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On intellectual capital efficiency and shariah governance in Islamic banking business model

Abstract

This paper empirically investigates whether intellectual capital (IC) and shariah governance jointly affect the economic performance of Islamic banks (IBs). In contrast to prior research, this paper disaggregate IC and corporate governance features and examine whether the two are jointly related to economic performance. These relationships are further explored before, during and after the financial crisis based on a sample of 64 Islamic banks operating in different regions during the period 2007-2014. The required data to calculate different constituents of IC efficiency and governance mechanism is hand collected from 512 annual reports. After controlling for other corporate governance and bank-specific characteristics (operational type, bank size, listing status, risk, type of auditor, accounting standard and region), we find both intellectual capital efficiency and shariah governance proxies (size and dominance of prominent scholars of shariah supervisory board) to have a significant positive relationship with accounting measure of performance. However, based on market performance measure, only one proxy for shariah governance mechanism i.e. prominent scholars on SSB, is found to be significant but in the negative direction. These results provide important insights into the relationship between IC efficiency, corporate governance and performance in Islamic banking business model and have policy and practical implications.

Keywords: intellectual capital, Islamic banks, corporate governance, shariah supervisory board, operating structure, resource-based view.

1. Introduction

Driven by religious business ethics, Islamic banks entered the main stream financial services sector about half a century ago to provide banking solutions that comply with Islamic jurisprudence (shariah) which eschew interest (*riba*), speculative trading or investments (*gharar*), excessive risk taking – in their investment and financing dealings and involve Islamic banks in the risk sharing of the proceeds and revenues of the borrower (Beck et al., 2013). Shariah compliance also prohibits issuance of debt/new products against debt/credit i.e. financial securitisation. In addition to these ontological and epistemological covenants, shariah places strong emphasis on justice and fairness and as such, requires all financial transactions to be backed by a real economic transaction that involves tangible assets (Nawaz, 2019) and restricts the use of many derivative products, including reasons such as excessive uncertainty, writing credit over credit, or derivative transactions that defer the transfer of money/capital and commodity/product in future (Obaidullah, 2005). The risk-sharing covenant of Islamic banking business model, require designing saving accounts that make depositors/investment account holders' return non-interest bearing and gives IBs discretion in to pay a return that based on IBs overall profitability or for that matter losses. Operationally, the revenue streams of IBs come mainly from investment, trade-based profit and fee-based services while their asset-side products can be either equity-based such as *musharakah* (capital-capital partnership) and *mudarabah* (capital-labour partnership or joint venture), or interest-free debt-based products like *ijarah* (leasing) and *murabahah* (cost-plus sale). Hence, the business model of Islamic banks is clearly different from conventional banks as it is faith-driven and must be shariah-compliant. This also means that the components of their financial statements are to some extent different from that of conventional banks.

Despite its impressive growth and recognition by the World Islamic Banking Competitiveness Report 2013-14 as a major force in global banking enjoying an annual growth

rate of 15-20% and assets exceeding US\$2 trillion by 2014 (Nazim & Bennie, 2012), Islamic banks cannot remain complacent as competition in the banking sector has intensified over the past decade (Ariss, 2010). Hence, it is imperative for Islamic banks to consider embracing new strategic priorities such as efficient investments in new capital and putting in place appropriate governance mechanisms that will help in sustaining their performance.

As one of the most knowledge-intensive industries (Mavridis & Kyrmizoglou, 2005; Chen et al., 2014), banks, including Islamic banks, no longer rely on their physical capital to maintain their performance. Efficient and effective management of and investments in intangible assets, or also referred to as intellectual capital (IC), are deemed essential to achieve and sustain superior performance (Eisenhardt & Schoonhoven, 1996). IC has also been acknowledged as the most important source of competitive advantage that will lead to innovation of new products (Subramaniam & Youndt, 2005) and better quality services and in turn, better bottom line. While there has been a number of studies that have looked at the association between IC and performance of conventional banks in different countries (Pulic, 2004; Goh, 2005; Mondal & Ghosh, 2012; Ismail & Kareem, 2011), the results have been mixed. Since Islamic banks need to generate new innovative shariah-compliant products to compete in the market, it is expected that the nature of their investments in IC will be different and in turn on their performance. Therefore, a study is needed to provide insights on the relationship between IC and Islamic banks' performance to see if they are (dis)similar to other prior studies.

One important component of IC is related to investments in human capital as bank performance also relies on good governance mechanisms to constrain agency problems and moral hazard. This aspect has received substantial attention especially following the financial crisis (Aebi et al., 2012). While conventional banks adopt a single layer governance mechanism or unitary board system, Islamic banks have an additional layer of governance in the form of a shariah supervisory board (SSB) that provides oversight on commitment to ethical or shariah-compliant practices (Grais & Pellegrini, 2006) such as ensuring that banks are not involved in

interest and speculation in their lending and investment activities, which may subsequently affect performance. Yet there are limited studies that have considered to what extent investments in SSB's members contribute to performance of Islamic banks.

Therefore, this paper contributes to both the IC and bank performance literature by exploring the relationship between intellectual capital efficiency and shariah governance mechanism on Islamic banks' performance while controlling for a number of other corporate governance and bank-specific characteristics. While there have been many studies examining effects of various factors on banks' performance during the financial crisis, there has not been any studies that have considered the association between IC and banks' performance. Banks investment strategies in IC and governance mechanism may be different following financial crisis and in turn on their performance. Hence, we further contribute to this line of literature by exploring the relationship between IC and shariah governance mechanism on Islamic banks' performance before, during and after the financial crisis.

The remainder of the paper is organised as follows: Section 2 presents the background and development of hypotheses for the current study. An outline of the research design is then presented in Section 3 followed by the empirical results in Section 4. The paper ends with the concluding remarks and avenues for further research.

