

## **Asset Securitization and Risk: Does Bank Type Matter?**

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## **Abstract**

This study is among the first attempts to tests for the relative differences between Islamic and conventional asset securitizations on bases of bank's capitalization and risk (credit risk and liquidity risk) during two evidential crises, financial crisis (2007-2009) and the political crisis (2011-2012). We employ GMM estimation for uniquely constructed data for global asset securitization of commercial banks in 22 countries in the years 2003 to 2012, data of 672 global banks (4889 year-observations). We find that on average, securitized banks are less capitalized but more liquid than non-securitized banks. Islamic banks (IBs) involved in securitization hold higher quality loan portfolios and are more prudent but less liquid than securitizing conventional banks (CBs). We find no relative differences between the two sectors with respect to capitalization. Results are robust during the financial crisis. Additional tests, distinguishes between retained and non-retained interests for asset securitizations to test whether the level of control of the securitizing assets affect banks' risk and capital adequacy. We find that non-retain interests by banks over securitization indicate significantly high prudence by banks however; this is associated with lower liquidity Our results are of importance to both local and international regulators as well as different stakeholders in banks. The bank type does not matters but the relative size of retained interests to the total issuance is that matters because it shows that there is impact on credit risk. Constrained model of IBs do not improve their liquidity though but helped with loan portfolio.

**Keywords:** Securitisation, Islamic banks, Conventional banks, Bank Risk, Capitalization

**JEL Classification:** C23, G01, G21, G28, L50, M41

## **1. Introduction:**

Over the last two decades, securitization has been a key technique for improving bank funding, risk management and performance. However, the financial crisis of 2008 demonstrated that asset securitization created significant financial problems for banks and consequently led to widespread problems in the banking industry. Therefore, it became a crucial contemporary issue in the research of financial institutions and markets to foster the understanding of banks' securitization activities and their impact on bank risk, identifying financial system implications.

Asset securitization is based on converting the promises of future payments into freely transferable securities (Davidson, 2003). This tool enables financial institutions to make non-marketable assets more marketable in their balance sheets and eliminate these assets from their balance sheets (Zöngür, 2010) as well as enlarge the volume of their businesses without the need to raise their equity capital (Alkhan, 2006). In addition, attempts to comply with Basel II capital adequacy guidelines promoted securitization to evolve rapidly as an important tool for improving the liquidity and capital structure of banks<sup>1</sup> (Barbouret al., 1998).

Issuers involved in asset securitization benefited from an improved access to funds at lower borrowing cost and lower capacity constraints (Jobst, 2007; AbdulAziz and Gintzbürger, 2009). They also enjoyed improved market-based valuation of securitized assets with the prospect of an enhanced credit rating. Both the active management of designated asset portfolios as well as the better matching between liability management and cash flows have added to these benefits. This comes alongside the increased competition of financial institutions in traditional credit markets. However, asset securitization brought about the severe subprime crisis, the beginning of the financial crisis, causing a major decline in real estate prices and real losses in subprime mortgages, with the devaluation of structured assets (Kiff and Kisser, 2014). This has been clearly linked to the presence of financial interest-

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<sup>1</sup>Both banks and financing corporations expanded their loan portfolios to offer new loans to lower income groups, accessible to subprime consumers (DeLorenzo, 2007; Totaro, 2009). Bank loans and other financial assets are pooled together into tradable securities, which are sold onto the secondary market. In the United States the market for securitizations counted on two important assets; Asset backed securities (ABS) and Mortgage backed securities (MBS). Both types of debt contracts have played a crucial role in integrating securitization markets. MBS are securities created from the pooling of mortgages, which is then sold to investors. They have been developed by means of government-sponsored agencies (such as the Federal National Mortgage Association, known as Fannie Mae, and the Federal Home Loan Mortgage Corporation or Freddie Mac). The demand for these types of securities grew rapidly for institutional investors who were more willing to invest in credit risk (Bowden and Lorimer, 2009; Campbell et al., 2011; Casu et al. 2011). These types of securities are prohibited in Islamic banks as it involves paying interest and the sale of debt.

based elements for home-financing products which targeted particularly the subprime consumers alongside the dominance of securitization.

Major international conventional banks have been weakened by the 2008 global financial crisis. Since then, there has been much questioning of the effectiveness of such innovative tools (Wilson, 2009). Although Islamic financial institutions have not emerged from the 2008 financial crisis intact, Islamic banks were less adversely affected than their conventional counterparts (Chapra, 2009). It has also been argued that the constraints observed by the Islamic finance system could have provided a potential alternative to the conventional securitized products which contributed to the crisis (Totaro, 2009)<sup>2</sup>.

