers the violation. Milney and Whalley (2001) through the capital buffer theory demonstrate that when a bank is concerned with expected future earnings, and has a charter value that exceeds a certain threshold, the banks holds an optimal capital buffer above the regulatory minimum in order to cushion negative shocks and reduce the costs associated with regulatory violations. However, in the event that the charter value falls below the threshold, the bank is no longer concerned with future earnings and hence opts to paying out dividends at the highest rate possible ending in a liquidation if an audit takes place in line with static models of moral hazard. Based on the above, the theoretical predictions derived from the model developed by Milne and Whalley (2001) imply that the relationship between capital buffers and charter values in non-linear.

And finally, discussions on the pro-cyclicality of banks' behaviour on the other hand are widely prevalent in the economic literature and predict a negative relationship between capital levels and economic cycles. (Peek and Rosengren,1995;Bernanke and Lown,2001; Bliss and Kaufman,2002).

The Islamic banking literature on the other hand, seems to indicate significant divergences between the current practices of Islamic banks and the theoretical models that were initially envisaged. Rosly (1999) for example illustrates a higher susceptibility to interest rate risk for Islamic banks relative to conventional banks. This is due to balance sheet mismatches resulting from an overall reliance on fixed profit rate (deferred payment sale) financing on the asset side of the banks' balance sheet coupled with fluctuating returns to PSIA holders on the liability side. These disparities result in ROR risk and consequently DCR as balance sheet risks are shifted from PSIA holders to shareholders.

A main determinant of the degree of exposure of Islamic banks to DCR is the risk characteristics of PSIAs that seem to vary from exhibiting deposit like to investment like features across jurisdictions in the presence of supervisory and competitive pressures in the market place (Archer and Abdel Karim, 2007). Farook et al. (2012) and Sudrarajan (2005) further explain that in contrast to the explicit contractual obligation to share profits with depositors, competitive pressures in the market place force implicit contractual conditions between Islamic banks and their depositors to provide distributions similar to market based deposit interest rates. The extent of profit distribution management towards market based interest rates (or away from asset returns) may in turn have a bearing on the risk outlook of the bank (Farook et al., 2012).

From a capital guidelines perspective, Hall et al. (2000) demonstrate rising relative agency (monitoring) costs for an Islamic bank as a function of an increase in the level of the PSIAs in the capital structure. Within this context, given that capital adequacy ratios [5] ignore the agency roles performed by Islamic banks, Hall et al. (2000) suggest ratios should be governed by the traditional capital adequacy ratio if the Islamic bank is dominated by debt-based contracts (fiduciary role dominates). Otherwise, if the Islamic bank is dominated by unrestricted PSIAs (agency role dominates), shareholders should maintain capital buffers in order to enhance their supervisory and oversight mechanism. Archer el al. (2010) also suggest capital adequacy ratios are not based on well-developed and explicit methods for the estimation of DCR but rather subject to supervisory discretion.[6] Along these lines, an inaccurate supervisory assessment by authorities might lead to Islamic banks being significantly undercapitalized, with consequent threats to financial stability, or conversely, might result in Islamic banks being required to carry excess amounts of capital, which will impair their ability to compete.

And finally, drawing on modern capital structure theories, Al Deehani et al. (1999) provide a theoretical framework given the risk absorbent features of PSIAs, and whereby shareholders of Islamic banks are incentivized to keep their equity capital at a minimum and maximize PSIA financing in order to generate additional returns at no extra risk. On the firm level, Bacha (1997) also demonstrates greater incentives on a risk-adjusted basis for taking on leverage using Mudarabah based financing relative to debt financing given the inherent risk absorbent features of the former type of contract. Within the constraints of Shariah compliance, Toumi et al. (2012) also discuss the various contractual principles and social tenets in Islam, which in theory should lead to symmetry of information and enhanced transparency between the Islamic bank and its stakeholders as compared to conventional banks.

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[5] Hall et al. (2000) refer to the capital adequacy guidelines of the Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI) in their paper.

[6] Archer et al. (2010) with reference to the capital guidelines of the Islamic Financial Services Board (IFSB) advocate a value-at-risk approach for the estimation of DCR rather than leaving it subject to supervisory discretion.

In summary as indicated above, the theoretical underpinnings associated with the determinants of banks' capital buffers, as well as the literature which encompasses unique risk exposures in the Islamic banking system, both seem to suggest a number of factors which might impact the capital buffers of Islamic banks. This in turn justifies the need for empirical answers with regards to the subject at hand.

2.2. Review of empirical findings

Fonseca and Gonzalez (2010) examine the influence of market discipline and market power on banks' capital buffers using the difference GMM estimator for a sample of banks in 70 countries. In line with theoretical predictions, their findings suggest a positive influence for the cost of deposits, a proxy for market discipline, and the Lerner index, an indicator of market power in the banking sector, on banks' capital buffers. Other empirical studies also provide evidence to suggest measures that reduce competition and increase bank franchise values are positively associated with capital buffers (Nier and Baumann, 2006; Uhde and Heimeshoff,2009; and Jokipii and Milne, 2011). On the other hand, whereas Fonseca and Gonzalez (2010) indicate negative coefficients for non-performing loans and loan loss provisions suggesting banks with greater asset riskiness have lower capital buffers, Jokipii and Milne (2011) and Shim (2012) amongst others indicate a positive relationship between loan loss provisions and capital buffers. A prevalence of studies also provides evidence to suggest banks' capital buffers behave pro-cyclically in line with theory (Nier and Baumann, 2006; Tabak et al., 2011; Coffinet et al., 2012;Shim, 2012; Lee and Hseih, 2013). It is also important to indicate that a positive influence for adjustment costs on banks' capital buffers is widely reported in the literature (Shrieves and Dahl, 1992; Stolz, 2007; Fonseca and Gonzalez, 2010; Stolz and Wedow, 2011). The negative impact for the size effect on banks' capital buffers, in line with the "too big to fail" paradigm of unconditional support by governments to large banks, is also reported in a number of empirical studies (Lindquist, 2003; Alfon et al., 2005; Stolz and Wedow, 2011). And finally, Boucinha (2008) also indicate a statistically significant positive relationship between banks' stock weightings in their portfolios and capital buffers, and which suggests banks with higher exposure to market risk seem to hold larger capital buffers.

Jokipii (2009) and Stolz (2007) on the other hand examine the long run relationship between capital buffers and charter values for sets of US and European Union (EU) banks respectively. Using a semi-parametric spline approach to allow the relationship between the two variables to vary depending on the size of the charter, the findings obtained by Jokipii (2009) suggest that the relationship between bank capital and charter values is nonlinear and concave in line with the capital buffer theory. It is important to note however that in contrast to theoretical predictions, Jokipii (2009) indicates that banks with charter values above the median level maintain a constant capital buffer and which he explains might be due to the better accessibility of large banks beyond a certain charter level to new equity thereby reducing the need for them to manage large capital buffers, or alternatively, might be associated with the "too big to fail" hypothesis. In contrast to the findings of Jokipii (2009), Stolz (2007) on the other hand finds the relationship is always found to be significant and negative for EU banks irrespective of the size of the charter, and hence rejecting the theoretical predictions of Milne and Whalley (2001). Stolz (2007) however points out that a negative relationship does not necessarily reject predictions of a nonlinear relationship if all banks in the sample have a charter value higher than their cost of recapitalization. This especially being the case given that the cost of recapitalization is difficult to observe, and therefore testing the effects of bank charter values on bank capital buffers are conducted without controlling for this variable.

Recent Islamic banking studies (Beck et al., 2012; Bourkhis and Nabi, 2013) on the other hand suggest distinctions between Islamic and conventional banks are relatively scarce. On comparing their relative performances over the recent financial crisis, Beck et. al (2012) and Bourkhis and

Nabi (2013) provide no evidence to suggest the crisis period affected the soundness of both bank types differently. The findings of Beck et. al (2012) however do suggest higher asset quality and equity to asset ratios for Islamic relative to conventional banks during local banking crises. This might indicate that they are less likely to dis-intermediate and deleverage relative to conventional banks. Cihak and Hesse (2008) also provide evidence to suggest comparatively higher stability for small Islamic banks relative to large Islamic banks. Interestingly, the findings obtained by Hasan and Dridi (2010) suggest otherwise as they report large Islamic banks fared better than both large conventional banks and small Islamic banks during the recent crisis period. On a similar note, Farook et al. (2012) also investigate the factors affecting the extent to which Islamic banks manage their profit distributions towards market based interest rates (or away from asset returns). This as a consequence has implications on the Islamic banks' financial stability and reporting incentives. The results obtained by Farook et al. (2012) seem to suggest a significant positive relationship between the extent of profit distribution management and the exposure of Islamic banks to fixed rate financing and the ensuing profit rate risk that occurs. This lends support to the discussions of Rosly (1999).

In summary, the aforementioned empirical studies are conflicting in their results possibly as a consequence of the relevant methodologies and time periods used. Where as a number of empirical studies have examined the determinants of banks' capital buffers in the conventional banking system, to the best of our knowledge, comparable research for the Islamic banking sector is currently lacking. There is therefore a need for empirical tests corresponding to our main research questions and hypotheses with the help of appropriate methodologies brought forward in the next section. Our tests are henceforth designed to fill this void in the Islamic banking literature in particular.

3. Proposed methodology (questions, models and methods)

This section details our main research objectives, followed by a description of the proposed model specifications and estimation methods for each of the research questions in sections 3.2 and 3.3 consequently.

3.1. Critical questions and hypotheses

Theoretical discussions brought forward in the literature review suggest supervisory and competitive pressures in the market place in jurisdictions where both bank types (Islamic and conventional banks) co-exist expose Islamic banks to unique risks emanating from their current practices. As discussed earlier, ensuing risks for Islamic banks include the rate of return (ROR) risk and displaced commercial risk (DCR) emanating from balance sheet mismatches. Other unique risks include equity investment risk resulting from the profit and loss sharing (PLS) nature of Islamic banks' financing activities.[7]

The risk absorbent features of Mudarabah-based PSIAs suggest that shocks to assets financed by these accounts should be passed on to PSIA holders and hence not impact the banks' own capital. Having said that, in practice the characteristics of PSIAs vary from being deposit-like in some jurisdictions, which would indicate the presence of DCR, to investment-like in other jurisdictions, which would indicate no DCR. Archer el al. (2010) for example discuss the potentially detrimental effects on capital adequacy ratios (CARs) emanating from the lack of well-developed and explicit methods for the estimation of DCR by supervisors. This in turn might impact Islamic banks either

[7] Other risks also emanate from the lack of Shariah compliant risk hedging and liquidity instruments in the various jurisdictions as well as Shariah compliance risk.

by making them significantly undercapitalized, with consequent threats to financial stability, or conversely, might result in Islamic banks being required to carry excess amounts of capital, which will impair their ability to compete.

Hall et al. (2000) on the other hand theoretically demonstrate rising relative agency (monitoring) costs for an Islamic bank as a function of an increase in the level of the PSIAs in the capital structure. And hence, due to shortcomings in current capital adequacy guidelines for Islamic banks, Hall et al. (2000) suggest a minimum level of financial participation (capital buffers) by the shareholders of a bank would serve to reduce moral hazard. This is the case given that absolute risk aversion is a function of the net asset value of the bank, and the level of unrestricted PSIAs in the capital structure is negatively related with the level of shareholders' risk aversion. And finally, drawing on modern capital structure theory, Al Deehani et al. (1999) demonstrate that subject to the risk absorbent features of PSIAs, shareholders are incentivized to keep their equity capital at a minimum and maximize PSIA financing in order to generate additional returns at no extra risk. As mentioned earlier, however, this does not seem to be a plausible assumption in practice.

In view of the above, the argument put forth by Archer et al. (2010) would seem to suggest Islamic banks' management might potentially adjust their own capital buffers in an effort to more accurately reflect their own in-house perspectives and risk outlooks, and hence, internally specify the adequate amount of additional capital required in order to mitigate DCR. The theoretical arguments proposed by Hall et al. (2000) on the other hand would seem to suggest that capital buffers are positively related to the level of unrestricted PSIAs in the capital structure of an Islamic bank given that AAOIFI capital adequacy guidelines ignore the agency role performed by Islamic banks. Having said that, whilst the theoretical predictions demonstrated by Al Deehani et al. (1999) suggest a negative relationship between capital buffers and the level of unrestricted PSIAs in the capital structure of an Islamic bank, their underlying assumptions do not seem to hold in practice.