2. Background and development of hypotheses

Banks' performance may be affected by both micro- and macro-economic factors (see Dietrich & Wanzenried, 2011; Beltratti & Stulz, 2012), which in turn have important implications not only on investors and depositors but also to the economy and society. The literature on determinants of bank performance can be split into those that are internal and those that are external (Staikouras & Wood, 2011). The former is associated with factors that are influenced by banks' management decisions and policy objectives such as effectiveness in managing the balance sheet structure (Wall, 1983; Zimmerman, 1996), governance aspects (Sierra et al.,

2006) as well as investment, marketing and operational strategies. The latter, on the other hand, are concerned with factors that are influenced by events outside the bank such as regulatory and macroeconomic factors. However, the extant literature on bank performance has failed to consider efficiency of banks' intangible assets investment strategies on their performance, especially in the context of financial crisis.

Likewise, the extant literature on Islamic banks' performance has either explored determinants of performance on a single country basis e.g. Pakistan (Akhtar et al., 2011), Malaysia (Wasiuzzaman & Tarmizi, 2010) or compared performance between conventional and Islamic banks in a single country or region such as Safiullah (2010) for Bangladesh; Onakoya and Onakoya (2013) for UK; Hanif et al. (2012) for Pakistan; Elsiefy (2013) for Qatar; Olson and Zoubi (2008) and Srairi (2009) for GCC and only a few have examined across countries (Beck et al., 2013; Johnes et al., 2014). These studies have also considered both macroeconomic (inflation, GDP growth) and bank specific characteristics (bank size, credit risk and operational cost) including corporate governance as possible determinants for Islamic banks' performance.

Our paper extends previous studies by focusing on two internal factors related to management's strategic investment policies and introduced an external factor based on financial crisis. In the following sections, we discuss each of them in more detail and develop our hypotheses accordingly.

2.1 Islamic banks' performance and intellectual capital

According to the resource-based view of the firm, gaining sustained competitive advantage requires organisations to exploit the bundle of tangible and intangible resources that they have (Wernerfelt, 1984; Penrose, 1995) into valuable resources that are neither imitable nor substitutable without great effort. The significance of intangible assets along with the traditional tangible economic resources i.e. land, labour and capital for superior economic

returns and sustained market valuation – underpinned by the resource-based view of the firm is gaining acceptance in various research streams stretching from economics, finance and accounting to organisational and strategic management studies (Reed et al., 2006). Thus, it is not surprising to find organisations becoming increasingly reliant on knowledge and experience (Stewart & Ruckdeschel, 1998), which constitutes intellectual capital (IC) or also referred to as intangibles (Villalonga, 2004), rather than physical assets in creating value. IC refers to the knowledge resources used to create value and attain competitive advantage in the market. IC can be further broken down into human capital (HC) and structural capital (SC), with the former embedded in the organisation's employees while the latter refers to the supportive infrastructure enabling knowledge to be converted into something owned by the organisation (Edvinsson & Malone, 1997). Petty and Guthrie (2000) include another component of IC called relational capital which refers to the ability of the organisation in creating and building relational capital with its external stakeholders through for example, customer and brand loyalty, customer satisfaction, market image and goodwill, power to negotiate, strategic alliances and coalitions (Joshi et al., 2013).

Following the rapid growth in the services sector, researchers have started to pay more attention to IC in the banking sector (Goh, 2005; Mavridis & Kyrmizoglou, 2005; Ismail & Karem, 2011; Joshi et al., 2013). It has been suggested that value creation in knowledge-intensive sectors such as the banking industry requires both IC and physical assets (Marr & Adams, 2004; Chen et al., 2014). Likewise, Goh (2005) recognises the importance of physical capital but further argues that in the banking sector, it is IC that determines the quality of services provided to customers. Ismail and Karem (2011) note that human capital is the main driver of performance in banks and Nawaz (2019) suggest that banks need to invest in the training of their human resources (i.e. HC), brand building, systems and processes (SC) to ensure competitive success.

One popular method of assessing value added by the company's resources (Firer & Williams, 2003) is the VAIC model developed by Pulic (2000). It is suggested that the higher the bank's value added intellectual coefficient (VAIC) and its sub-components i.e. human capital efficiency (HCE), structural capital efficiency (SCE) and capital employed efficiency (CEE), the greater will be its competitive advantage leading to better firm performance. Studies that focused on the relationship between IC efficiency and bank performance based on VAIC model find conclusive evidence of a positive relationship between the two (Mondal & Ghosh, 2012), particularly human capital (Goh, 2005). However, the relationship between IC efficiency and Islamic banks' performance has been relatively unexplored.

The resource-based view of the firm further holds that a firm evaluates the strengths and weaknesses of its resources and then selects an achievable strategy accordingly. Human capital is one of the underlying strategic resources that is both supportive and necessary for organisational success since employees' knowledge and skill are essential in knowledge intensive firms such as banks (Subramaniam & Youndt, 2005), including Islamic banks. We argue that knowledge embedded in the shariah supervisory board members provides Islamic banks with increased cognitive abilities (i.e. offering *fatwa* for complexed financial instruments), which distinguishes the human capital stock of Islamic banks than their conventional rivals. Islamic banks exploit such human capital resources to achieve and sustain competitive advantage in the market.

Since IC resources drive a firm's capability to innovate (Subramaniam & Youndt, 2005), we argue that this is more so in the case of Islamic banking and finance institutions. They need to have higher investments in human intellectual capital since many of the employees may have less experience on the shariah banking model. Islamic banks also need to invest in structural capital to support innovation of the new business model. In addition, Islamic banks need to effectively manage the different types of financial resources as this is vital for gaining competitive advantage.

Human intellectual capital is particularly important for Islamic banks because the creation and endorsement of ethical products that are shariah compliant and the ability to cater to the needs of various groups of customers require human resources that have higher awareness of *fiqh muamalat* (Islamic jurisprudence that deals with commercial and business activities) as well as having competency in banking-related knowledge.

Similarly, shariah compliant products and services require different treatments when recording contracts and transactions than conventional banks. Therefore, Islamic banks need to invest in infrastructure and computer networks that are better suited to deal with the complexity of their transactions. In short, value creation in Islamic banks is dependent on efficient and effective investments in human and structural capital, which will lead to tangible (e.g. new products or processes) and intangible (e.g. more experienced employees likely to engage in future product and service innovations) outputs, and subsequently better banks' performance. Therefore, our first hypothesis, based on both accounting and market based measures of performance, is stated as follows:

H₁: There is a statistically significant positive association between an Islamic bank's performance and VAIC.