Islamic banking and finance has grown exponentially over the last 20 years, so much that it is now a notable feature in the global finance of the 21<sup>st</sup> century (Pollard & Samers, 2007). Over 500 Islamic financial institutions (IFIs) are now in existence, with estimated global Islamic banking assets of US\$ 1.3 trillion in 2011 (E&Y, 2012). Many international financial players (such as HSBC, CITI group, Dow Jones, FTSE and S&P) across the globe entered the IBF sector to tap into new markets, and enlarge their client base (Pollard & Samers, 2007).

As Islamic banking markets have been increasingly confronted with the need for innovated financial products and mechanisms that enable Islamic financial institutions to operate on a global scale, IBs have started to actively trade in what is called “Islamic bonds” or *sukuk*<sup>3</sup>. *Sukuk* issuance is referred to as asset securitization in Islamic banking; they have been used interchangeably by Islamic banks (IBs) to refer to the Islamic securitization process. According to Standard and Poor’s, the Islamic securitization market evolved as a new frontier of securitization (Standard and Poor’s, 2008). In its competition with conventional banks and endeavour for liquidity management, many Islamic banks conceived securitization. Whereas the vital characteristic of conventional securitization aims at shifting the risk within an interest-bearing contract, Islamic securitization is an entrepreneurial investment linked with real economic activities within an interest-free structural arrangement

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<sup>2</sup>Islamic finance is based on Shariah principles including the risk-sharing principle, the requirement of business ethical conduct; the provision of credit is primarily for the purchase of real goods and services. These principles also involve restrictions on all of the following; (i) the sale of debt, (ii) short sales, (iii) excessive uncertainty and (iv) prohibitions to sell assets not owned. Islamic finance represents a distinct set of contractual and product structures that aim to achieve equivalent economic benefits as those offered by the conventional financial system.

<sup>3</sup> *Sukuk* are similar in nature to debt certificates and can only be issued on the basis of the revenue which is expected to be generated by an underlying asset, i.e. they are more like equity. According to the AAOIFI Shariah Standards No. 17 (became effective on January 1, 2004) *Sukuk* represents undivided beneficial ownership of tangible assets, or assets of particular projects or special investment activity. *Sukuk* should be tradable and must be owned by investors, and should not represent a debt or receivables.

(Zöngür, 2010; Jobst, 2007). Such a structure of securitization complements the conventional securitization by providing an alternative investment product that suits the demands of a specific category of investors.

Asset securitization has been one of the most active Islamic debt market instruments, and one of the fastest growing industries in Islamic financial markets; it has been growing at a steady pace both in terms of size and number of issuances since the 2000s<sup>4</sup> (Bassens et al. 2013). The global sukuk market reached the USD100bln mark in terms of new issuances in 2013, with total issuances amounting to USD119.7bln as at end-2013 (MIFC, 2014).

The increasing volume of securitization activity in both banking sectors before the financial crisis raised the concerns of researchers, as well as those of investors and regulators over the potential for an increase in bank risk. Proponents of Islamic finance argued that IBs were better shielded than conventional banks (CBs) from the impact of the financial crisis (Chapra, 2008; Ahmed, 2009; Ahmad, 2010) due to the constraints imposed on their securitisation process. Such claims need to be empirically tested both pre and post the financial crises<sup>5</sup>, given that the other counter claims that many Islamic banking products mimic (i.e. Murabahah) their conventional counterparts. In particular, this research investigates whether the constrained IBs' asset securitization structures promoted lower risk and better capitalization during crises as compared to their conventional counterparts. We also examine the impact of the bank control level over the securitized assets on risk, particularly credit risk (Barth et al., 2011).

Some empirical work has been undertaken in providing cross-country evidence on the relative financial stability of CBs and IBs (see Čihák and Hesse, 2010; Abedifar et al. 2012; Beck et al. 2013). Although their tests cover certain aspects of the bank performance including the business model, efficiency and asset quality, none of the studies, to the best of our knowledge, has tested the impact of asset securitizations on bank risk of both banking

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<sup>4</sup>From Malaysia, Sukuk securitization found its way to the Gulf Islamic markets, and was gradually introduced from 2001 onward via sovereign issuances in Bahrain and Qatar, later followed by sovereign and corporate issuances in the UAE and Saudi Arabia (Wilson, 2004). Investment in sukuk has been gaining popularity, not only by Muslim investors, but also by non-Muslim investors who seek to diversify their investment portfolios. However, the sukuk market was withheld briefly during the 2008–2009 crises. This shock itself illustrates the highly globalized nature of Islamic capital markets, as issuers have been suffering from low investment appetites at the time. This dip in sukuk issuance was also related to more 'local' events such as the Dubai debt crisis in 2009 (Bassens et al., 2010).