Along similar lines, Farook et al. (2012) also suggest the degree to which Islamic banks undertake to provide distributions to PSIAs similar to market based deposit interest rates may have a bearing on the risk outlook of the bank. Within this context, banks that engage (do not engage) in profit distribution management, may be taking on more (less) equity risk and thereby shielding (exposing) investment depositors of the risks associated with the asset portfolios of the banks. This in turn entices banks' management to have a more cautious (aggressive) risk profile to ensure (because) shareholders' equity is not threatened. Drawing on the theoretical discussions proposed by Farook et al. (2012), it can therefore be implied that capital buffers are positively related to the level of profit distribution management towards market based interest rates (or away from asset returns)[8].

Risks emanating from an overall reliance on fixed profit rate (deferred payment sale) financing on the asset side (Rosly, 1999), also serve to exacerbate the balance sheet mismatches and resulting exposures of Islamic banks to ROR and DCR. And hence, in line with the above, Islamic banks are encouraged to adopt a more cautious risk profile (higher capital buffers) in order to mitigate these risks. Having said that, the impact of participatory (PLS based) financing and the ensuing equity investment risk on Islamic banks' capital buffers remain unclear. Whereas Toumi et al. (2012) seem to suggest reduced problems of moral hazard and information asymmetries between the parties as Islamic banks have more effective means to control and minimize the risk of loss of capital, Bacha (1997) on the other hand seems to suggest much higher agency problems associated with Mudarabah financing relative to conventional equity and debt financing.

In view of the aforementioned theoretical discussions our first critical question is therefore:

Q.1: Do unique risk exposures in the Islamic banking system impact Islamic banks' capital buffers and hence their resulting risk outlooks?

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[8] The level of profit distribution management is also linked to the practice of income smoothing by Islamic banks for unrestricted PSIAs that is prevalent in the literature.

This in turn would entail examining the impact of the levels of PSIAs, the levels of profit distribution management towards market based interest rates (or away from asset returns), the levels of PLS based financing and the levels of fixed rate financing on the capital buffers of Islamic banks. In response to the critical question on hand for Islamic banks, and drawing on the aforementioned theoretical discussions we expect the following outcomes:

Expected outcomes in light of the theoretical predictions for Islamic banks
The level of Islamic banks' capital buffers are positively related to the level of unrestricted PSIAs in the capital structure
The level of Islamic banks' capital buffers are positively related to the level of profit distribution management towards market based interest rates
The level of Islamic banks' capital buffers are positively related to the level of fixed rate financing in their investment portfolio
The relationship between Islamic banks' capital buffers and the level of equity (PLS based) financing in the investment portfolio is indeterminate

The theoretical literature also predicts a moderating effect of banks' charter values that is reflective of their market power (monopoly rents), on banks' risk taking incentives as mirrored in their capital buffers (Keeley, 1990). The underlying notion being banks with high charter values characteristically have a lower probability of default as represented by higher capital (buffers), and also tend to exhibit lower asset risk in their portfolios (Stolz, 2007), all in a bid to protect their valuable charters. On analysing the determinants of economic capital, the theoretical model developed by Elizalde and Repullo (2007) also demonstrate that changes in the market power of banks may impact economic capital differently depending on the initial level of competition. Elizalde and Repullo (2007) demonstrate that the threat of closing undercapitalized banks induces bank shareholders to choose a capital level above regulatory capital, and hence such regulations typically explain why banks hold capital buffers above the regulatory minimum. The "charter value hypotheses" model based on the works of Allen and Gale (2004) and developed in order to examine the relationship between banking stability and the degree of competition, also predicts banks' risk of failure as increasing with the number of competing firms.

Drawing on capital buffer theory, Milne and Whalley (2001) develop a theoretical model in order to explain why banks hold capital buffers in excess of the regulatory minimum. Through their model, they demonstrate two opposing effects that govern the relationship between charter values and capital buffers, namely the "charter value effect" and the "moral hazard effect". As explained by Jokipii (2009), the former effect, which suggests a negative relationship, dominates when a bank is concerned with expected future earnings, and has a charter value that exceeds a certain threshold. And hence, when the expected loss from the charter value outweighs the benefits from deposit insurance schemes (financial safety nets), the banks hold an optimal capital buffer above the regulatory minimum in order to cushion negative shocks and reduce the costs associated with violating the regulatory minimum. Within this context, high charter value banks are therefore motivated to hold larger capital buffers as the charter value falls in order to protect the valuable charter. As the charter value falls below the threshold, however, the "moral hazard effect" dominates as the bank is no longer concerned with future earnings and hence opts to paying out dividends at the highest rate possible ultimately ending in a liquidation if an audit takes place in line with static models of moral hazard. In the latter case, the relationship is reversed as the incentive to protect the charter value is eroded, and the bank is no longer concerned with future earnings as the optimal capital buffer falls to zero. In summary based on the above, the theoretical predictions derived from the model developed by Milne and Whalley (2001) seem to imply that the relationship between capital buffers and charter values in non-linear and a function of the size of the charter. From a theoretical standpoint therefore, the relationship between Islamic banks' capital buffers and their charter values remain inconclusive. Along these lines, we therefore proceed to test whether Islamic banks' charter values have a disciplining effect on their risk taking incentives (capital buffers), and whether this relationship is a function of the size of the charter as predicted by theory. Our second critical question is therefore:

Q.2: Is the relationship between Islamic banks' capital buffers and their charter values non-linear as predicted by theory?

In response to the critical question on hand for Islamic banks, and drawing on the above-mentioned theoretical discussions we expect the following outcomes as a function of the size of the banks' charter:

Expected outcomes in light of the theoretical predictions for Islamic banks
In a high charter value environment, a negative relationship dominates between Islamic banks' capital buffers and their charter values as banks seek to protect their valuable charter
In a low charter value environment, a positive relationship dominates between Islamic banks' capital buffers and their charter values as the incentive to protect the charter is eroded

3.2. The determinants of Islamic banks' capital buffers

3.2.1. Model specification

With reference to our first critical question as earlier stated, we propose the following empirical model:

$$RBUF_{i,t} = \beta_0 + \beta_1 RBUF_{i,t-1} + \beta_2 PDM_{i,t} + \beta_3 DEPOSIT_{i,t} + \beta_4 EQTYFIN_{i,t} + \beta_5 FIXEDRTFIN_{i,t} + \beta_6 BANK_{i,t} + \beta_7 CR_{j,t} + \beta_8 FINDEV_{j,t} + \beta_9 GDPGR_{j,t} + \beta_{10} FINREG_{j,t} + \beta_{11} \sum_{k=1}^{4} REGION_k + \beta_{12} \sum_{t=2005}^{2012} T_t + vi + \epsilon it$$

where i indicates the bank (i = 1,…, 128) and t indicates the annual time period (t = 2005,…, 2012).

We measure capital buffers ($RBUF_{i,t}$) in relative terms, i.e., the difference between the total capital ratio and the minimum regulatory capital requirement divided by this requirement [9] (see Fonseca and Gonzalez, 2010). The influence of adjustment costs on the banks' optimal capital ratios are captured by the first lag of the dependent variable ($RBUF_{i,t-1}$).

We capture the extent of banks' profit distribution management $\left(PDM_{i,t}\right)$ via two measures, namely the asset spread ($ASSETSPR_{i,t}$) and the equity spread ($EQTYSPR_{i,t}$) (see Farook et al., 2012). The first bank specific measure, the asset spread ($ASSETSPR_{i,t}$) represents the absolute spread between

[9] It is important to note however that the regulatory requirements placed on banks have undergone changes throughout the sample period associated with the varying timelines for the implementation of the Basel I and II capital adequacy guidelines by the regulators in each jurisdiction in our sample.

the return on assets (ROA) (after considering all expenses but excluding profits paid to depositors) and the returns on depositors' funds.[10] Within this context, a larger asset spread indicates a greater extent of profit distribution management towards market based interest rates (or away from asset returns). As indicated by Farook et al. (2012), the asset spread is potentially the most relevant measure of the extent of profit distribution management given that it captures the spread between total asset return on the banks' asset and services portfolio and the distributions paid to depositors. In order to ensure consistency with the asset spread, the second measure, namely the equity spread ($EQTYSPR_{i,t}$), represents the absolute spread between the average return on equity and the average rate of return on depositors' funds. Given the reliance of Islamic banks on UPSIAs as a funding source [11] (see Sundararajan, 2008), we include the level of unrestricted UPSIAs relative to total liabilities $DEPOSIT_{i,t}$to examine its impact on Islamic banks' capital buffers.[12]

We attempt to capture the impact of equity investment risk emanating from the profit and loss sharing (PLS) nature of Islamic banks' financing activities on capital buffers by including the level of PLS based financing relative to total financing ($EQTYFIN_{i,t}$). Given an overall reliance on fixed profit rate (deferred payment sale) financing on the asset side (Rosly, 1999), we also include an additional variable which represents the level of fixed rate financing relative to total financing ($FIXEDRTFIN_{i,t}$).

We include bank specific control variables ($BANK_{i,t}$) and which consist namely of return on equity ($ROE_{i,t}$), non performing loans $\left(NPL_{i,t}\right)$, loan loss provisions ($LLP_{i,t}$), loans relative to customer deposits ($LOANSCD_{i,t}$), and a proxy for the influence of bank size ($SIZE_{i,t}$) (see Shrieves and Dahl, 1992; Nier and Baumann, 2006; Fonseca and Gonzalez, 2010; Beck et al., 2012).

Our country specific control variables include a measure of the market structure, namely the degree of market concentration within an industry ($CR_{j,t}$), by considering the three-bank ($CR3_{j,t}$) and four-bank ($CR4_{j,t}$) concentration ratios (see Lee and Hsieh, 2013). Computation of the above measures involves determining the total assets of the top three and four banks respectively relative to total banking assets in each country. Given that the developing countries in our sample have been engaged in a process of deregulation, bank privatization and financial liberalization, we include a measure that examines the degree of financial development ($FINDEV_{j,t}$), namely the financial development index. The composition and scoring of this index is a function of an assessment of seven indicators grouped into three categories that gage the various aspects of financial development, namely: factors, policies and institutions; financial intermediaries; and financial access. The World Economic Forum provides an overall score for each country on a 1 to 7 normalized scale. In line with widely prevalent theoretical discussions in the economic literature on the pro-cyclicality of bank capital, we also include the annual growth of real gross domestic product ($GDPGR_{j,t}$) and the annual growth of real per capita gross domestic product ($GDPCAPGR_{j,t}$).

We include two variables on financial market regulations ($FINREG_{j,t}$), namely a measure for supervisory power ($SPR_{j,t}$) and a measure for market discipline and private monitoring ($MDPM_{j,t}$) (see Lee and Hsieh, 2013). The supervisory power measure gauges the authority of supervisory

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[10] Within this context, it is important to note that based on the nature of the contractual arrangements between Islamic banks and their customers, not all depositors' accounts are entitled to profits.

[11] The Saudi Arabian Monetary Agency (SAMA) does not permit such accounts in the capital structure of Islamic banks, and hence, similar tenured Shariah compliant deposits are used instead.

[12] For comparison purposes, and given the market perception of unrestricted PSIAs by retail customers as close substitutes for conventional deposits, we have also included the level of similar tenured deposits relative to total liabilities for conventional banks.

agencies in each country, indicating the extent to which they can take specific actions against bank management and directors, shareholders, and bank auditors. This index takes values between 0 and 14 with higher values indicating more supervisory power. Our measure for market discipline and private monitoring uses an index to indicate the level of market discipline and shows the degree to which banks are forced to disclose accurate information to the public and whether there are incentives to increase market discipline. In line with Lee and Hsieh (2013), this index ranges between 0 and 8 with higher values indicating greater market discipline. Both indices are determined based on the regulatory and supervisory database questionnaires provided by the World Bank.

We include an Islamic bank dummy ($IBDUM$), which takes the value of one for Islamic banks and zero otherwise. We interact the Islamic bank dummy with the other variables in our study through several specifications to compare Islamic and conventional banks in relation to the critical issues at hand. We include a dummy variable for explicit deposit insurance schemes ($EXPLICIT$). We also include dummy variables for publicly listed banks ($PUBLIC$) and state owned banks ($STATE$). We in turn interact these dummy variables with the Islamic bank dummy as well as other variables at hand in order to examine these specifications in relation to the critical issues at hand.

The scarcity of Islamic banks when compared on a country-by-country basis indicates it is best we include a set of regional dummy variables ($REGION_j$) as opposed to country dummy variables in order to control for other region specific characteristics not included above. We in turn include dummies to represent the following regions, namely the Middle East, North Africa and Turkey (MENAT) region, the Association of South East Asian Nations (ASEAN) region, and the South Asian (SOUTHASIA) region.