H_{1a}: There is a statistically significant positive association between an Islamic bank's performance and its human capital efficiency (HCE).

H_{1b}: There is a statistically significant positive association between an Islamic bank's performance and its structural capital efficiency (SCE)

H_{1c}: There is a statistically significant positive association between an Islamic bank's performance and its capital employed efficiency (CEE).

2.2 Islamic banks' performance and shariah governance

Islamic banks must at all times ensure that their aims, operations, business affairs and activities comply with shariah. The consequences of shariah non-compliant activities can potentially tarnish the banks' reputation and reduce the confidence of depositors, investors, customers, and other stakeholders which in turn, affect their performance. In order to provide religious

legitimacy to their activities, Islamic banks appoint a number of shariah scholars to sit on their Shariah Supervisory Board (SSB). Members of this board play a vital role in providing input to Islamic banks on matters enabling the banks to comply with shariah principles. This includes setting shariah related rules and principle, issuing verdict (*fatwa*) and overseeing compliance to ensure that policies and procedures of the banks are in conformity with shariah (Nawaz, 2019). Therefore, investment in shariah board members is an important strategic decision undertaken by Islamic banks. Having a large shariah board may signal to the banks' stakeholders of their commitment in ensuring their activities are shariah compliant which in turn may boost their performance. Since some shariah scholars have higher reputation and credibility than others, having more prominent scholars on the SSB will further enhance the banks' legitimacy and performance. Hence, we hypothesise the following two hypotheses:

H₂: There is a statistically significant positive association between an Islamic bank's performance and the size of its SSB.

H₃: There is a statistically significant positive association between an Islamic bank's performance and having more prominent scholars on its SSB.

2.3 Islamic banks' performance and corporate governance

While there have been many studies conducted on the relationship between corporate governance and performance in the non-financial sector (Haniffa & Hudaib, 2006), studies in the context of banks and more specifically Islamic banks, have been limited and needs examining.

Board structure and bank performance

It has been suggested that bigger boards will negatively affect firm performance (Hermalin & Weisbach, 2003) because of coordination costs and free-rider problems while smaller boards may enhance monitoring capabilities (Yermack, 1996; Khanchel, 2007). On the other hand, bigger boards may provide greater balance in promoting effective decision making which may

affect firm positively. It has also been argued that as board size increases, control and monitoring functions will be impaired (Dalton et al., 1999). The results on the association between bank performance and board size have been mixed. De Andres and Vallelado (2008) and Adams and Mehran (2012) find a significant positive relationship between board size and bank performance while Pathan and Faff (2013) find the relationship to be negative. Other studies (e.g. Wintoki et al., 2012) find no economically significant association between board size and firm performance, in contrast. In the context of Islamic banks, larger boards may provide balance for effective decision making beyond religious matters. Conversely, in the presence of a larger SSB the coordination costs of having larger board may affect negatively on Islamic bank's performance.

Closely related to board size is board independence i.e. the ratio of non-executive (outside) to executive (inside) directors, and its relationship with performance. Non-executive directors are needed to act as gatekeepers in aligning management and shareholders' interest and reducing management's opportunistic behaviour (Segrestin & Hatchuel, 2011; Li et al., 2012), thus contributing mainly to the monitoring role as suggested by agency theory. On the other hand, resource-dependence theory highlights the important advisory and consulting role performed by non-executive directors owing to their possession of resources needed by the firm (Haniffa & Cooke, 2002; Hillman & Dalziel, 2003; Haniffa & Hudaib, 2006; Machold & Farquhar, 2013), such as expertise, prestige and networks, to help in the strategic decision making process in enhancing performance and maximising shareholders wealth (Knockaert & Ucbasaran, 2013). The results on the relationship between bank performance and board independence are also inconclusive. De Andres and Vallelado (2008) and Cornett et al. (2009) report a positive effect while Pathan and Faff (2013) note a negative effect. However, Adams and Mehran (2012) and Wintoki et al. (2012) do not find a significant relationship between board independence and firm performance. The inconclusiveness of the results and significance

of outside directors' role on the board, cited in the aforementioned literature merits for further investigation in the context of Islamic banks.

CEO power is another important attribute of effective governance. Although the theoretical argument suggest to separate the role of board's chairperson and the CEO (see, among others, Dalton & Kesner, 1985, and Patton & Baker, 1987), the emperical evidience is far from reaching a consensus. This is especially the case in studies conducted in the context of Islmaic banks (e.g. Mollah & Zaman, 2015, Nawaz, 2019). The conventional literature strongly advocates for the separation of chairman and CEO roles (see Jensen, 1993) and this is supported by the empirical evidence, which suggests that CEO role duality diminishes board independence, cute board's capacity to oversight managers' actions and erupts decision making process (Yermack, 1996; Lehn & Zhao, 2006; Cerbioni & Parbonetti, 2007). In the context of Islamic banks, giving too much power to the leadership go against the Islamic concept of *shura* (consultation) which calls for leaders to always seek advice from a group before making decisions. Similarly, strong and effective internal audit controls can determine managers' behaviour in a timely fashion, which in turn reduces information asymmetry between the internal and external stakeholder and subsequently improves firm performance (Kalbers & Fogarty, 1993; Chen & Chen, 2012). Furthermore, the power of the audit committee may be stronger if their number is relatively large compared to the overall board size.

2.4 Islamic banks' performance and bank-specific characteristics

Operating structure

Islamic banks may choose to operate as Islamic windows or subsidiaries of conventional banks or operate as fully-fledged Islamic banks. The former is an operational strategy adopted by conventional banks for the purpose of attracting customers from conventional to shariah-compliant banking, meeting increasing demand from customers for ethical products and improving mobilisations of savings. The downside of operating as windows or subsidiaries is that Islamic windows by design have to spend more internally on staff recruitment, training

and development and externally on branding and marketing to position themselves as shariah-compliant business in the market to satisfy existing customers and attract potential clients looking for shariah-compliant financial services. Such additional costs may affect their bottom line. On the other hand, fully-fledged banks may have lower training and recruitment costs as staff have more specialised knowledge and experience as well as lower marketing cost as customers have more trust on their brand name and products.