<sup>5</sup>Allen and Wood (2006) define financial stability as state of affairs in which exogenous shocks are unlikely to occur.

sectors comparatively. This should come as no surprise, given the data requirements and sampling criteria challenges in Islamic banking (Zaher and Hassan, 2001). Therefore, using uniquely constructed hand collected data for global asset securitization; our study updates the existing evidence using global and bank level data. We also extend prior literature by controlling for additional macroeconomic effects and country governance variables.

We focus our tests on banks involved in asset securitization and compares between constrained Islamic asset securitization financing structure (SEC IBs) and CBs involved in asset securitization (SEC CBs). Tests compare the two sectors pre, during and post the financial crisis in 22 countries. Empirical tests employ the two-step GMM estimation for the panel data of 672 global banks (4889 year-observations), and provide the first global empirical evidence on Islamic asset securitization. We use accounting-based information to identify measures which capture each of (a) capitalization (*capital adequacy and equity to total asset ratios*), (b) credit risk (*non-performing loans to gross loans and loan loss reserves to gross loans ratios*) and (c) liquidity management (*liquid assets total deposit and borrowings and net loans to total assets ratios*). The constraints imposed on Islamic Finance product structures as well as the crises period provide a unique setting for our testing for both types of banks; given that bankers are more likely to deviate from accounting standards and regulatory requirements during periods of financial distress (Hofmann, 2012).

Irrespective of the bank type, we find that securitized banks on average are less capitalized (significantly low CAR) but they are more liquid (they give more net loans total assets). Distinguishing between banks, our results show during the whole period that SEC IBs, are on average more prudent (high loan loss reserve to gross loans ratio), hold higher quality of loan portfolio (low non-performing loans to gross loans) however, they are less liquid than SEC CBs. SEC IBs showed consistently lower credit risk but poor liquidity management position during the financial crisis (2007-2009). These findings are consistent with prior studies claims (Chapra, 2008; Ahmed, 2009; Ahmed, 2010) that SEC IBs securitizing assets appear to have a more prudent approach, especially during the financial crisis, as compared with their conventional counterparts (SEC CBs) by holding significantly higher capitalization as a safety cushion, and holding a significantly higher reserves ratio for impaired assets. This implies also that constrained securitization model of IBs does not improve their liquidity position though but only helped with improving their loan portfolio.

Further analyses testing, in line with Barth et al. (2011), for the level of control that a bank holds over securitized assets, non-retained interests, indicate that banks (irrespective of

the bank type) with high retained interests over securitized assets are more prudent<sup>6</sup>. These banks significantly increase the ratio of loan loss reserves to gross loans to mitigate unexpected losses emerging from the loss of control over the underlying securitized assets. Results also report that liquidity position is marginally low for those banks. These results are insensitive when we controlled for IBs. Findings indicates that bank type does not matter when it comes to the level of control over the securitized assets however, the relative size of non-retained interests to the total issuance matters, showing significant impact on the overall bank's credit risk.

The next section discusses the study background followed by hypotheses development in section 3. The methodology and data are covered in sections 4 and 5 respectively followed by the results and conclusion in sections 6 and 7.

## **2. Background:**

### *2.1 Islamic versus Conventional Securitization:*

Conventional asset securitization reflects a flexible structured finance technique of liquidity, which involves risk transfer and the conversions of present or future asset claims of varying maturity and quality into tradable debt securities. In a typical transaction, the originating bank transfers a pool of financial assets with fixed or nearly fixed cash flows to an SPV. This represents a legal entity that in turn finances the purchase through the issuance of securities backed by the pool. These securities must also be grouped in one of the top two ratings as determined by an accredited credit rating agency, and usually pay periodic payments that are similar to coupon payments. (Bowden and Lorimer, 2009).