We also introduce time fixed effects, through the inclusion of time dummies ($\mathrm{T_t}$) in order to account for any cross sectional dependence in the data. Controlling for this allows us to examine the robustness of our results to the inclusion of time fixed effects. Within this context, in line with Beck et al. (2013), we also check the robustness of our main results by interacting the Islamic bank dummy ($IBDUM$) with a crisis dummy (*CRISIS*), and which takes on the value one for the financial crisis period in 2008. Given the limitations associated with the relatively short time period covered in our panel data set, we do not include a time trend component. Having said that, it is important to note that Nier and Baumann (2006) suggest a tighter control is to introduce time fixed effects as we have done.

And finally, vi is an unobservable bank-specific effect assumed to be constant over time; and ϵit is the white noise error term.

Please note a table that summarizes the aforementioned variables along with definitions, descriptions and data sources is included in Appendix B.

3.2.2. Estimation method

The theoretical literature investigating banks' capital buffers makes use of dynamic models in order to control for adjustment costs that banks may face in moving towards their optimal capital ratios (Milne and Whalley, 2001; Elizalde and Repullo, 2007). Dynamic panel data regressions are characterized by two sources of persistence over time, namely, autocorrelation due to the presence of a lagged dependent variable among the regressors and individual effects characterizing the heterogeneity among the individuals.

The endogeneity problem associated with dynamic models is dealt with in this study using the generalized method of moments (GMM) procedure proposed by Arellano and Bond (1991) which is more efficient than the instrumental variable (IV) estimation procedure suggested by Anderson and Hsiao (1981). Arellano and Bond (1991) demonstrate additional instruments can be obtained in a dynamic panel data model if one utilizes the orthogonality conditions that exist between lagged values of the dependent variable and the disturbances ν_{it}. Using these moment conditions, Arellano and Bond (1991) propose a two-step GMM estimator. In the first step, the error terms are assumed to be both independent and homoskedastic across entities and over time. In the second step, the residuals obtained in the first step are used to construct a consistent estimate of the variance-covariance matrix, thus relaxing the assumptions of independence and homoskedasticity. The estimator based on these conditions is referred to as the difference GMM estimator.

Blundell and Bond (1998) demonstrate however that the instruments used in the difference GMM estimator become less informative in two important cases. Firstly, as the autoregressive parameter increases toward unity; and second as the variance of the parameter effect increases relative to the variance of the transitory shocks. In response to the shortcomings of the difference GMM estimator, Arellano and Bover (1995) and Blundell and Bond (1998) propose that an additional mild stationarity restriction on the initial conditions process allows the use of an extended system GMM estimator that uses lagged differences of the dependent variable as instruments for equations in levels, in addition to lagged levels of the dependent variable as instruments for equations in first differences. The system GMM estimation is found to be more appropriate than the difference GMM estimation in the presence of variables that are close to a random walk (Bond, 2002; Roodman, 2009), given that the latter estimation under these conditions is found to suffer from a weak instrument problem (Sarafidis et. al, 2009). Whilst the flexible GMM framework accommodates unbalanced panels, another disadvantage of the difference GMM approach is that it magnifies gaps in unbalanced panels (Roodman, 2009). This in turn motivates the use of forward orthogonal deviations transformation proposed by Arellano and Bover (1995).[13]

In view of the above, we run both the two-step difference and system GMM estimations for our panel data set (see tables in the Appendix). We follow up with post estimation specification tests, namely the Sargan (1975) test for over-identifying restrictions and the Arellano-Bond (1991) test for no autocorrelation in the first-differenced errors. We base our decision to proceed with the difference GMM estimation in spite of the limitations discussed above, given the relatively low level of persistence in the time series dimension of capital buffers (average of around 0.34), and for which high persistence in the series is a necessary condition for expectations of asymptotic efficiency gains using the system GMM[14] (Blundell and Bond, 1998; Roodman, 2009). On comparing across specifications, the application of difference GMM is also warranted given the estimated coefficient of the lagged dependent variable for the two-step system estimator does not increase significantly on average relative to the two-step differenced estimator[15] (Windmeijer, 2005). We apply the Windmeijer (2005) finite-sample correction to the reported standard errors in the two-step estimation, without which estimations of the standard errors tend to be severely downward biased. It is important to note the distribution of the Sargan test is not known after specifying Windmeijer corrected (WC-robust) standard errors. Specifying WC-robust standard errors also produces variance-covariance estimates that are robust to heteroskedasticity. With regards to the instrument proliferation problem, we do not follow the rule of thumb recommended

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[13] The forward orthogonal deviations (FOD) transformation option is available in David Roodman's xtabond2 implementation of the dynamic panel data estimator.

[14] Roodman (2009) as a rule of thumb, suggests an estimated coefficient of at least 0.8 is required to indicate persistence in the series, and for which system GMM results based on simulations seem the most promising.

[15] Windmeijer (2005) suggests an increase in the estimated coefficient of the lagged dependent variable for the two-step system GMM estimator of at least 50% relative to the estimated coefficient of the two-step differenced estimator as evidence that the former estimator corrects the downward bias through the use of a more informative set of instruments.

by Roodman (2009), and which suggests collapsing the instrument matrix.[16] It is however relevant to note the length of our time series on average across the panel is relatively short, and hence the number of instruments doesn't outnumber the individual units (number of groups). This suggests potential problems of instrument proliferation are not apparent (Roodman, 2009). Roodman (2009) also indicates issues associated with instrument proliferation are particularly suspect in system GMM estimations as a large instrument collection over-fits endogenous variables even as it weakens the Hansen test of the instruments' joint validity. The possibility of instrument proliferation therefore also warrants the application of difference GMM.

We check the robustness of our empirical results by considering modifications to our empirical model as applied to both the full and subsamples of banks respectively. Given that GMM estimators assume that the disturbances of error terms are cross-sectionally independent, we introduce time fixed effects (time dummies) to account for any cross sectional dependence in the data. The inclusion of time dummies or demeaning data is sufficient as a control if homogenous cross sectional dependence is present, however, there can be still cross-sectional dependence in the error terms which is the case under heterogeneous error cross-sectional dependence (Sarafidis and Robertson, 2009). [17]

3.3. Threshold analysis of banks' capital buffers

3.3.1. Model specification

In relation to the second critical question at hand, we use the threshold regression approach suggested by Hansen (2000) to examine the nonlinear behaviour of charter values in relation to banks' capital buffers as a function of the size of the charter as suggested by theory. The model, based on threshold regression, takes the following form:

$$RBUF_i = (\beta_1 CV_i + \gamma_1 X_i)\mathrm{I}(CV \leq \lambda) + (\beta_2 CV_i + \gamma_2 X_i)\mathrm{I}(CV > \lambda) + \epsilon_i$$

Where as discussed earlier, we measure capital buffers ($RBUF_i$) in relative terms, i.e., the difference between the total capital ratio and the minimum capital requirement divided by the minimum capital requirement. We proxy the charter value of the bank (CV_i) through two variables common to the literature, firstly, Tobin's q ratio (CV_{TBQ}) which is defined as the current market value of a firm's assets (the market value of its equity plus debt) divided by their current cost to a firm (the book value of assets) (Keeley, 1990; Saurina, 1997). As discussed by Keeley (1990), Tobin's q ratio is an ideal measure of market power given that the capitalized value of monopoly rents whether arising from dominance in the asset markets, or the deposit markets, or both, would be reflected in the firm's equity market value, and hence in their assets, without being reflected in the costs of the acquired assets. As suggested by Furlong and Kwan (2005), we also employ the market value to book value of capital (CV_{PBV}) as a proxy for a bank's charter value, given that in line with Tobin's q ratio, the present value of a firm's future rents would also be reflected in this measure.

[16] It is important to note that this feature is not available in Stata's official commands (xtabond) but is however an additional feature in David Roodman's (2009) xtabond2.

[17] Testing procedures for error cross sectional dependence are not available in Stata's official commands (xtabond) but are however an additional feature in David Roodman's (2009) xtabond2.

Given that the capital buffer theory, seems to imply that the relationship between capital buffers and charter values in non-linear and a function of the size of the charter, the charter value of the bank (CV) is the threshold variable used to split the sample into regimes or groups and λ is the unknown threshold parameter.[18] I(□) is the indicator function, which takes the value 1 if the argument in the indicator function is valid, and 0 otherwise. This type of modelling in turn allows the relationship between charter values and banks' capital buffers to differ depending on whether the size of the charter is below/equal to or above some unknown level of λ. In this equation, our proxies for the size of the charter (CV) therefore act as the sample-splitting (or threshold) variables. The impact of banks' charter values on capital buffers will therefore be a function of the size of the charter, defined by β_1 and β_2 for banks with low or high charter value regimes, respectively.

Within this context, it is important to note that Hansen (2000) allows for the threshold variable to be an element of the m-vector of explanatory variables. This is particularly relevant given that as noted earlier, the charter value of the bank (CV) acts as both the threshold variable and the explanatory variable of interest, CV_i, in the empirical model.

X_i on the other hand is a vector of bank and country specific control variables namely consisting of, the level of non-performing loans relative to total financing (NPL_i) as a measure of bank risk, the degree of financial development $(FINDEV_j)$ as reflected by the financial development index provided by the World Economic Forum, and the annual growth of real gross domestic product $(GDPGR_j)$. All the variables are transformed into logarithm. And finally ϵ_i is the white noise error term.

Please note a table that summarizes the aforementioned variables along with definitions, descriptions and data sources is included in Appendix B.

3.3.2. Estimation method

As discussed earlier, the implications based on theory (Milne and Whalley, 2001; Elizalde and Repullo, 2007) are that the relationship between capital buffers and charter values is non-linear and a function of the size of the charter. For the purposes of this study therefore, we follow the Hansen (2000) approach for estimating TAR models[19], given that the threshold in this case is governed by the size of the charter that is acting as the regime-switching trigger, taking on a value below/equal to (or above) some value λ[20], and hence an observable process determines the regime. As implied by theory (Milne and Whalley, 2001), the transition in the level of the variable being modelled $RBUF_i$ is also assumed to be abrupt, and based on some exogenously determined value of this variable in line with the specifications of the TAR model. Having said that, we do not pursue the panel threshold approach suggested by Hansen (1999) given that an important limitation of this model is that all regressors are required to be strictly exogenous, and we recognize the possibility for potential endogeneity between banks' charter values and capital buffers, since banks will try to maintain a target probability of default as a function of both capital levels and asset risk, and which in turn is linked to the value of the charter. Along these lines, it is also important to note that the theory for the case of dynamic panel thresholds has not been developed as of yet. From a theoretical

[18] Using spline estimation techniques both Stolz (2007) and Jokipii (2009) also split their sample size based on charter values. This is in line with the theoretical predictions of the capital buffer theory whereby the model developed by Milne and Whalley (2001) seems to imply that the relationship between capital buffers and charter values in non-linear and a function of the size of the charter.

[19] Initially proposed by Tong (1978).

[20] The empirical model is defined in the previous section.

standpoint, a number of papers analyse capital and risk taking decisions where banks' franchise values are endogenous (Elizalde and Repullo, 2007; Souarez, 1994). We therefore proceed by following the cross-section threshold approach suggested by Hansen (2000), given the limitations associated with obtaining time series data for publicly listed banks in the jurisdictions under study (as indicated in section 3.4).[21] It is also relevant to point out that the data set employed in this analysis includes the full sample of publicly-listed conventional and Islamic commercial banks in the jurisdictions where both Islamic and conventional banking systems coexist. Within this context, our empirical results extend to both bank types. Repeating the analysis on a sample consisting exclusively of Islamic commercial banks is not possible at this stage given the limited number of publicly listed Islamic commercial banks, and whereby of the final data set consisting of 101 publicly listed commercial banks only 25 are Islamic commercial banks.[22] Having said that, we examine however whether our empirical findings for the full sample apply to Islamic banks as well based on the relative distributions of the Islamic banks' threshold values around the identified threshold value point estimates.

Based on Hansen (2000) therefore, we explore the nonlinear behavior of banks' charter values in relation to capital buffers subject to the threshold regression model illustrated below (and further defined in section 3.3.1):

$$RBUF_i = (\beta_1 CV_i + \gamma_1 X_i)\mathrm{I}(CV \le \lambda) + (\beta_2 CV_i + \gamma_2 X_i)\mathrm{I}(CV > \lambda) + \epsilon_i$$

As indicated above, CV, which represents the size of the banks' charter value, is the threshold variable used to split the data set into regimes or sub-samples, and λ is the unknown threshold parameter. I( ) on the other hand is the indicator function which takes the value of 1 if the argument is valid and 0 otherwise. This in turn allows the role of banks' charter values CV_i to differ depending on whether the size of the charter falls below/equal to or above some unknown level of λ. As mentioned earlier, the size of the charter is therefore acting as the sample-splitting or regime-switching trigger.