Size, listing status & risk

On average, larger and listed banks are better performers because they are able to diversify their risk and also they have more analysts following which puts them under more pressure to perform well. Banks with more debts in their capital structure are more risky which may affect their performance.

Auditor type, accounting standards & regions

Auditor quality is often associated with firm size and engaging a Big4 auditor may reduce agency problems and moral hazard which would contribute to better performance. Islamic banks have a choice to either follow IFRS, AAOIFI or its own country's standards and it is expected that banks that follow the former standards will show better performance as it is more flexible (principle-based). Islamic banks operating in the Middle-East are expected to perform better as they can draw from a larger wealthy client base.

2.5 Conceptual framework

Figure 1 presents the conceptual framework showing the relationships between the main explanatory factors and Islamic banks together with the set of hypotheses discussed earlier.

INSERT FIGURE 1 ABOUT HERE

2.6 Effect of financial crisis on relationship between IC and shariah governance investments and Islamic banks' performance

The banking sector has received increased scrutiny from stakeholders following the financial crisis, which had affected bank performance. Hasan and Dridi (2010) suggest that Islamic banks were more resilient during the crisis compared to their conventional counterparts and hence, will continue to invest in IC and shariah supervisory boards. Therefore, we expect the association between such investments and Islamic bank's performance to still hold before and after the financial crisis. Thus, we test the following null hypothesis:

H₄: There is no statistically significant difference in the positive association between an Islamic bank's performance and its IC efficacy variables before and after the financial crisis.

H₅: There is no statistically significant difference in the positive association between an Islamic bank's performance and its shariah governance variables before and after the financial crisis.

3. Data, empirical method and variables description

3.1 Sample selection

We used BankScope database to extract financial data related to the sampled banks. There were 147 Islamic banks listed in BankScope database and after eliminating banks due to limitations on data availability or no longer in existence, our final sample consists of 64 banks operating in 25 countries covering a period of eight years from 2007-2014, as can be seen in Table 1. This provides us with 512 bank-year observations.

INSERT TABLE 1 ABOUT HERE

3.2 Dependent and explanatory variables

Table 2 presents a summary of the operationalisation and source of the variables used in our model. The dependent variable, bank performance, can be assessed in different ways. For the purpose of this study, we used one common accounting based measures i.e. average return on asset, ROAA (Usoff et al., 2002) and Tobin's Q as the market-based measure (Weir et al., 2002). It has been argued that Tobin's Q is endogenous with respect to managerial decisions regarding a firm's scale, with underinvestment inflating Tobin's Q (see Dybvig & Warachka, 2015). The authors further contend that the q-ratio either increase or decreases based on the relative importance of scale decisions versus cost discipline, respectively. We acknowledged limitations in using Tobin's Q as a market measure but have used it due to data constraint for Islamic banks.

INSERT TABLE 2 ABOUT HERE

Our first independent variable is related to overall IC efficiency. Following Pulic (2000), Goh (2005) and Mondal and Ghosh (2012), we calculate the value added intellectual coefficient (VAICTM) as proxy for the aggregate intellectual capital efficiency consisting of human capital efficiency (HCE), structural capital efficiency (SCE) and capital employed efficiency (CEE). The general formula takes the form of: $VAIC^{TM} = HCE + SCE + CEE$. The next set of independent variables is related to investments in shariah governance *viz.* shariah supervisory board size (SSBsize) and domination of prominent scholars on shariah supervisory board (SSBdominance).

Our corporate governance control variables include: board size (LnBsize), board independence (Bindep) based on proportion of independent non-executive directors to total board size, CEO power (Dual) based on whether the CEO is also the chairman, audit committee size (ACS), audit committee power (ACP) based on proportion of non-executives who are audit committee members to total board size. Our bank-specific control variables include bank

operating structure i.e. full-fledged or Islamic windows (OS), bank size based on total assets (LnTA), risk based on debt to equity (Risk), dummy variables for listing status (list), auditor type (Big4), accounting standard based on IFRS or other (Accstd) and region based on whether it is in the GCC or other (Region).

3.3 Econometric modelling

We used the following model to test our hypotheses.

$$Performance_{i,t} = \alpha + \beta_{xn}IC_{i,t} + \beta_{xn}SG_{i,t} + \gamma_{xn}Control_{xn} + \varepsilon_{tx}$$

where $Performance_{i,t}$ is the proxy for the performance variable of bank i at time t , $IC_{i,t}$ is the matrix of intellectual capital efficiency variable of bank i at time t , $SG_{i,t}$, is a matrix of shariah governance variables of bank i at time t , $Control$ is a matrix of corporate governance variables and bank-specific characteristics of bank i at time t , $\varepsilon_{t,x}$ is the error term, α_0 is the constant, and β and γ are the vectors of coefficient estimates.

We used the model to analyse the effect of (i) intellectual capital efficiency (VAIC, HCE, SCE and CEE), and (ii) shariah governance (SSB size, SSB domination by prominent scholars), on bank performance (both accounting and market-based) using return on asset and Tobin's Q as proxies for performance. We used the pooled OLS regression to test our model.

4. Empirical results

4.1 Descriptive statistics

Table 3 provides the descriptive statistics *viz.* minimum, maximum, mean, standard deviation, standardised skewness and kurtosis, for the dependent and independent variables used in our models. Focusing first on the dependent variables (Panel A), it can be seen that the mean for ROAA is 8%, with a minimum of -13% and maximum of 77%. The negative minimum figure suggests some banks in the sample making a loss. The mean for Tobin's Q is 1.08, ranging from a minimum of 0.49 to maximum of 2.35.