Conventional securitization has become popular for some reasons, among them are; first, it allowed financial institutions to have a direct and quick alternative to access the capital markets (Leyshon and Thrift, 2007). Second, securitization provides more diversified product portfolios for large institutional investors. Third, securitization enables banks to better satisfy

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<sup>6</sup> Non-retained interests' tests are based on determining whether control of the assets has been transferred to the special purpose vehicle (SPV) (Barth et al., 2011). Retained interest securitization is defined by the case, in which the bank holds the control and did not transfer to SPV, then the assets are deemed to be assets of the securitizing bank and the transaction is treated as a borrowing secured by the assets. If control did transfer, then the assets are deemed to no longer be assets of the securitizing bank, and the portion of the assets not retained by the bank is treated as sold to the SPV. This would refer to non-retained interest securitization.

capital adequacy requirements by Basel II, through a preoccupation transfer of liabilities to become an off-balance item. Hence, banks can circumvent the adequacy capital ratio imposed by Basel, which limited the size of outstanding loans vis-a-vis equity capital (Aalbers et al., 2011).

With the financial crisis in 2008 being originated from the US subprime and extended worldwide, the world had a housing boom which led to financial turmoil in the United States and many other countries (Taylor, 2009). Dissipating of liquidity has been caused by the consecutive contamination of the different classes of financing products in the credit market alongside the freezing of non-government credit markets, such as commercial papers and bonds (Kiff and Kisser, 2010). The inflated capital costs led to the occurrence of the credit crisis and to the failure of financial institutions with poor credit profiles and a weak liquidity position. Both the large injection of money from banks into the mortgage bond market as well as the high volume of lending practices by the mortgage brokers, banks and others accelerated the subprime crisis. This in fact has exposed the global banking system to high vulnerability to both insolvency and credit risks. Economists have asserted that the crisis revealed the weaknesses of conventional finance to mitigate exogenous finance shocks (Parashar and Venkatesh, 2010; Alasrag, 2010).

Rising competition and continuing efforts to provide innovative products have together contributed to a growing interest in Islamic banking. IBs enjoy a higher trust premium in predominantly Muslim countries like Malaysia, Pakistan, Egypt, and the Gulf Cooperation Council (GCC). In principle, Islamic banking differs significantly from conventional finance, given the prohibition both of interest and speculation, in addition to the assumed dominance of the profit and risk sharing principle. These in fact are likely to pose substantial differences with respect to product and activity structures between IBs and CBs. In line with the imperative claims made about the added protection for Islamic finance against excessive risk-taking, the Islamic banking sector attracted more attention during and after the financial crisis. The peculiar nature of IBs that all financial transactions, must be either trade-based or asset-linked in addition to the extra governance layer (Shariah supervisory board), encourage more resilience in the system (Chapra, 2008; Ahmed, 2010). Islamic banking contractual arrangements are likely to bring greater scrutiny and stricter oversight by depositors and investors alike. Hence, Islamic banking does not allow the provision of credit to subprime borrowers (Desai, 2008). On the other hand, it is currently being argued that, in practice, IBs are becoming more like CBs by replacing interest payments with fees and charges (El-Gamal



(2007); Chong and Liu (2009); Khan (2010b) and the prevalence of debt based (rather than equity based) financial instruments. This has been justified by the liquidity problems facing many IBs, given the lack of short-term investment opportunities and quick access to market sources which are available to CBs.

Islamic Sukuk securitization has been one of the innovative techniques recently flourishing in many countries, in an attempt to mimic conventional securitization and overcome liquidity challenges faced by IBs<sup>7</sup> (Kothari, 2008). It also supports the IBs in their intermediation process and reinforces its role in financing development (Khoutem, 2014). The Islamic securitization market indicates that the originators (owners of income-generating assets) do not raise loans in the capital markets, but rather sell underlying assets contracts they have on the balance sheet. Securitization within IBs has seen many positive developments, owing to the adoption of enabling competitions with CBs, meeting bank capital regulations and allowing financial innovation in the Islamic banking industry. Islamic securitization is based on transforming risk sharing between borrowers and lenders in Islamic finance into the market-based refinancing of one or more underlying Islamic finance transactions. This involves an originator selling existing or future revenues from lease receivables, profit sharing contracts or private equity from a portfolio of acceptable assets to a special purpose vehicle (SPV). This entity refinances itself by issuing unsecured securities to market investors (Jobst, 2007). Those investors assume the role of collective financier, whose entrepreneurial investment does not involve guaranteed, interest-based earnings.