As suggested by Hansen (2000), we begin by testing the null hypothesis of linearity $\mathrm{H}_0: \beta_1 = \beta_2$ in order to verify that there is indeed evidence for a threshold effect, and given that the impact of banks' charter values on capital buffers will be β_1 and β_2 in a low and high charter value environments respectively. This in turn, is done by employing the heteroskedasticity-consistent Lagrange multiplier (LM) test for a threshold as suggested by Hansen (1996). Since the threshold parameter λ was not identified under the null hypothesis of no threshold effect, this becomes a non-standard inference problem and the Wald or LM test statistics therefore do not carry their conventional chi-square limits (Hansen, 1996, 2000). Inferences are obtained instead through p-values computed by a bootstrap analog, fixing the regressors from the right-hand side of the equation, and generating the bootstrap dependent variable from the distribution $N\,(0, \widehat{\in}_i^2)$ where $\widehat{\in}_i$ is the OLS residual from the estimated threshold model. This bootstrap analog produces asymptotically correct p-values as established by Hansen (1996).

Following Hansen (2000), the statistical significance of the threshold estimate is therefore determined via the p-value subject to 1000 bootstrap replications and a 15% trimming percentage. Once an estimate of λ is obtained (as the minimizer of the residual sum of squares computed across all possible values of λ), estimates of the slope parameters follow trivially as $\hat{\hat{\beta}}(\hat{\lambda})$ and $\hat{\gamma}(\hat{\lambda})$.

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21 The approach developed by Hansen (2000) allows for either cross-section or time series observations.

22 Within this context, it is important to note that in jurisdictions such as Malaysia most Islamic banks are subsidiaries of conventional banks, and hence, the Islamic banking subsidiaries are not individually listed on the public exchanges.

Following this, it is also important to note that the presence of an endogeneity problem would imply that the least squares (LS) estimation may yield biased and inconsistent coefficient estimates, and hence, hypotheses tests can be seriously misleading. We therefore test for the potential endogeneity of the charter value by performing the Durban-Wu-Hausman test as suggested by Davidson and MacKinnon (1993). Should the test results in turn indicate that the set of estimates obtained by least squares (LS) are inconsistent, there would be a need to introduce the threshold regression with instrumental variables (IV) proposed by Caner and Hansen (2004) for further robustness checks. Otherwise, we should prefer the least squares results based on Hansen (2000) given that it is the most efficient.[23]

4. Data and initial results

In this section we firstly present an overview of the data and descriptive statistics associated with our analysis. In the subsequent sections, we report the initial empirical results and distinct policy implications associated with our main research objectives.

4.1. Database and descriptive statistics

This study focuses exclusively on Islamic and conventional commercial banks in 18 countries were both Islamic and conventional banks coexist. We therefore exclude from our analysis individual banks in countries that have full fledged Islamic banking systems, namely Iran and Sudan. Specifically, the panel data set comprises a total of 170 banks (108 conventional banks and 62 Islamic banks) over the period 2005-2012. Our bank selection process is governed primarily by the obtainability of publically available disclosures of capital ratios for the banks that are in line with the requirements of the respective national authorities and the applicable Basel capital adequacy guidelines. In line with Stolz and Wedow (2011), we also exclude banks from our sample with negative capital buffers given that these banks are in breach of the respective capital adequacy guidelines and may be distressed. We also omit initial bank capital buffer observations for banks incorporated during the period under study given the potential upward bias resulting from banks not being fully operational during that period.[24] Based on the above criteria, our final sample consists of an unbalanced panel data set of 128 commercial banks of which 44 are Islamic commercial banks.

We construct bank specific measures for the commercial banks in our sample using unconsolidated and consolidated individual bank balance sheet and income statement data from the Bureau Van Dijk Bankscope database as well as publicly available individual audited financial statement where available. In relation to the Islamic commercial banks, it is important to note the standardized financial information obtained from Bankscope does not factor the differences in financial accounting (AAOIFI versus IFRS compliant) as well as the appropriate grouping of line items for Islamic banks relative to conventional banks. Key financial information for constructing our main Islamic bank specific measures were therefore manually derived from the banks' publicly available audited financial statements.

Information on the minimum bank capital requirements in each jurisdiction used to construct our measure for capital buffers ($RBUF_{i,t}$)is obtained directly from the websites of the central banks. The total banking system assets used for constructing the $CR_{j,t}$ measures were obtained from

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[23] As suggested by Law et al. (2013) on using the threshold estimation technique in order to examine whether the growth effect of financial development in countries with distinct levels of institutional development differs.

[24] Banks during the initial stages following incorporation are in the process of implementing their investment and funding decisions and hence have abnormally high capital buffers during that period.

financial worksheets disclosed on the respective central banks' websites. The total assets of the top three and top four banks in each jurisdiction were obtained from the Bankscope database. The $FINDEV_{j,t}$measures on the other hand was obtained from the annual financial development reports of the World Economic Forum. The $GDPGR_{j,t}$ and $GDPCAPGR_{j,t}$ measures where obtained from the World Economic Outlook database of the International Monetary Fund.

In line with Lee and Hsieh (2013), the data upon which the $SPR_{j,t}$ and $MDPM_{j,t}$ indices are constructed are obtained from the Bank Regulation and Supervision Database of the World Bank. The criteria for constructing the bank specific dummy variables are also based on information from the Bankscope database. And finally, it is important to note the limitations associated with the availability and quality of data for the developing countries in our sample.

In relation to our second critical question at hand, given that both our proxies for the charter value of the bank (CV_i) are market based measures, our sample in relation to this sub section is further restricted to only publicly-listed conventional and Islamic commercial banks in the jurisdictions where both Islamic and conventional banking systems coexist. This in turn results in a final data set consisting of 101 publicly listed commercial banks of which 25 are Islamic commercial banks.[25] Key financial and market-based data used for constructing our bank charter value proxies (CV_{TBQ}) and (CV_{PBV}) were obtained from the Bankscope database and the respective stock exchanges websites. To examine the non-linear behaviour of charter values in relation to banks' capital buffers as implied by theory, we therefore assume a cross sectional data set rather than a panel data approach as discussed in the earlier section.

Table 1 summarizes the median values of the bank and country level variables over the sample period (2005-2012) by country. The Islamic (IB) and conventional (CB) commercial banks in our sample span several regions including the Middle East, North Africa and Turkey (MENAT) as well as the Association of South East Asian Nations (ASEAN) regions. Of these countries, 7 of them have instituted some form of an explicit deposit insurance scheme to act as a financial system safety net, whilst the other 11 countries have an implicit deposit insurance mechanism in place. Over the sample period, MENAT region banks seem to exhibit the highest relative capital buffers ($RBUF_{i,t}$) on average (1.01), followed by ASEAN region banks (.89) and South Asian banks (.43) respectively.[26] Based on bank type, Islamic banks in the MENAT region also exhibit the highest $RBUF_{i,t}$ measures on average (1.28) relative to Islamic banks in other regions.[27]ASEAN region conventional banks on the other hand exhibit the highest $RBUF_{i,t}$ measure on average (.84) relative to conventional banks in other regions. It is also relevant to note that over the entire sample, a higher $RBUF_{i,t}$ measure was reported for Islamic banks (1.07) relative to conventional banks (.69) on average.

Table 2 provides the matrix of Pearson correlation coefficients, which based on the results, indicates relatively weak association between the variables on average (less than .3).

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[25] Within this context, it is important to note that in jurisdictions such as Malaysia most Islamic banks are subsidiaries of conventional banks, and hence, the Islamic banking subsidiaries are not individually listed on the public exchanges.

[26] Based on sample averages of the median values by country as indicated in Table 1.

[27] $RBUF_{i,t}$ measures are at an average of .93 for ASEAN Islamic banks and .55 for South Asian Islamic banks.

Table 1

Notes: Summary of descriptive statistics. Indicates the median values for each country. * Represents the countries for which explicit deposit insurance schemes are in place for all banks.

				BANK LEVEL VARIABLES									COUNTRY LEVEL VARIABLES			
Region	**Country**	BNK TYPE	BNK NUM	RBUF	ASSETSPR	DEPOSIT	ROE	NPL	LOANSCD	EQTYFIN	SIZE	TOBINSQ	REGCAP	CR3	FINDEV	GDPGR
MENAT	Bahrain*	IB	5	0.85	0.01	0.49	0.07	0.05	0.80	0.04	8.11	0.92	0.12	0.32	3.90	0.05
		CB	4	0.58	0.01	0.44	0.15	0.04	0.94	n.a.	8.68	1.05				
	Egypt	IB	1	0.77	0.02	0.69	0.08	0.40	0.72	-	8.54	0.95	0.10	0.44	3.28	0.05
		CB	2	0.42	0.01	0.51	0.23	0.03	0.56	n.a.	8.50	1.03				
	Jordan*	IB	2	0.77	0.00	0.63	0.15	0.05	1.54	0.01	7.55	1.06	0.12	0.49	3.65	0.07
		CB	6	0.64	0.01	0.43	0.11	0.06	0.70	n.a.	7.94	1.08				
	Kuwait	IB	3	0.90	0.00	0.76	0.05	0.09	1.00	-	8.42	1.11	0.12	0.72	3.73	0.05
		CB	4	0.50	0.01	0.56	0.16	0.03	1.04	n.a.	9.21	1.19				
	Palestinian Ter.	IB	2	0.69	0.00	0.62	-	-	-	-	5.71	-	0.12	0.52	-	-
		CB	2	0.39	0.02	0.24	0.19	0.04	0.38	n.a.	6.40	1.11				
	Qatar	IB	3	0.98	0.02	0.68	0.16	0.02	0.98	0.03	8.97	1.14	0.10	0.62	-	0.14
		CB	6	0.68	0.01	0.51	0.18	0.01	0.95	n.a.	9.00	1.07				
	Saudi Arabia	IB	3	1.48	0.01	0.28	0.23	0.03	0.79	-	9.08	1.24	0.08	0.46	3.89	0.05
		CB	6	1.13	0.02	0.46	0.18	0.02	0.82	n.a.	10.42	1.12				
	Syria	IB	2	5.41	0.00	0.70	-	0.08	0.64	-	6.28	-	0.08	0.60	-	0.04
		CB	3	1.02	0.00	0.56	0.11	0.04	0.40	n.a.	7.14	1.12				
	Turkey*	IB	4	0.89	0.01	0.76	0.17	0.03	1.03	-	8.60	1.01	0.08	0.41	3.18	0.05
		CB	10	0.97	0.02	0.63	0.19	0.03	1.07	n.a.	9.84	1.06				
	United Arab Emirates	IB	4	0.51	0.01	0.67	0.11	0.06	0.89	-	9.21	0.97	0.12	0.42	4.03	0.05
		CB	13	0.77	0.01	0.55	0.14	0.03	1.04	n.a.	9.46	0.99				
	Yemen	IB	1	0.85	0.02	0.72	0.02	0.02	0.27	0.27	7.42	-	0.08	0.34	-	0.04
		CB	2	1.15	0.00	0.50	0.33	0.35	0.28	n.a.	6.09	-				
ASEAN	Brunei	IB	1	1.77	0.01	0.09	0.09	0.11	0.78	-	8.19	-	0.10	-	-	0.00
		CB	0	-	-	-	-	-	-	n.a.	-	-				
	Indonesia*	IB	3	0.56	0.00	0.82	0.18	0.04	0.87	0.39	7.60	-	0.08	0.38	2.90	0.06
		CB	14	1.02	0.01	0.50	0.12	0.03	0.84	n.a.	8.39	1.07				
	Malaysia*	IB	15	0.78	0.01	0.54	0.10	0.02	0.87	-	8.07	-	0.08	0.40	4.22	0.05
		CB	13	0.72	0.01	0.53	0.16	0.03	0.80	n.a.	9.58	1.13				
	Thailand*	IB	1	0.62	-	0.85	0.05	0.09	0.93	-	7.23	-	0.09	0.43	3.36	0.03
		CB	1	0.78	0.00	-	0.12	0.07	0.98	n.a.	10.76	-				
South Asia	Bangladesh*	IB	6	0.12	0.01	0.77	0.20	0.02	0.93	-	6.63	1.09	0.10	0.30	2.57	0.06
		CB	10	0.17	0.01	0.54	0.21	0.04	0.88	n.a.	6.81	1.11				
	Pakistan	IB	5	0.98	0.02	0.73	0.00	0.06	0.56	0.32	6.23	0.99	0.10	0.38	2.62	0.04
		CB	11	0.44	0.01	0.27	0.15	0.09	0.72	n.a.	8.15	0.99				
Africa	South Africa	IB	1	0.38	0.00	0.99	0.06	-	0.90	0.67	5.77	-	0.10	0.76	3.59	0.03
		CB	1	0.32	0.05	0.18	0.25	0.04	0.89	n.a.	11.50	-				
Median				**0.72**	**0.01**	**0.53**	**0.15**	**0.03**	**0.88**	**-**	**8.47**	**1.06**	**0.10**	**0.43**	**3.23**	**0.05**
Mean				**0.85**	**0.01**	**0.53**	**0.15**	**0.05**	**0.89**	**0.03**	**8.47**	**1.08**	**0.10**	**0.44**	**2.50**	**0.05**
Standard deviation				**0.72**	**0.01**	**0.19**	**0.10**	**0.06**	**0.36**	**0.10**	**1.52**	**0.18**	**0.02**	**0.17**	**1.65**	**0.03**