INSERT FIGURE 2 ABOUT HERE

As for the continuous independent variables (Panel B rows 3-6), the mean for value added intellectual coefficient (VAIC) is 20.12, with a minimum of 1.16 and maximum of 446.75, indicating that Islamic banks in our sample are generally efficient in generating value from their intellectual capital. The means for the three sub-components, HCE, SCE and CEE are 18.51, 0.81 and 0.81, respectively. The high mean for HCE suggests that it is the main value driver as indicated by the effective utilisation of human capital during the study period. Further, as can be seen in Panel C, the value creation capability (VAIC) of Islamic banks over the period has deteriorated from 25.37 in 2007 to 17.46 in 2014, suggesting reduction in human capital efficiency (HCE). The SCE and CEE have remained relatively stable over the period. The mean economic performance measured by ROAA and Tobin's Q, respectively and average IC efficiency of sampled IBs during the study period is illustrated in Figure 2.

INSERT TABLE 3 ABOUT HERE

With regards to shariah governance variables (Panel B rows 7 & 8), the mean size of SSB is 4, with a minimum and maximum of 1 and 14, respectively. This indicates heterogeneity within the industry on *Shariah*-monitoring policy. As for dominance of prominent shariah scholars serving on SSBs, it can be seen that some banks are 100% dominated by them and on average, they occupy about 26% of each SSB. Results reported in Panel C suggest that Islamic banks were efficient in creating value using their human, structural and financial resources during the study period. The negative value for VAIC during 2008-2011 suggest the impact of financial crisis and market adjustment.

Table 3 (columns 8-20) also presents Pearson correlation matrix for the continuous variables. It can be seen that our variable of interest, VAIC, is significantly associated with both ROAA and Tobin's Q, with the former in the positive direction and the latter in the

opposite direction. All three sub-components of VAIC are significantly and positively related to ROAA but negatively in the case of Tobin's Q. In terms of shariah governance, SSB size is positively and significantly associated only with ROAA while dominance of prominent scholars on SSB is not significantly associated with both performance measures.

The Variance Inflation Factors (VIFs) for all regressions is also computed for all regressions to check for multicollinearity (column 8). The highest value of VIF is 2.94, well below the conventional value of 10. Likewise, the lowest value of tolerance is 1.18, well above the conventional value of 0.1. There is no multicollinearity between the independent variables.

4.2 Do intellectual capital efficiency and shariah governance affect Islamic banks' accounting and market performance?

Table 4 presents the results for two sets of models: VAIC and bank performance (Models 1 & 2), and sub-components of VAIC and bank performance (Models 3 & 4). The difference between Models 1 & 2 is that the former is based on ROAA while the latter is based on Tobin's Q.

INSERT TABLE 4 ABOUT HERE

As can be seen in Model (1), the relation between accounting performance measurement (ROAA) and VAIC is positively and significantly related at the 1% level, as expected, and the result is consistent with prior studies for conventional banks (e.g. Ting & Lean, 2009; Pulic 2002b). On the other hand, in Model (2), the relation between the market performance measure (Tobin's Q) and VAIC is insignificant and is in the direction opposite to expectation. Hence, our hypothesis H₁ is only supported based on accounting performance. Our results suggest that Islamic banks that are efficient in using their intellectual capital are able to generate higher profitability.

SSB size relates positively (at 5% significance level) with profitability but insignificant based on market performance measure, thus partially supporting H₂. SSB dominated by

prominent scholars is significant at the 5% and 1% levels based on profitability and market value respectively, with the former in the positive direction as expected while the latter in the opposite direction. Hence, our H₃ is supported except that the direction for market value is opposite to expectation. This indicates that the market perceives less favourably banks with prominent figures on the SSB although the results suggest that they may help enhance banks' profitability. A further plausible interpretation of the results is that the market may perceive prominent figures as an extra expense as compare to relatively less known SSB members and may put negative value to banks dominated by prominent shariah scholars. Equally, some of the prominent scholars holding more than fifty SSB positions within the Islamic finance industry, thus, such a high concentration may signal the market the demand on one's time, which relates negatively with market value. This merits for further investigation by the future research in this area.

Models (3) & (4) show the relationship between bank performance and the three VAIC sub-components. Based on Models 3 and 4, the regression results indicate both HCE and CEE to have highly significant effect on both performance measures, with the former in opposite direction to expectation while the former in positive direction as expected, thus supporting H_{1a} and H_{1c}. The negative result for HCE performance suggest that high investment on human capital reduces profit and market value, which is contrary to prior studies (e.g. Goh, 2005; Mavridis & Kyrmizoglou, 2005) for conventional banks. The positive result for CEE indicates that efficient utilisation of financial capital helps in generating profit as well as increase market value, which is consistent with prior studies (e.g. Saengchan, 2008; Ting & Lean, 2009) for conventional banks. However, SCE has a significant positive effect only on ROAA (at 1% level), thus partially supporting H_{1b}. The result is contrary to Ting and Lean (2009).

In all four models, we include corporate governance and bank-specific characteristics as control variables. In terms of corporate governance, our regression results indicate board size and board independence to have a significant positive effect only on profitability. This

result is consistent with De Andres and Vallelado (2008) and Cornett et al. (2009). Role duality, contrary to expectation and inconsistent with Cerbioni and Parbonetti (2007) and Krause et al. (2014), is positive and highly significant for both models, but in the direction opposite to expectation. This suggests that role duality may actually help enhance profitability and market value as the CEO is able to pursue the vision of the bank more effectively. Audit committee size is negatively and significantly related only to profitability and in the direction opposite to expectation which is inconsistent to suggestion by Chen and Chen (2012). Audit committee power is insignificant in both Models 1 & 2 but significant in Model 3. The insignificant result is consistent with that of Wintoki et al. (2012).

With regards to the business operational model, regression results indicate fully-fledged banks to be significantly related to profitability and market value with the former in negative direction and the latter in opposite direction. A possible reason for fully-fledged Islamic banks to be negatively related to accounting profitability may be attributed to higher operational cost, but positively related to market performance possibly due to the market perceiving them to have higher growth potential.

Bank size has a significant negative effect on both performance measures, suggesting that bigger banks are less efficient but in the opposite direction to expectation. A possible explanation for smaller Islamic banks to be better performers may be attributed to less complex products and lower operating cost. Listed banks have significant positive effect on profitability but negative effect on market value. Risk and auditor type are both insignificant regardless of the performance measure. Adoption of IFRS enhances profitability but not market value. Banks in the GCC have significant positive profitability and market value.