Islamic securitization is based on specific principles, which include the identification of the real purpose behind raising funds and the type of collateral assets used, which must not be debt, cash or involving any sinful activity. Participants involved in the transactions must have a share in both the risk and return (Jobst, 2007). The securitization structure should provide investors a compensation for business risk involved in securitized assets; however, this should not imply an exchange of debt for interest generating investment returns. Still, investors should not hold a conditional or secured payment obligation (there must not be a guaranteed promissory note) but instead, a sufficient element of ownership must be clarified

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<sup>7</sup> Islamic banking markets have been characterized as being relatively young and illiquid. Islamic bankers and regulators have therefore actively been looking for mechanisms to build more active trading and integrated markets. Similar to conventional banking markets, disintermediation through securitization offers IBs with cheaper finance and longer maturity terms than loans contracts. The demand for Islamic securitization has been growing tremendously for several reasons (Bassens et al., 2013) including the pressing need for investment products that improve liquidity management.

to investors. An additional key element in these types of Sukuk is the promise or the guarantee provided by the originator to purchase the asset back at par value or market value, either at maturity or in the case of early termination. This represents a similar arrangement like the conventional unsecured bond with no recourse for investors to the asset, and rates the instruments according to the obligor's credit worthiness (Mohd Noor, 2008; Howlader 2009). Such an arrangement renders Sukuk similar to conventional bonds in their risk-return profile (Dar, 2012). The scrutiny of securitized collateral is more complicated when there is a requirement for Shariah compliance of assets.

Comparative studies between IBs and CBs provide mixed results. While Yudistira (2003) find that IBs suffered from inefficiencies during 1998-1999, Iqbal (2001), Hussein (2004) and Siddiqui (2008) found that IBs outperformed their conventional counterparts using different performance measures and different research methodologies. This was clearer during the recent global financial crisis of 2008 (Khamis et al., 2010; Hassan and Dridi, 2010). On the other hand, Čihák and Hesse, (2010) report that small IBs tend to be financially stronger than small commercial banks, while large commercial banks tend to be financially stronger than large IBs. They also show that small IBs tend to be financially stronger than large IBs. Abedifar et al. (2012) find no significant difference between the two banking sectors, with respect to the insolvency risk. Their finding on credit risk is mixed, varying according to which proxy for credit risk is used. Beck et al. (2013) show insignificant differences between IBs and CBs in their business orientation. However, they find that IBs are less cost-effective, but have a higher intermediation ratio, higher asset quality and are better capitalized. They find no significant evidence for the financial stability of both IBs and CBs during the recent financial crisis.

## *2.2 Bank Capitalization and Risk:*

Banks' capitalization and capital adequacy have received particular attention from many international regulators, specifically Basel capital adequacy ratio (CAR) as a crucial regulatory control, which can be used to scrutinize a bank's financial health (Mili et al. 2014). The CAR represents a measure of the amount of capital that a bank must hold. It is expressed as a percentage of the bank's capital to the total risk weighted assets. In line with, Sinkey (1989) CAR can be used by regulators to assess a bank's "safety and soundness". This is because capital represents a safety margin that is used to absorb potential losses.

The legal requirement of maintaining capital adequacy has started to emerge in the early 1980s, with the expansion of bank lending and the need to hold minimum capital to protect a

depositor's funds. Minimum capital requirements have been strictly identified by regulators, particularly after several economic downturns and attempts to dampen the procyclicality of the minimum capital requirement were reflected by the Basel Committee on Banking Supervision (BCBS) through the issuance of Basel I in 1988. Well capitalized banks are required to hold more capital, in excess of the minimum required, to meet prudential regulation and to avoid regulatory capital shortfalls (Gambacorta and Mistrulli, 2004). Under this framework, adequately capitalized banks must maintain a minimum ratio of 4% of Tier 1 capital and 8% of total capital (Lobo & Yang, 2001)<sup>9</sup>.

In banking literature (Flannery and Rangan, 2008; Fonseca and González, 2010), banks may hold capital beyond the minimum legally required levels to respond to the market discipline. As bank liabilities are not totally insured and investors should be secured for this higher bank risk, a bank may increase its capital to reduce bank risks and hence, minimizes the cost of deposits.