Table 2[28]

Notes: *** and ** and * indicate the one, five, and ten percent significance levels respectively. RBUF represents the banks' capital buffers. The ASSETSPR represents the absolute spread between the return on assets (ROA) and the returns on depositors' funds. The EQTYSPR represents the absolute spread between the average return on equity and the returns on depositors' funds. DEPOSIT is the level of unrestricted PSIAs relative to total liabilities for Islamic banks, and similar tenured deposits for conventional banks. ROE, NPL, and LOANSCD are proxies for the opportunity cost of capital, bank risk, and the level of financial intermediation respectively. EQTYFIN and FIXEDRTFIN represent the level of PLS based financing and fixed rate financing relative to total financing respectively. SIZE represents the natural logarithm of total bank assets. TOBINSQ is a measure of market power defined as the current market value of a firm's assets (the market value of its equity plus debt) divided by their current cost to a firm. REGCAP represents the regulatory minimum capital requirements in each country in 2011.CR3 represents the three bank concentration ratio. FINDEV is the financial development index provided by the World Economic Forum. GDPGR is the annual growth of real gross domestic product.

Pearson correlation coefficients

	RBUF	ASSETSPR	EQTYSPR	DEPOSIT	ROE	NPL	LOANSCD	EQTYFIN	FIXEDTRFIN	SIZE	TOBINSQ	CR3	FINDEV	GDPGR
RBUF	1.0													
ASSETSPR	0.1783***	1.0												
EQTYSPR	-0.097***	0.247***	1.0											
DEPOSIT	0.0386	-0.0925***	-0.143***	1.0										
ROE	-0.1727***	-0.1494**	0.616***	-0.119***	1.0									
NPL	-0.0062	0.0212	-0.028	-0.0867***	-0.1843***	1.0								
LOANSCD	-0.0302	0.0453	-0.116***	0.0064	-0.0293	-0.2343***	1.0							
EQTYFIN	0.0572**	0.1354***	-0.083***	0.2913***	-0.2161***	0.0133	-0.0776**	1.0						
FIXEDTRFIN	0.1564***	-0.0354	0.102*	-0.1794***	0.0901	0.0188	0.0396	-0.6007***	1.0					
SIZE	-0.1004***	-0.0317	0.179***	-0.1856***	0.2156***	-0.2222***	0.1349***	-0.2511***	0.2367***	1.0				
TOBINSQ	0.1344***	-0.0073	0.275***	-0.0571	0.268***	-0.2287***	0.0081	-0.114***	0.351***	0.0977**	1.0			
CR3	0.099***	0.0123	0.023	0.025	-0.0597*	-0.0618*	0.0312	0.0091	0.1919***	0.2282***	0.1553***	1.0		
FINDEV	0.1773***	-0.0771*	-0.053	-0.0554	-0.2107***	-0.0918**	0.0887**	-0.1285***	0.152**	0.4203***	-0.0885*	0.3495***	1.0	
GDPGR	-0.0509*	0.0164	0.16***	-0.0118	0.2017***	-0.2121***	0.0456	-0.0642**	0.062	-0.0441	0.0821**	0.1519***	-0.1588***	1.0

[28] Kennedy (2008) indicates multicollinearity a critical problem with correlations above 0.80, which is not the case here as indicated in the table.

4.2. Islamic banks' capital buffers and their unique risk exposures

As reported earlier, we proceed with the difference GMM estimation, given the relatively low level of persistence in the time series dimension of capital buffers, and for which high persistence in the series is a necessary condition for expectations of asymptotic efficiency gains using the system GMM (Blundell and Bond, 1998). As discussed earlier, the possibility of "instrument proliferation" also warrants the application of difference GMM.Given that the two-step estimates of the standard errors tend to be severely downward biased (Arellano and Bond, 1991; Blundell and Bond, 1998), we then apply the finite-sample correction to the two-step covariance matrix derived by Windmeijer (2005) prior to reporting our results for the first-difference GMM below.[29] We report our results using the full sample of banks of hand, as well as subsamples that are further classified by commercial bank type (whether Islamic or conventional banks). We also check the robustness of our empirical results firstly by considering modifications to our empirical model as applied to both the full and subsamples of banks respectively and also control for time fixed effects.

4.2.1. Full and sub sample tests

Table 3 reports our initial results in connection to our first critical question using the full sample of banks on hand (both Islamic and conventional banks). As indicated across all specifications (SPEC 1-6), the non-significance of the AR (2) statistic indicates no second order serial correlation in the first-differenced errors, which is a required condition for the consistency of the GMM estimates.[30]

Firstly, it is important to note that the lagged dependent variable is positive and significant at the one per cent level across the specifications, in line with earlier findings in other empirical studies (Fonseca and Gonzalez, 2010; Stolz and Wedow, 2011; and Jokipii and Milne, 2011). This result confirms our choice of a dynamic specification for our model.

On evaluating the impact of bank specific variables associated with the critical issue on hand, the $ASSETSPR_{i,t}$variable is not significant across most of the specifications. Interacting the Islamic bank dummy with the asset spread measure ($IBDUM$ x $ASSETSPR_{i,t}$) however results in an estimated coefficient that is positive in line with expectations and statistically significant at the ten per cent level in four out of the six specifications (significant at five per cent level in SPEC3). The estimated coefficient for $DEPOSIT_{i,t}$is also not significant across the specifications. Having said that, the estimated coefficient for $IBDUM$ x $DEPOSIT_{i,t}$ has a positive sign in line with expectations and is statistically significant at the five per cent level in four of the six specifications (significance level of ten per cent in SPECS 1 and 4). Our findings with regards to both measures expose potential shortcomings in capital adequacy guidelines as Islamic banks seem to adjust their own capital buffers in an effort to more accurately reflect their own in-house perspectives and risk outlooks when mitigating the effects of ROR risk and DCR. This is in line with the literature (Hall et. al, 2000; Archer et. al, 2010; Farook et. al, 2012). The statistically significant positive

[29] With regards to the post estimation specification test results, the distribution of the Sargan test is not known when the disturbances are heteroskedastic, and hence a robust version of the Sargan test is not available after specifying vce (robust) in STATA. As discussed earlier, given that the gmm two-step standard errors are downward biased, robust standard errors are recommended. The vce(robust) uses the robust estimator. For the two-step estimator, vce(robust) represents the Windmeijer WC-robust estimator. A robust version of the Arellano-Bond test for serial correlation is however available and produced in all the tables. Specifying WC-robust standard errors also produces variance-covariance estimates that are robust to heteroskedasticity.

[30] The null of no first-order serial correlation was rejected across all specifications, which is also correct.

relationship for $IBDUM$ x $DEPOSIT_{i,t}$ also suggests Islamic banks might not manage their UPSIAs in line with their inherent risk absorbent and hence succumb to supervisory and competitive pressures in the market place. From a regulatory and supervisory perspective, adequate measures must be taken to enhance regulatory capital standards for Islamic banks across jurisdictions in order to more accurately take into account the unique operations of these financial institutions. Given that Islamic banks' capital buffers seem larger on average relative to their conventional peers (see table 2), the further enhancement of regulatory standards in relation to mitigating the effects of ROR and DCR might also serve to free up excess capital (reduce capital buffers) in the long run and hence improve their ability to compete going forward.

It is also important to note the estimated coefficient IBDUM x STATE x $\mathrm{DEPOSIT}_{\mathrm{i,t}}$ is negative and statistically significant at the ten per cent level in SPEC 6. This suggests state owned Islamic banks might operate differently to both privately owned Islamic banks and conventional banks in general. We also include a set of regional dummy variables ($\mathrm{REGION}_{\mathrm{k}}$) that are not reported in Table 3 in order to save space. Our results suggest no clear differences in economic significance when interacting our primary variables of interest with the regional dummies. Having said that, the estimated coefficient for $ASEANDUM$ x $EQTYFIN_{i,t}$ is negative in value and statistically significant at the one percent level. The $SOUTHASIADUM$ x $EQTYFIN_{i,t}$ on the other hand is positive and statistically significant at the ten per cent level. Both results aren't in line with our earlier findings, as the sign of the estimated coefficient for $EQTYFIN_{i,t}$ in SPEC 2 is positive but not statistically significant.

We also repeat the above analysis on subsamples of banks that are further classified by commercial bank type, namely Islamic versus conventional banks. Our main results are broadly in line with our earlier findings for the full sample tests. All sub-samples test estimation tables are available upon request.

Table 3[31]

Full sample tests: Estimation method is the Arellano and Bond (1991) two-step GMM difference estimator for panel data with lagged dependent variables. The dependent variable is RBUF, which represents the banks' capital buffers. All other variables are described in section 3.2.1 and the variables summary tables in Appendix B. We estimate regressions for 2005-2012 (annual frequency). Windmeijer corrected (WC-robust) standard errors are in parentheses. The null hypothesis of the serial correlation test is that the errors exhibit no second-order serial correlation. ***, ** and * indicate significance levels of one percent, five percent and ten percent respectively.

	All banks :Dependent variable RBUF					
	(1)	(2)	(3)	(4)	(5)	(6)
RBUF $_{t-1}$	0.357***	0.281**	0.336***	0.35***	0.353***	0.356***
	[0.091]	[0.11]	[0.089]	[0.095]	[0.09]	[0.09]
ASSETSPR	2.844	2.03	2.361	2.650	2.831	2.801
	[2.158]	[2.238]	[2.146]	[2.206]	[2.105]	[2.161]
IBDUM x ASSETSPR	5.503*	5.984*	6.588**	4.996	5.595*	5.623*
	[3.163]	[3.16]	[3.182]	[3.246]	[3.16]	[3.188]
EQTYFIN		0.757				
		[0.817]				
DEPOSIT	0.108	0.039	0.121	0.100	0.105	0.102
	[0.191]	[0.194]	[0.195]	[0.191]	[0.191]	[0.19]
IBDUM x DEPOSIT	1.012*	1.213**	1.009**	0.93*	1.031**	1.15**
	[0.536]	[0.509]	[0.497]	[0.536]	[0.524]	[0.556]
ROE	0.204	0.186	0.199	0.219	0.211	0.198
	[0.393]	[0.378]	[0.364]	[0.377]	[0.395]	[0.397]
NPL	-1.205**	-1.225**	-1.195**	-1.197**	-1.2***	-1.251***
	[0.475]	[0.499]	[0.468]	[0.496]	[0.457]	[0.469]
LOANSCD	-0.216	-0.274*	-0.170	-0.211	-0.21	-0.223
	[0.155]	[0.145]	[0.161]	[0.165]	[0.16]	[0.156]
SIZE	-0.119	-0.16*	-0.138	-0.091	-0.113	-0.114
	[0.092]	[0.085]	[0.09]	[0.105]	[0.093]	[0.091]
IBDUM x SIZE				-0.088		
				[0.143]		
CR3	1.411	0.874	-0.490	1.264	1.459	1.408
	[1.054]	[1.135]	[1.315]	[1.059]	[1.046]	[1.049]
IBDUM x CR3			4.211**			
			[1.9]			
FINDEV	-0.923***	-1.002***	-1.035***	-0.902***	-0.917***	-0.922***
	[0.230]	[0.235]	[0.236]	[0.235]	[0.234]	[0.23]
GDPGR	-1.429***	-1.228***	-1.28***	-1.502***	-1.479***	-1.428***
	[0.451]	[0.469]	[0.432]	[0.458]	[0.517]	[0.451]
IBDUM x GDPGR					0.172	
					[0.826]	
STATE x *IBDUM x DEPOSIT*						-1.2*
						[0.646]
No of observations	380	380	380	380	380	380
No of banks	128	128	128	128	128	128
Instruments	30	31	31	31	31	31
AR(1) test	-3.206***	-2.54**	-3.146***	-3.091***	-3.194***	-3.181***
AR(2) test	1.037	0.977	1.013	1.072	1.034	1.008

31 Given that the GMM two-step standard errors are downward biased, robust standard errors are recommended. A robust version of the Sargan test however is not available in STATA after specifying vce(robust) which represents the Windmeijer WC-robust estimator. Country and region dummy variables are included but not reported. We introduce time fixed effects (time dummies) to account for any cross sectional dependence in the data. In line with Nier and Baumann (2006) and Silaghi et. al (2014) we control for time fixed effects as part of our robustness checks exclusively in Table 5. Given the limitations associated with the relatively short time span covered in our panel data set, we do not include any time trend component. The introduction of time fixed effects represents however a tighter control (Nier and Baumann, 2006). Tests of joint significance are conducted but not reported. In line with the arbitrary rule of thumb suggested by Roodman (2009), the number of instruments doesn't outnumber the individual units (number of groups) in the panel suggesting potential problems of instrument proliferation are not apparent.