4.3 Do the relationships between IC and shariah governance investments and Islamic banks' performance differ before, during and after the financial crisis?

Table 5 presents the regression results on the effect of the relationship between the two investment types of investments and bank performance before, during and after the financial

crisis. Based on accounting performance (Models 1, 2 & 3) and the three VAIC sub-components, it can be seen that CEE is the main driver for profitability performance in all three periods. SCE is positively significant in the period during and post-crisis. The latter result suggests that efficient utilisation of structural capital becomes increasingly crucial for generating profit following the crisis. On the other hand, HCE is negatively associated with profitability in all three periods but only significant during the crisis period, suggesting that investments in human capital will reduce profitability significantly during the crisis period. Turning to market-based performance measure (Models 4, 5 & 6), SCE is only significantly positive with market value in the pre-crisis period. For the post-crisis period, CEE and HCE are both significantly associated with market value, positively in the case of the former and negatively for the latter.

INSERT TABLE 5 ABOUT HERE

The variation in VAIC and its sub-components before, during and after the crisis suggests that investment efficiency is closely related to the market condition. As can be seen earlier in Panel C of Table 3, before the crisis, HCE was in an upward trend (10% increase) while CEE was in a downward trend (13% decrease). This suggests that banks invest less in human capital during the crisis and focuses more on improving efficiency of their capital employed. However, the degree of change in structural capital efficiency is steady regardless of the economic conditions. This suggests that banks favour adjusting HCE and CEE because they are more liquid than their investment in SCE, which remains relatively unchanged.

In terms of shariah governance variables, SSB size is negatively associated to profitability in all three periods but significantly during the crisis, which is understandable as more expenses incurred in paying bigger boards will significantly reduce profitability. Results indicate having prominent scholars on SSB to have significant positive association with accounting performance in all three periods but with diminishing effect. Based on market value

measure of performance, SSB size is not significantly related while having prominent scholars on SSB is significantly and negatively associated with market value during and after the crisis. This suggests that prominent SSB members are perceived as an ultra-expense by the market in the wake of financial malaise. Another interpretation of the negative association is that the market may hint to favour the non-prominent SSB members in times of financial distress and thereafter because they perceive prominent members have time constraint given the demand on their time and that non-prominent members may spend more time and extra efforts to study and resolve issues during the crisis and later in the adjustment period.

As for the control variables, board size and board independence are positively and significantly associated with profitability; the latter during and after the crisis while the former only during the crisis. Audit committee size and power are both significantly associated with profitability only during the crisis period with the former in negative direction and the latter in the opposite direction. Interestingly, role duality has no effect on profitability in all three periods while it is the only variable to be positively and significantly related to Tobin's Q in all three periods but with diminishing effect.

Fully-fledged banks are significantly associated with performance after the crisis period but in the negative direction in the case of accounting measure. IFRS has significant positive effect on profitability while GCC banks have positive effect on market value in all three periods. Banks audited by Big4 and listed banks are significantly and positively related to profitability while large and listed banks are negatively and significantly related to market value, post crisis.

5. Conclusion

The main objective of our paper is to identify whether investments in intellectual capital and shariah governance have significant impact on performance of Islamic banks, while controlling for other corporate governance and bank-specific characteristics. Our regression results based

on VAIC suggest that Islamic banks have utilised their resources efficiently leading to increase in profitability but this was not reflected in the case of market value. This highlights that the relationship between performance and intellectual capital efficiency is dependent on which performance measure is considered. Our empirical results further reveal that both structural and financial capital efficiency are the main drivers for bank performance rather than human capital, as found in many studies in the context of conventional banks (Chen et al., 2014). The results for HCE suggest that the human capital expenditure to support the ethical business model adopted by the Islamic banks is expensive without optimal output as of yet. The results can be attributed to the phenomenal growth Islamic banking is experiencing since the beginning of the new millennium. To sustain the current growth trends, Islamic banks are spending more on human capital resource (Hasan & Dridi, 2010). However, in the longer run when the industry reaches the maturity stage such expenditure are expected to relate positively with Islamic banks' performance.

Our results regarding corporate governance reveal role duality to be positively related to performance, which challenges mainstream studies (Mishra & Nielsen, 2000; Pathan, 2009) and the corporate governance code as well as the *shuratic* (consultation) concept in Islamic ethics which sees dominance of power in one hand may reduce board effectiveness. We further find having more prominent scholars on the banks' SSBs help boost profitability but reduce market value possibly due to the market perceiving them as less independent and too busy to actually perform their role effectively. Our results elucidate and suggest an alternative view to Mollah and Zaman (2015) on the role of shariah board in Islamic banking business model.

Our analysis on the impact of the financial crisis indicates some differences in the relationship between some of the determinants and performance in the pre-, during and post-crisis, suggesting that Islamic banks respond to changing times by adjusting their strategies accordingly. In times of financial distress Islamic banks tend to adjust more liquid resources such as CEE and SCE and reduce investments in less liquid resources such as HCE. In short,

our results indicate the two main variables of interest in our study to be important determinants of Islamic banks' performance and that their impact on performance is dependent on macro-events.

Our study makes significant contributions to the corporate governance, intellectual capital and bank performance, Islamic banks' performance literature streams, in particular. The positive results of IC efficiency and shariah governance mechanisms have important implications for the governing and monitoring bodies responsible for designing strategies and mechanisms that enable the Islamic finance industry to compete effectively and also to sustain competitive advantage in the market. The negative relationship between prominent scholars on SSB and bank market performance implies that the market pays less attention on who sits on the SSBs. Thus, Islamic banks should not be investing too much resources on prominent shariah figures to legitimise their activities to market players.

Our study is not without limitations. Firstly, macro-economic factors such as GDP growth rate, inflation rate, etc. in assessing Islamic banks' performance. Hence, the future research may considering the impact of these variables while assessing Islamic banks' performance. Secondly, some researchers have raised concerns on the validity of VAIC as a method of measuring IC and future studies may adopt other indicators in capturing IC. Thirdly, we only focused on the impact on Islamic banks and prospect researchers may consider a comparative research study conventional vis-à-vis Islamic banks. Fourthly, we used Tobin's Q as proxy for market performance and future studies can consider other proxies such as the operating efficiency measures (i.e. scale efficiency and cost discipline) proposed by Dybvig and Warachka (2015) when data is available.

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Tables

Table 1. Sample selection criteria

Sample	No of Islamic banks
Initially identified Islamic banks	147
Islamic banks merged or not in business	11
Islamic banks with missing financial data	49
Islamic banks with missing corporate governance data	23
Final sample size	64

Table 2. Summary of operationalization of the variables

Variable name	Acronym	Operationalization	Data source
Dependent variables			
Return on Average Assets	ROAA	Net income available to stockholder/ average total assets	Bankscope
Tobin's Q	Tobin's Q	Market value of equity plus book value of liabilities divided by book value of assets	Bankscope /Annual report
Independent variables			
Intellectual capital			
Value added	VA	Total income – Total expenses excluding personal expenses	Bankscope /Annual report
Human capital	HC	Total personal expenses considered as investments	Bankscope /Annual report
Human capital efficiency	HCE	HCE = VA/HC i.e. value added/human capital, or (Total income – Total expenses excluding personal expenses) divided by (Total personal expenses considered as investments)	
Structural capital	SC	SC = VA – HC i.e. value added – human capital, or (Total income – Total expenses excluding personal expenses) – (Total income – Total expenses excluding personal expenses)	Bankscope /Annual report
Structural capital efficiency	SCE	SCE = SC/VA i.e. structural capital/value added, or (VA-HC)/VA [(Total income – Total expenses excluding personal expenses) – (Total income – Total expenses excluding personal expenses)] divided by (Total income – Total expenses excluding personal expenses)	
Capital employed	CE	Physical and financial capital employed or Total assets + Total liabilities	Bankscope /Annual report
Capital employed efficiency	CEE	CEE = VA/CE i.e. value added/physical and financial capital employed, or (Total income – Total expenses excluding personal expenses) divided by (Total assets+ Total liabilities)	
Value added intellectual coefficient	VAIC	VAIC = HCE + SCE + CEE	
Shariah governance variables			
Shariah supervisory board (SSB) size	SSBsize	Log of total number of members of SSB	Annual/corporate governance report
Domination of prominent scholars on shariah supervisory board (SSB)	SSBdominance	Proportion of prominent scholars to total SSB members (in percentage)	Annual/corporate governance report
Governance-specific variables			
Board-size	Bsize	Log of total number of directors on board	Annual/corporate governance report
Board independence	Bindep	Proportion of independent non-executive directors to total board size (in percentage)	Annual/corporate governance report
CEO power	Dual	Dummy; 1=role duality, 0 otherwise	Annual/corporate governance report
Audit committee size	ACSize	Log of total number of members serving on the audit committee	Annual/corporate governance report
Audit committee power	ACPower	Proportion of non-executives who are audit committee members to total board size (in percentage)	Annual/corporate governance report
Firm-specific control variables			
Bank size	LnBankSize	Log of total assets	Bankscope/ Annual report
Listing status	List	Dummy; 1=listed, 0 otherwise	Bankscope/ Annual report
Level of risk	Risk	Total debt/Total equity	Bankscope/ Annual report
Type of auditor	Big4	Dummy; 1=Big four, 0 otherwise	Annual report
Bank's operating structure	Bos	1 = Full-fledged, 0 = Islamic windows/subsidiaries	Annual/corporate governance report
Accounting standard used	Accstd	Dummy; 1=IFRS, 0 otherwise	Annual report
Region	Region	Dummy; 1 if the bank is located in GCC, 0 otherwise	Annual/corporate governance report

Table 3. Descriptive Statistics

	<i>Min</i>	<i>Max</i>	<i>Mean</i>	<i>Std.</i>	<i>Skew</i>	<i>Kurt</i>	<i>VIF</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>	<i>9</i>	<i>10</i>	<i>11</i>	<i>12</i>	<i>13</i>	
<i>Panel A: Dependent variable</i>																					
1. ROAA	-.13	.77	.08	.08	-.03	.32		1													
2. Tobin's Q	.49	2.35	1.08	.18	.03	6.81		-0.02	1												
<i>Panel B: Independent variables</i>																					
3. VAIC	1.16	446.75	20.12	41.97	-.35	2.67	2.94	0.10	-0.11	1											
4. HCE	1.02	444.80	18.51	41.72	.53	1.08	2.67	0.09	-0.10	1	1										
5. SCE	.02	1.00	.81	.19	-.23	3.46	1.55	0.21	-0.14	0.33	0.32	1									
6. CEE	.00	5.12	.81	.84	-.10	.75	1.53	0.44	-0.21	0.23	0.21	0.39	1								
7. SSB	1.00	14.00	4.23	1.92	-.32	1.95	1.45	0.15	-0.01	0.00	0.00	0.09	0.37	1							
8. SSBdominance	.00	1.00	.26	.30	.78	-.62	1.40	-0.06	0.03	-0.19	-0.19	-0.32	-0.29	-0.30	1						
9. Board Size	3.00	20.00	9.09	2.88	1.46	3.05	1.34	0.12	0.01	-0.10	-0.11	0.03	0.43	0.52	-0.18	1					
10. Bindep	.00	.93	.65	.21	-.57	-.47	1.33	0.12	-0.03	0.09	0.09	0.01	0.05	-0.08	-0.01	-0.15	1				
11. ACSize	2.00	8.00	3.36	.87	1.48	4.50	1.29	-0.06	0.05	0.20	0.20	0.15	0.08	0.26	-0.22	0.27	-0.10	1			
12. ACPower	.11	1.00	.39	.14	1.15	2.03	1.22	-0.10	0.02	0.27	0.27	0.12	-0.22	-0.14	0.00	-0.60	0.01	0.51	1		
13. BankSize (LnTA)	2.48	11.32	7.40	1.81	-0.43	-0.16	1.22	-0.15	0.06	0.07	0.07	0.10	-0.11	0.03	-0.21	0.22	0.08	0.16	-0.20	1	
14. Risk	.04	1.39	0.53	0.30	-0.31	-0.90	1.18	0.05	-0.13	0.24	0.23	0.34	0.40	0.13	-0.11	0.14	0.00	0.31	-0.44	0.21	