4.2.3. Robustness checks

In Table 4 we check the robustness of our empirical results by considering modifications to our empirical model as applied to both the full and subsamples of banks respectively. In the first specification (SPEC 1), we include an additional measure of the level of profit distribution management, namely the equity spread ($EQTYSPR_{i,t}$). Having said that, we remove the $ROE_{i,t}$ measure from this specification in view of the relatively strong association (.616) between this measure and the equity spread as depicted in the matrix of Pearson correlation coefficients (Table 2).Whilst the estimated coefficient for the $EQTYSPR_{i,t}$ is negative and statistically significant at the five percent level, on interaction with the Islamic bank dummy, $IBDUM$ x $EQTYSPR_{i,t}$ is non-significant. It is important to note however the equity spread is not as reliable a measure as the asset spread for examining this issue (Farook et. al, 2012).

In Table 5 we introduce time dummies (T_t) in order to account for any cross sectional dependence in the data. Within this context, our results reveal for the time dummies covering the period under study, the only statistically significant coefficient relates to the 2008 period dummy. All other time dummy coefficients are not significant, and hence not reported. We therefore proceed to examine the robustness of our main results whilst controlling for the recent crisis. In line with Beck et al. (2013), we interact $IBDUM$ with a crisis dummy (*CRISIS*), and which takes on the value one for the 2008 period and zero otherwise. As indicated in SPEC 1 our prior main findings for Islamic banks are broadly confirmed after controlling for time fixed effects. In SPEC 4, it is also important to note the statistically significant negative coefficient on examining the effects of the business cycle on Islamic banks' capital buffers during the crisis period ($IBDUM$ x $CRISIS$ x $GDPGR$). The coefficient is significantly higher than the comparable coefficient for conventional banks, and does not support the findings of Beck et al. (2013), which suggest Islamic banks are less likely to dis-intermediate during crises.

Table 4[32]

Robustness checks: Estimation method is the Arellano and Bond (1991) two-step GMM difference estimator for panel data with lagged dependent variables. The dependent variable is RBUF, which represents the banks' capital buffers. All other variables are described in section 3.2.1 and the variables summary tables in Appendix B. We estimate regressions for 2005-2012 (annual frequency). WC-robust standard errors are in parentheses. The null hypothesis of the serial correlation test is that the errors exhibit no second-order serial correlation. ***,** and * indicate significance levels of one percent, five percent and ten percent respectively.

	Dependent variable RBUF						
	(1) All banks	(2) All banks	(3) All banks	(4) All banks	(5) Islamic banks	(6) Islamic banks	(7) Conventional banks
RBUF $_{t-1}$	0.325***	0.371***	0.3828***	0.37***	0.304***	0.305**	0.265**
	[0.086]	[0.093]	[0.092]	[0.093]	[0.098]	[0.132]	[0.111]
ASSETSPR	3.56*	2.623	2.814	2.912	10.174**	10.839***	0.917
	[2.012]	[2.212]	[2.337]	[2.248]	[4.06]	[3.498]	[2.518]
IBDUM x ASSETSPR	5.177*	5.342	4.33	4.876			
	[3.074]	[3.348]	[3.642]	[3.317]			
EQTYSPR	-0.767**						
	[0.354]						
IBDUM x EQTYSPR	-0.715						
	[0.71]						
DEPOSIT	0.057	0.072	0.059	0.077	1.196***	1.14***	-0.121
	[0.191]	[0.195]	[0.197]	[0.196]	[0.436]	[0.368]	[0.266]
IBDUM x DEPOSIT	1.096**	1.06**	1.014*	1.054*			
	[0.525]	[0.535]	[0.556]	[0.546]			
EQTYFIN						-0.602	
						[1.442]	
FIXEDRTFIN					-0.553		
					[0.443]		
ROE		0.248	0.271	0.307	1.577**	1.633***	-0.459
		[0.406]	[0.406]	[0.399]	[0.633]	[0.574]	[0.358]
NPL	-0.936*	-1.379***	-0.874	-1.471***	0.652	0.14	-1.616*
	[0.529]	[0.468]	[0.836]	[0.49]	[1.639]	[1.464]	[0.936]
LLP			-1.118		-4.071	-2.553	
			[1.663]		[3.329]	[2.461]	
LOANSCD	-0.157	-0.245	-0.241	-0.247	0.136	0.138	-0.593**
	[0.172]	[0.171]	[0.162]	[0.168]	[0.307]	[0.313]	[0.26]
SIZE	-0.141*	-0.146	-0.141	-0.161*	-0.235*	-0.213	-0.143
	[0.084]	[0.093]	[0.095]	[0.091]	[0.141]	[0.153]	[0.108]
CR3	1.605	2.169**	2.359**				
	[0.985]	[0.965]	[0.96]				
CR4				1.663*	3.509**	3.696	-0.934
				[0.867]	[1.71]	[2.329]	[0.861]
FINDEV	-0.875***	-1.18***	-1.187***	-1.172**	-2.099***	-1.689**	-0.686**
	[0.225]	[0.295]	[0.3]	[0.298]	[0.703]	[0.924]	[0.302]
GDPGR	-1.261***						-1.391***
	[0.428]						[0.512]
GDPCAPGR		-0.79**	-0.826**	-0.805**	0.438	0.506	
		[0.398]	[0.397]	[0.401]	[0.817]	[0.683]	
No of observations	377	380	379	380	119	119	261
No of banks	128	128	128	128	44	44	84
Instruments	31	30	31	30	30	30	28
AR(1) test	-3.173***	-3.213***	-3.26***	-3.222***	-2.167**	-2.135**	-2.289**
AR(2) test	1.304	1.233	1.251	1.21	0.344	0.241	1.384

32 Given that the GMM two-step standard errors are downward biased, robust standard errors are recommended. A robust version of the Sargan test however is not available in STATA after specifying vce(robust) which represents the Windmeijer WC-robust estimator. Country and region dummy variables are included but not reported. We introduce time fixed effects (time dummies) to account for any cross sectional dependence in the data in table 5. Tests of joint significance are also conducted but not reported. In line with Roodman (2009)'s rule of thumb, the number of instruments doesn't outnumber the number of groups in the panel.

Table 5[33]

Robustness check using time dummies: Estimation method is the Arellano and Bond (1991) two-step GMM difference estimator for panel data. All variables are described in section 3.2.1 and the variables summary tables in Appendix B. We estimate regressions for 2005-2012 (annual frequency). Windmeijer corrected (WC-robust) standard errors are in parentheses. The null hypothesis of the serial correlation test is that the errors exhibit no second-order serial correlation. ***, ** and * indicate significance levels of one percent, five percent and ten percent respectively. [a] In SPEC 7 we did not interact the CRISIS period dummy with IBDUM as the sample consists exclusively of conventional banks.

	Dependent variable RBUF						
	(1) All banks	(2) All banks	(3) All banks	(4) All banks	(5) All banks	(6) Islamic banks	(7) Conventional banks
RBUF $_{t-1}$	0.379***	0.349***	0.371***	0.381***	0.376***	0.396***	0.342***
	[0.089]	[0.093]	[0.089]	[0.088]	[0.095]	[0.099]	[0.088]
ASSETSPR	2.908	2.798	2.938	2.953	2.934	10.863**	2.097
	[2.218]	[2.123]	[2.19]	[2.158]	[2.143]	[4.245]	[2.67]
IBDUM x ASSETSPR	5.667*	5.598*	5.687*	5.424*	4.143		
	[3.207]	[3.357]	[3.202]	[3.176]	[3.598]		
DEPOSIT	0.066	0.086	0.087	0.059	0.095	1.074**	-.072
	[0.192]	[0.191]	[0.192]	[0.194]	[0.191]	[0.529]	[0.218]
IBDUM x DEPOSIT	1.141**	1.007*	1.012*	1.016**	0.894*		
	[0.540]	[0.539]	[0.532]	[0.507]	[0.541]		
STATE x IBDUM x DEPOSIT	-1.385**						
	[0.633]						
ROE	0.305	0.128	0.275	0.332	0.336	1.768***	-.357
	[0.411]	[0.393]	[0.405]	[0.413]	[0.408]	[0.649]	[0.405]
NPL	-1.33***	-1.211**	-1.223**	-1.363***	-1.278**	-1.793*	-1.423
	[0.493]	[0.492]	[0.486]	[0.497]	[0.546]	[0.956]	[0.933]
LOANSCD	-0.277**	-0.229	-0.236	-0.296*	-0.238	-0.044	-0.505**
	[0.150]	[0.156]	[0.153]	[0.115]	[0.159]	[0.269]	[0.257]
SIZE	-0.158*	-0.118	-0.147	-0.167*	-0.187*	-0.271**	-0.227*
	[0.095]	[0.096]	[0.096]	[0.094]	[0.098]	[0.140]	[0.119]
CR3	1.219	1.375	1.288	1.332	0.831	3.576*	0.027
	[1.079]	[1.08]	[1.081]	[0.074]	[1.15]	[2.062]	[1.238]
FINDEV	-0.867***	-0.925***	-0.880***	-0.830***	-1.027***	-0.426	0.31
	[0.228]	[0.235]	[0.231]	[0.236]	[0.274]	[0.731]	[0.399]
IBDUM x FINDEV					1.082		
					0.918		
GDPGR	-1.324***	-1.402***	-1.366***	-1.562***	-1.274***	0.301	-1.024**
	[0.459]	[0.456]	[0.460]	[0.502]	[0.452]	[0.871]	[0.501]
IBDUM x GDPGR				0.763			
				[0.797]			
IBDUM x CRISIS [a]	-0.153*				-0.238**	-0.326***	-0.209***
	[0.081]				[0.107]	[0.084]	[0.058]
IBDUM x ASSETSPR x CRISIS		-0.758					
		[7.101]					
IBDUM x DEPOSIT x CRISIS			-0.163				
			[0.119]				
IBDUM x GDPGR x CRISIS				-4.051**			
				[1.887]			
No of observations	380	380	380	380	380	119	261
No of banks	128	128	128	128	128	44	84
Instruments	32	31	31	32	32	29	29
AR(1) test	-3.227***	-3.174***	-3.219***	-3.173***	-3.061***	-2.135**	-2.7086**
AR(2) test	0.892	0.972	0.852	0.91	0.893	-0.074	1.7047*

33 Given that the GMM two-step standard errors are downward biased, robust standard errors are recommended. A robust version of the Sargan test however is not available in STATA after specifying vce (robust) that represents the Windmeijer WC-robust estimator. Country and region dummy variables are included but not reported. We introduce time fixed effects (time dummies) to account for any cross sectional dependence in the data. The only statistically significant coefficient however relates to the 2008 crisis period. We therefore include a crisis dummy to examine the robustness of our main results whilst controlling for the recent financial crisis. Given the limitations associated with the relatively short time span covered in our panel data set, we do not include any time trend component. The introduction of time fixed effects, however represents a tighter control (Nier and Baumann, 2006).