<i>Panel C: Mean intellectual coefficient</i>				
<i>Year</i>	<i>VAIC</i>	<i>HCE</i>	<i>SCE</i>	<i>CEE</i>
2007	25.37	23.51	0.82	1.04
2008	27.58 (+9%)	25.87 (+10%)	0.82 (+0%)	0.9 (-13%)
2009	22.92 (-17%)	21.32 (-18%)	0.79 (-4%)	0.81 (-10%)
2010	18.21 (-21%)	16.66 (-22%)	0.78 (-1%)	0.77 (-5%)
2011	15.95 (-12%)	14.46 (-13%)	0.79 (+1%)	0.7 (-9%)
2012	16.49 (+3%)	14.9 (+3%)	0.83 (+5%)	0.76 (+9%)
2013	16.98 (+3%)	15.42 (+3%)	0.82 (-1%)	0.74 (-3%)
2014	17.46 (+3%)	15.92 (+3%)	0.82 (+0%)	0.72 (-3%)

<i>Panel D: Dummy variables</i>		Mean	Std. Dev.
OS (Fully-fledged)	0 1	0.66	0.47
Duality	0 1	0.02	0.12
List (Listed)	0 1	0.48	0.50
Auditor (Big4)	0 1	0.75	0.43
Accstd (IFRS)	0 1	0.59	0.49
Region (GCC)	0 1	0.47	0.50

Table 4. Regression models of accounting and market based performance

	Predicted sign	Model 1 LnROAA	Model 2 LnTobin'sQ	Model 3 LnROAA	Model 4 LnTobin'sQ
Observations		512	512	512	512
R ²		0.255	.287	0.513	.307
Adj. R ²		0.233	.266	0.496	.284
Std.Error (Constant)		2.304 -0.137	0.136 0.042	1.864 3.056**	.134 0.107
<i>Value added intellectual capital variables:</i>					
LnVAIC	(H ₁) +	0.208**	-0.001		
LnHCE	(H _{1a}) +			-0.152**	-0.010*
LnSCE	(H _{1b}) +			0.203**	0.002
LnCEE	(H _{1c}) +			0.809**	0.017**
<i>Shariah governance variables:</i>					
LnSSBSize	(H ₂) +	0.728*	0.028	-0.530*	0.005
SSBdominance	(H ₃) +	0.865*	-0.107**	1.206**	-0.101**
<i>Governance control variables:</i>					
Board Size		0.117	0.005	0.261**	0.007
Bindep		1.074*	0.042	1.016*	0.047
Duality		2.613**	0.289**	0.940	0.262**
LnACSize		-1.556*	0.031	-2.212**	0.023
AcPower		1.368	0.050	5.039**	0.121
<i>Bank-specific control variables:</i>					
Op. strategy		-1.095**	0.030*	-0.630**	0.035*
LnBankSize		-0.310**	-0.027**	0.081	-0.019**
List		0.597*	-0.086**	0.643**	-0.089**
Risk		-0.004	0.000	0.002	0.001*
Big4		0.103	0.010	0.448	0.018
Accstd		0.722**	0.000	1.046**	0.007
Region		1.657**	0.144**	0.646*	0.125**

*significant at 5% and ** significant at 1%

Table 5. Regression models of accounting and market based performance for pre-, during and post-crisis

	Model 1 Pre- crisis (2007)	Model 2 During crisis (2008- 2009)	Model 3 Post- crisis (2010- 2014)	Model 4 Pre-crisis (2007)	Model 5 During the crisis (2008- 2009)	Model 6 Post-crisis (2010-2014)
	LnROAA	LnROAA	LnROAA	LnTobin'sQ	LnTobin'sQ	LnTobin'sQ
<i>N</i>	64	128	320	64	128	320
<i>R</i> ²	0.649	0.504	0.566	0.498	0.414	0.351
<i>Adj. R</i> ²	0.519	0.428	0.541	0.312	0.324	0.315
<i>Std. Error</i>	2.173	2.054	1.668	0.157	0.116	0.131
(Constant)	-0.330	-4.232*	5.986**	0.064	0.155	0.123
VAIC						
components:						
LnHCE	-0.192	-0.189*	-0.097	-0.003	-0.006	-0.012*
LnSCE	0.075	0.302**	0.233**	0.028*	0.007	0.001
LnCEE	0.862**	0.714**	0.869**	0.004	0.008	0.027**
Shariah governance variables:						
LnSSBSize	0.076	-1.551**	-0.279	0.049	0.038	-0.011
SSBdominance	2.175*	1.675*	0.743*	-0.084	-0.088*	-0.103**
Corporate governance variables:						
Board Size	0.498	0.776**	0.050	0.000	0.002	0.010
Bindep	0.243	2.367**	0.880*	0.193	0.086	0.021
Duality	-0.007	0.790	0.885	0.715**	0.322**	0.144*
LnAC.Size	-5.217	-5.005**	-0.734	-0.095	0.008	0.014
AcPower	13.370	13.411**	1.212	0.101	-0.060	0.261
Bank-specific variables:						
Op. strategy	-1.050	-0.480	-0.442*	0.001	0.006	0.058**
Risk	0.013	0.004	-0.001	-0.001	0.00	0.001**
LnBankSize	0.203	0.408*	-0.026	-0.011	-0.017	-0.019**
List	0.673	0.522	0.786**	-0.047	-0.100**	-0.097**
Big4	-0.055	-0.158	0.795**	-0.086	-0.006	0.031
Accestd	1.988*	1.302*	0.754**	0.080	-0.017	-0.009
Region	1.236	0.823	0.198	0.172**	0.140**	0.106**

*significant at 5% and ** significant at 1%