4.3. The relationship between banks' charter values and capital buffers

In connection to our second critical question, table 6 reports our results from testing the null hypothesis of linearity ($H_0: \beta_1 = \beta_2$) against the threshold model defined in section 3, and which in turn allows us to establish the presence of a charter value threshold effect as implied by theory (Milne and Whalley, 2001). For this purpose, we use our two measures of market power, namely CV_{TBQ} and CV_{PBV} as defined earlier. Following Hansen (2000), the statistical significance of the threshold estimate is determined via the p-value subject to 1000 bootstrap replications and a 15% trimming percentage. As indicated, our results suggest possible threshold effects in both charter value measures, whereas the bootstrap p-values are statistically significant at the one percent level in the four model specifications (first sample split). Our first sample-split results therefore indicate our sample can be split into two regimes regardless of whether we use CV_{TBQ} or CV_{PBV} as our measure of market power. As indicated in the table, our threshold point estimates using CV_{TBQ} are 0.96 with 95% confidence intervals of (.95,.96) and 1.04 with 95% confidence intervals of (1.04,1.05) in models 1a and 2a respectively. On the other hand our threshold point estimate using CV_{PBV} is 1.46 in both models, however, with different 95% confidence intervals of (.49,1.59) and (1.22,1.54) in models 1b and 2b respectively. This implies that our regime switching trigger CV_{TBQ} divides our sample of banks into those with threshold values equal to or below the point estimate (0.96 and 1.04 respectively for models 1a and 2a), and which in turn are classified as low charter value banks (low charter value bank environment), and those above the point estimate, which are classified as high charter value banks (high charter value bank environment). Based on CV_{PBV} on the other hand, our banks are classified as to whether the threshold values figure equal to or below the point estimate 1.46 or above that point estimate, and are in turn similarly classified. We also test whether the high charter value group could be further split into sub-regimes. Whilst the bootstrap p-values were insignificant in models 1a, 2a, and 2b, it is relevant to note that the bootstrap p-value in model 1b of .049 suggests an additional threshold might be relevant for this model (a second sample split).

Table 6

Notes: Null hypothesis (H0) of no threshold effect

Threshold estimates of charter values (CV)

	Model 1 Charter values=CV_{TBQ}	Model 2 Charter values=CV_{PBV}
	CV= Tobins q ratio	
	Model 1a	Model 1b
First sample split		
LM test for no threshold	16.221	20.573
Bootstrap *p*- value	0.004	0.000
Threshold estimate	0.96	1.46
95% confidence intervals	(.95,.96)	(.49,1.59)
Second sample split		
LM test for no threshold	10.672	12.994
Bootstrap *p*- value	0.182	0.049
Threshold estimate	-	2.2
95% confidence intervals	-	(2.2,2.48)
	CV= Price to book value	
	Model 2a	Model 2b
First sample split		
LM test for no threshold	21.221	21.958
Bootstrap *p*- value	0.001	0.000
Threshold estimate	1.04	1.46
95% confidence intervals	(1.04,1.05)	(1.22,1.54)
Second sample split		
LM test for no threshold	7.684	9.986
Bootstrap *p*- value	0.541	0.282

In table 7 we present our empirical results using CV_{TBQ} and CV_{PBV} as our charter value threshold variables, and CV_{TBQ} as our explanatory variable of interest.[34] As indicated in both threshold models 1a and 1b, the coefficient of the charter value measure CV_{TBQ} is negative and statistically significant at the one per cent level when the size of the charter value falls below the threshold level, and non-significant when the size of the charter value falls above the threshold level. This result would in turn suggest that the relationship between banks' charter values and capital buffers is non-linear. Our results seem to suggest increased competition might enhance the self-disciplining behaviour of banks. This seems to be the case given evidence of a negative relationship in a low charter value environment, which is suggestive of competition in the banking system, and is in line with the "charter value effect". This indicates as the charter value falls, banks are motivated to maintain larger capital buffers in order to protect the valuable charter. On the other hand, our results for charter values above the threshold level seem to suggest that high charter value banks are not responsive to fluctuations in their franchise values from a risk management perspective. This might

[34] Within this context, it is important to note that Hansen (2000) allows for the threshold variable to be an element of the m-vector of explanatory variables. This is particularly relevant given that as noted earlier, the charter value of the bank (CV) acts as both the threshold variable and the explanatory variable of interest, CV_i, in the above empirical model.

have implications given that the effective management of capital buffers is reflective of the risk outlook of the banks going forward, and taking into account as well the importance of capital in reducing the likelihood of bankruptcy and financial distress costs.

Table 7

Notes: Regression results using charter values (CV) as a threshold variable. The dependent variable RBUF represents banks' capital buffers. The explanatory charter value variable is Tobin's q ratio (CV_{TBQ}). All other variables are described in section 3.2.1 and the variables summary tables in Appendix B. The standard errors are reported in parentheses (White corrected for heteroskedasticity). Results correspond to trimming percentages of 15%. ** and *** indicate significance levels of five percent and one percent respectively.

	Linear model	Threshold model 1a (charter values=CV_{TBQ})		Threshold model 1b (charter values=CV_{PBV})	
	OLS without threshold	Regime 1 CV≤0.96	Regime 2 CV>0.96	Regime 1 CV≤1.46	Regime 2 CV>1.46
Constant	-5.259***	-5.604**	-5.265***	-0.519	-8.534***
	(1.04)	(1.841)	(1.11)	(1.371)	(1.549)
CV_{TBQ}	-0.284	-0.48**	0.871	-0.966***	-0.045
	(0.296)	(0.183)	(0.749)	(0.317)	(1.138)
NPL	-0.185**	-0.129	-0.249**	-0.162	-0.256**
	(0.084)	(0.105)	(0.097)	(0.104)	(0.118)
GDPGR	-0.734**	-1.924**	-0.397	0.252	-1.564**
	(0.364)	(0.727)	(0.367)	(0.477)	(0.607)
FINDEV	1.566***	-0.829	2.11***	0.282	1.985***
	(0.444)	(0.77)	(0.438)	(0.66)	(0.512)
R-sq	0.269	0.33	0.344	0.123	0.529
Heteroskedasticity test (*p* -value)	0.019	-	-	-	-
No. of observations	101	14	87	46	55

Table 8

Notes: Regression results using charter values (CV) as a threshold variable. The dependent variable RBUF represents banks' capital buffers. The explanatory charter value variable is the price to book value ratio (CV_{PBV}). All other variables are described in section 3.2.1 and the variables summary tables in Appendix B. The standard errors are reported in parentheses (White corrected for heteroskedasticity). Results correspond to trimming percentages of 15%. ** and *** indicate significance levels of five percent and one percent respectively.

	Linear model	Threshold model 2a (charter values=CV_{TBQ})		Threshold model 2b (charter values=CV_{PBV})	
	OLS without threshold	Regime 1 CV≤1.04	Regime 2 CV>1.04	Regime 1 CV≤1.46	Regime 2 CV>1.46
Constant	-4.91***	-2.697**	-6.914***	-0.5	-8.394***
	(1.022)	(1.306)	(1.259)	(1.341)	(1.375)
CV_{PBV}	-0.202	-0.711***	-0.531	-0.483***	-0.251
	(0.104)	(0.162)	(0.265)	(0.168)	(0.28)
NPL	-0.233***	-0.271***	-0.191	-0.233**	-0.271**
	(0.083)	(0.098)	(0.112)	(0.102)	(0.112)
GDPGR	-0.578	-0.1562	-1.26**	0.39	-1.576***
	(0.363)	(0.433)	(0.476)	(0.458)	(0.543)
FINDEV	1.597***	0.595	2.001***	0.414	1.968***
	(0.437)	(0.586)	(0.486)	(0.604)	(0.497)
R-sq	0.29	0.338	0.48	0.196	0.537
Heteroskedasticity test (*p* -value)	0.023	-	-	-	-
No. of observations	101	44	57	46	55

In table 8 we present our empirical results using CV_{TBQ} and CV_{PBV} as our charter value threshold variables, and CV_{PBV} as our explanatory variable of interest. Our main results are broadly in line with our earlier findings in Table 7.

Table 9

Notes: Second sample split regression results using charter values (CV) as a threshold variable. The dependent variable RBUF represents banks' capital buffers. The explanatory charter value variable is Tobin's q ratio (CV_{TBQ}). All other variables are described in section 3.2.1 and the variables summary tables in Appendix B. The standard errors are reported in parentheses (White corrected for heteroskedasticity). Results correspond to trimming percentages of 15%. ** and *** indicate significance levels of five percent and one percent respectively.

	Linear model	Threshold model 3b (charter values=CV_{PBV})	
	OLS without threshold	Regime 1 CV≤2.2	Regime 2 CV>2.2
Constant	-8.534***	-10.392***	-3.971
	(1.549)	(1.854)	(2.077)
CV_{TBQ}	-0.045	4.464	2.491
	(1.138)	(2.289)	(1.373)
NPL	-0.256**	-0.363	-0.355**
	(0.118)	(0.176)	(0.164)
GDPGR	-1.564**	-2.235***	1.081
	(0.607)	(0.581)	(1.02)
FINDEV	1.985***	1.247**	3.975***
	(0.512)	(0.597)	(0.769)
R-sq	0.529	0.585	0.685
Heteroskedasticity test (p -value)	0.064	-	-
No. of observations	55	29	26

In table 9 we present our empirical results using CV_{PBV} as our charter value threshold variable, and CV_{TBQ} as our explanatory variable of interest in connection with our second sample split. Beginning with the estimated coefficient for CV_{TBQ}, our results are consistent with earlier results noted for banks with charter values greater than the threshold level of 1.46.This in turn might be attributed to better accessibility of large banks beyond a certain charter level to new equity thereby reducing the need for them to manage large capital buffers, or alternatively, might be associated with the "too big to fail" paradigm as discussed earlier.

It is important to reiterate that repeating the analysis on a sample consisting exclusively of Islamic commercial banks is not possible at this stage given the limited number of publicly listed Islamic commercial banks (only 25 are publicly listed).[35] Having said that, based on the threshold value point estimate for CV_{TBQ} of .96, it is important to note that twenty Islamic banks have threshold values of more than .96, whist the remaining five Islamic banks have threshold values less than .96. On the other hand, based on the threshold value point estimates for CV_{TBQ} of 1.04 and for CV_{PBV} of 1.46, the threshold values of Islamic banks seem to be more or less equally distributed above and below the point estimates. And finally, in connection with our second sample split, it is important to note that seven Islamic banks have threshold values less than the CV_{PBV} point estimate of 2.2 and five Islamic banks have threshold values more than the CV_{PBV} point estimate of 2.2. These results

[35] It is important to note that in jurisdictions such as Malaysia most Islamic banks are subsidiaries of conventional banks, and hence, the Islamic banking subsidiaries are not individually listed on the public exchanges.

would in turn seem to suggest that the relationship between Islamic banks' charter values and capital buffers are also non-linear in line with the theoretical predictions.

And finally, we recognize the possibility for potential endogeneity between the charter value of the bank (CV_i) and capital buffers ($RBUF_i$) as suggested by theory. [36] The presence of an endogeneity problem would imply that the least squares (LS) estimation may yield biased and inconsistent coefficient estimates, hence, hypotheses tests can be seriously misleading. We therefore test for the potential endogeneity of the charter value by performing the Durban-Wu-Hausman test as suggested by Davidson and MacKinnon (1993). On testing the endogeneity of our explanatory variables of interest, namely CV_{TBQ} and CV_{PBV}, our test results reveal that both measures are exogenous.[37] Our test results in turn indicate that the set of estimates obtained by least squares are consistent, and hence the use of instrumental variables is not required.

5. Final remarks

As a result of the increasing global recognition of Islamic banking as a viable alternative banking model, this study in particular aims to contribute to the understanding of how Islamic banks' capital buffers behave in the face of unique risk exposures arising from the nature of their operations. It is expected this in turn would provide insight on the overall susceptibilities of Islamic banks to risks emanating from their operating environments, as well as their current risk management practices. In line with recent soundings for viable incentives that could moderate banks' excessive risk taking behaviour, we also address whether the disciplining effect of Islamic banks' charter values on their risk-taking incentives (capital buffers) is a function of the size of the charter in line with theoretical predictions. Our results raise distinct policy implications in particular with regards to the regulation and supervision of Islamic banks going forward. We also envisage our findings to further enhance the risk management capabilities of Islamic banks, and in that sense, contribute to the resilience and sustainability of the Islamic financial system going forward.

[36] Theoretical papers analyze capital and risk taking decisions where banks' franchise values are endogenous (Elizalde and Repullo, 2007; Souarez, 1994).

[37] The statistic is 2.19 and its p-value is .14 for CV_{TBQ} and .16 and its p-value is .689 for CV_{PBV}.

Appendix A

Table A.1[38]

Full sample tests: Estimation method is the Arellano and Bond (1991) two-step GMM difference estimator for panel data with lagged dependent variables. The dependent variable is RBUF, which represents the banks' capital buffers. All other variables are described in section 3.2.1 and the variables summary tables in Appendix B. We estimate regressions for 2005-2012 (annual frequency). We apply Sargan's statistic of over-identifying restrictions to confirm the absence of correlation between the instruments and the error term. The null hypothesis of the serial correlation test is that the errors exhibit no second-order serial correlation. ***,** and * indicate significance levels of one percent, five percent and ten percent respectively.

	All banks :Dependent variable RBUF					
	(1)	(2)	(3)	(4)	(5)	(6)
$RBUF_{t-1}$	0.357***	0.281***	0.336***	0.35***	0.353***	0.356***
	[0.069]	[0.076]	[0.063]	[0.070]	[0.070]	[0.069]
ASSETSPR	2.844	2.03	2.361	2.650	2.831	2.801
	[1.911]	[1.953]	[1.904]	[1.920]	[1.877]	[1.911]
IBDUM x ASSETSPR	5.503**	5.984**	6.588**	4.996*	5.595**	5.623**
	[2.672]	[2.607]	[2.696]	[2.740]	[2.667]	[2.666]
EQTYFIN		0.757				
		[0.626]				
DEPOSIT	0.108	0.039	0.121	0.100	0.105	0.102
	[0.176]	[0.177]	[0.176]	[0.177]	[0.175]	[0.176]
IBDUM x DEPOSIT	1.012**	1.213***	1.009**	0.93**	1.031**	1.15***
	[0 .429]	[0.414]	[0.419]	[0.435]	[0.424]	[0.439]
ROE	0.204	0.186	0.199	0.219	0.211	0.198
	[0.320]	[0.322]	[0.304]	[0.315]	[0.322]	[0.320]
NPL	-1.205**	-1.225***	-1.195***	-1.197**	-1.2***	-1.251***
	[0.474]	[0.472]	[0.458]	[0.485]	[0.458]	[0.459]
LOANSCD	-0.216*	-0.274**	-0.170	-0.211	-0.21	-0.223*
	[0.127]	[0.127]	[0.131]	[0.129]	[0.130]	[0.127]
SIZE	-0.118*	-0.16**	-0.138*	-0.091	-0.113	-0.114
	[0.070]	[0.071]	[0.071]	[0.076]	[0.072]	[0.070]
IBDUM x SIZE				-0.088		
				[0.103]		
CR3	1.410*	0.874	-0.490	1.264*	1.459**	1.408*
	[0.725]	[0.770]	[0.957]	[0.731]	[0.730]	[0.723]
IBDUM x CR3			4.211***			
			[1.382]			
FINDEV	-0.923***	-1.002***	-1.035***	-0.902***	-0.917***	-0.922***
	[0.203]	[0.207]	[0.211]	[0.205]	[0.204]	[.202]
GDPGR	-1.429***	-1.228***	-1.28***	-1.502***	-1.479***	-1.428***
	[0.347]	[0.361]	[0.343]	[0.347]	[0.397]	[0.346]
IBDUM x GDPGR					0.172	
					[0.727]	
STATE x *IBDUM x DEPOSIT*						-1.2**
						[0.547]
No of obs	380	380	380	380	380	380
No of banks	128	128	128	128	128	128
Instruments	30	31	31	31	31	31
Sargan test	22.192	18.687	18.854	21.92	22.5	22.525
AR(1) test	-3.514***	-2.943***	-3.518***	-3.466***	-3.480***	-3.480***
AR(2) test	1.053	0.993	1.028	1.094	1.051	1.025

[38] We introduce time fixed effects (time dummies) to account for any cross sectional dependence in the data. In line with Nier and Baumann (2006) and Silaghi et. al (2014) we control for time fixed effects as part of our robustness checks exclusively in Table 5. Given the limitations associated with the relatively short time span covered in our panel data set, we do not include any time trend component. The introduction of time fixed effects represents however a tighter control (Nier and Baumann, 2006). Tests of joint significance are conducted but not reported. In line with the arbitrary rule of thumb suggested by Roodman (2009), the number of instruments doesn't outnumber the individual units (number of groups) in the panel suggesting potential problems of instrument proliferation are not apparent.

Table A.2[39]

Full sample tests: Estimation method is the Blundell and Bond (1998) two-step system GMM estimator for panel data with lagged dependent variables. The dependent variable is RBUF, which represents the banks' capital buffers. All other variables are described in section 3.2.1 and the variables summary tables in Appendix B. We estimate regressions for 2005-2012 (annual frequency). We apply Sargan's statistic of over-identifying restrictions to confirm the absence of correlation between the instruments and the error term. The null hypothesis of the serial correlation test is that the errors exhibit no second-order serial correlation. ***, ** and * indicate significance levels of one percent, five percent and ten percent respectively.

	All banks :Dependent variable RBUF					
	(1)	(2)	(3)	(4)	(5)	(6)
RBUF $_{t-1}$	0.499***	0.518***	0.454***	0.444***	0.499***	0.498***
	[0.050]	[0.048]	[0.049]	[0.056]	[0.050]	[0.050]
ASSETSPR	3.528*	3.309*	3.37*	3.128	3.519*	3.504*
	[1.963]	[1.968]	[1.930]	[1.942]	[1.945]	[1.964]
IBDUM x ASSETSPR	2.101	3.531	1.741	3.761	2.036	2.004
	[2.748]	[2.633]	[2.695]	[2.709]	[2.711]	[2.734]
EQTYFIN		-1.035**				
		[0.472]				
DEPOSIT	0.282	0.199	0.229	0.108	0.275	0.279
	[.188]	[0.182]	[0.185]	[0.178]	[0.188]	[0.188]
IBDUM x DEPOSIT	-0.263	0.002	-0.183	0.435	-0.245	-0.29
	[0.369]	[0.348]	[0.421]	[0.394]	[0.370]	[0.368]
ROE	-0.133	-0.0731	-0.121	0.152	-0.148	-0.149
	[.299]	[0.309]	[0.312]	[0.308]	[0.298]	[0.297]
NPL	-1.037*	-1.007*	-0.828	-0.842*	-1.057*	-1.049*
	[0.564]	[0.552]	[0.555]	[0.496]	[0.557]	[0.559]
LOANSCD	-0.064	-0.142	-0.083	-0.140	-0.072	-0.064
	[0.1405]	[0.139]	[0.140]	[0.128]	[0.142]	[0.139]
SIZE	0.061	0.0491	0.051	0.053	0.061	0.057
	[0.051]	[0.051]	[0.058]	[0.050]	[0.052]	[0.052]
IBDUM x SIZE				-0.138***		
				[0.053]		
CR3	1.402**	1.668***	1.619**	1.404**	1.396**	1.373**
	[0.6167]	[0.607]	[0.757]	[0.638]	[0.617]	[0.612]
IBDUM x CR3			-0.231			
			[1.010]			
FINDEV	-0.766***	-0.774***	-0.665***	-0.781***	-0.753***	-0.776***
	[0.206]	[0.200]	[0.196]	[0.203]	[0.208]	[.208]
GDPGR	-1.837***	-1.902***	-1.793***	-1.851***	-1.958***	-1.825***
	[0.342]	[0.342]	[0.338]	[0.325]	[0.382]	[0.343]
IBDUM x GDPGR					0.291	
					[0.783]	
STATE x *IBDUM x DEPOSIT*						0.104
						[0.581]
No of obs	515	515	515	515	515	515
No of banks	132	132	132	132	132	132
Instruments	35	36	36	36	36	36
Sargan test	30.578*	29.53	31.798*	26.555	30.658*	30.668*
AR(1) test	-4.101***	-4.202***	-3.966***	-3.735***	-4.1***	-4.107***
AR(2) test	1.247	1.048	1.242	1.189	1.253	1.256

39 We introduce time fixed effects to account for any cross sectional dependence in the data. In line with Nier and Baumann (2006) and Silaghi et. al (2014) we control for time fixed effects as part of our robustness checks in Table 5. Given the limitations associated with the relatively short time span covered, we do not include any time trend component. The introduction of time fixed effects represents however a tighter control (Nier and Baumann, 2006). Tests of joint significance are conducted but not reported. In line with the arbitrary rule of thumb suggested by Roodman (2009), the number of instruments doesn't outnumber the number of groups in the panel suggesting potential problems of instrument proliferation are not apparent. Our results also satisfy the requirements for the "steady state" assumption for the validity of instruments in system GMM to hold (Roodman, 2009).

Appendix B

Table B.1

Summary of all variables table: Summary of definitions, descriptions and data sources for all variables defined in sections 3.2.1 and 3.3.1.

Variable	Definition	Description	Data source
RBUF	Relative capital buffers	Difference between the total capital ratio and the minimum capital requirement divided by the minimum capital requirement.	Bankscope database and individual audited financial statements
ASSETSPR	Asset spread measure	Absolute spread between the return on assets (ROA) (after considering all expenses but excluding profits paid to depositors) and the returns on depositors' funds.	Individual audited financial statements
EQTYSPR	Equity spread measure	Absolute spread between the average return on equity (ROE) and the average rate of return on depositors' funds.	Bankscope database
DEPOSIT	UPSIAs and similar tenured deposits for conventional banks	Level of unrestricted PSIAs relative to total liabilities for Islamic banks and similar tenured deposits to total liabilities for conventional	Individual audited financial statements
EQTYFIN	PLS based financing	Level of PLS based financing relative to total financing for Islamic banks.	Individual audited financial statements
FIXEDRTFIN	Fixed rate financing	Level of fixed rate financing relative to total financing for Islamic banks.	Individual audited financial statements
ROE	Return on equity	Amount of net income returned relative to total shareholder's equity.	Bankscope database
NPL & LLP	Non performing loans and loan loss provisions	Level of non performing loans and loan loss provisions relative to total financings.	Bankscope database
LOANSCD	Loans to customer deposits	Level of loans relative to customers' deposits.	Bankscope database
SIZE	Bank size effect	Natural logarithm of total banks assets.	Bankscope database
CR3 & CR4	Banking system concentration ratios	Total assets of the top three and four banks respectively relative to total banking assets in each country.	Central bank websites
FINDEV	Financial development index	The composition and scoring of this index is a function of an assessment of seven indicators that gage the various aspects of financial development.Overall score for each country calculated on a 1 to 7 normalized scale.	Annual financial development reports (World Economic Forum)
GDPGR & GDPCAPGR	Growth rate in real GDP and on a per capital basis	The annual growth rate of real gross domestic product and the annual growth rate of real per capita gross domestic product respectively.	IMF World Economic Outlook database
CV_{TBQ}	Tobin's q ratio	The current market value of a firm's assets (the market value of its equity plus debt) divided by their current cost to a firm (the book value of assets).	Bankscope database and stock exchanges websites
CV_{PBV}	Price to book value	The market value to book value of capital.	Bankscope database and stock exchanges websites
SPR	Measure for supervisory power	Takes values between 0 and 14 with higher values indicating more supervisory power.	World Bank Regulation and Supervision database
MDPM	Measure for market discipline and private monitoring	Takes values between 0 and 8 with higher values indicating greater market discipline.	World Bank Regulation and Supervision database

Table B.2

Summary of dummy variables table: Summary of definitions, descriptions and data sources for dummy variables defined in sections 3.2.1.

Variable	Definition	Description	Data source
IBDUM	Islamic bank dummy variable	Takes the value of 1 for Islamic banks and 0 otherwise.	STATA generated
STATE	State bank dummy variable	Takes the value of 1 for state owned banks and 0 otherwise.	STATA generated
EXPLICIT	Explicit deposit insurance dummy variable	Takes the value of 1 for countries with explicit deposit insurance systems and 0 otherwise.	STATA generated
PUBLIC	Publicly listed bank dummy variable	Takes the value of 1 for publicly listed banks and 0 otherwise.	STATA generated
CRISIS	2008 crisis dummy variable	Takes the value of 1 for the 2008 financial crisis period and 0 otherwise.	STATA generated
MENAT	Middle East, North Africa and Turkey region	Takes the value of 1 for countries in this region and 0 otherwise.	STATA generated
ASEAN	The Association of South East Asian Nations region	Takes the value of 1 for countries in this region and 0 otherwise.	STATA generated
SOUTHASIA	The South Asian region	Takes the value of 1 for countries in this region and 0 otherwise.	STATA generated

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