Prior studies have been conducted on bank capitalization and capital structure in attempts to identify the determinants of capital, and the impact on a bank's overall financial health (Chu et al., 2007; Fonseca and González, 2010; Buch and Prieto, 2014; Ebrahim et al., 2014). Chu et al. (2007) find that banks with a low level of capitalization reduce their lending commitments, particularly after the introduction of the Basle Accord. Fonseca and González (2010) report that capital buffers are positively related to the bank market power. They find that high scrutiny over banks' capitalization and better accounting disclosure have a positive impact on capital buffers, due to strengthening market discipline as well as reducing risk-taking incentives. Buch and Prieto (2014) analysed the link between the capitalization of the banking sector and bank loans using co-integration models for the German economy, and found that high bank capital is associated with higher business loan volume. Ebrahim et al. (2014) found that Malaysian firms amended capital structure during the financial crisis, and

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<sup>8</sup> Under the early adoption of Basel I, loan loss reserves used to be categorized as part of the primary capital. In 1990, the capital adequacy framework was revised to risk-based capital requirements, and all banks were required to maintain a minimum total capital corresponding to 8% of risk weighted assets (RWA) (Ahmed, Takeda, & Thomas, 1999). Total capital consists of Tier 1 and Tier 2 capital. Tier 1 capital is an equity measure of capital. It is referred to as core capital, and comprises the sum of book value of equity, qualifying noncumulative perpetual preferred stock and minority interests in equity accounts of subsidiaries, less goodwill and other intangible assets. Tier 2 capital reflects supplementary capital, and consists of loan loss reserves up to a certain limit, perpetual preferred stock, hybrid capital instruments, and perpetual debt, mandatory convertible debt securities, terms subordinated debt, and intermediated preferred stocks.

<sup>9</sup> Tier 2 must not exceed the amount of Tier 1. This system therefore requires at least 50% of total capital to be supplied by Tier 1 capital.

that patronised firms reduced debt quicker than non-connected firms, while this difference for patronised firms dissipated in the recovery period.

In theory, capital requirements have stabilizing effects, based on the option-pricing model (Furlong and Keeley, 1989; Episcopos, 2008). Accordingly, proper capitalization and meeting capital requirements can strengthen the stability of the banking system. According to Koehn and Santomero (1980) and Kim and Santomero (1988), a forced reduction in leverage would translate into reduced expected returns, which might drive banks to undertake risky investments to try to increase returns. Therefore, increased bank risk offsets the increase in capital, leading to a greater default probability (Fonseca and González, 2010).

Accordingly, capital requirements counteract banks' risks like credit risk; this is because risk-shifting incentives are exacerbated by the maintenance of regulatory capital ratios. An increase in a bank's credit risk indicates that the total value of its risk-adjusted assets is increased; this indicates that consequently a bank will have to issue additional equity, or even undertake other costly actions to comply with minimum capital requirements (Chu et al., 2007).

### **3. Related Literature and Hypotheses Development:**

The purpose of this paper is to assess capitalization and risk of a global sample of both Islamic and conventional banks involved in asset securitization, given the significant differences in the structures of their securitisation models.

Several issues drive predictions that SEC IBs are likely to be different from SEC CBs. One of the most essential features between Islamic and conventional securitizations lies within the 'true sale' requirement for Islamic securitization. This indicates that sale of the originator's asset must fulfil all accounting and legal requirements to remove the asset from the originator's books (Dusuki and Mokhtar, 2008). An additional major difference between Islamic and conventional finance system is presented by the relationship between an IB and its customer which is required to be backed by the nature of the contract and a real economic activities, (asset backing model) (Jobst, 2007). Islamic securitization is constrained through direct linking to existing asset and economic activity. Hence, securitization of debt is prohibited according to Shariah. In terms of income generation, conventional securitizations render income from the financial rights of obligations linked to the debt while income under Islamic securitization is derived directly from the cash flow of the asset being securitized (AbdulAziz and Gintzburger, 2009).

First, one of the most essential features of securitization in Islam is the ‘true sale’ requirement which indicates that sale of the originator’s asset must fulfil all accounting and legal requirements to remove the asset from the originator’s books (Dusuki and Mokhtar, 2010). This ideally is expected to control the whole securitization process and to meet the bankruptcy-remoteness requirement and hence, influence the credit risk exposure and liquidity management in IBs. Second, Shariah primarily prohibits finance arbitrage in transactions through requiring a clear link between assets and securitization transactions (Bashir, 1999). Second, IBs are said to have restricted access to market sources to meet liquidity requirements which are relatively more expensive due to the Shariah compliance condition. IBs primarily rely on Sukuk as a permissible tool in their liquidity management. Finally, compliance with Basel II requirements for capitalization by IBs since December 2005 implies that the composition of eligible capital and Risk weighted assets is strictly determined by the nature of the market and credit risk for IBs (IFSB, 2005)<sup>10</sup>. With the relative short history of Islamic banking in asset securitization and the small niche in many countries for sukuk issuance, SEC IBs are expected to be better capitalised than SEC CBs. This is attributable to their limited access to market resources to cover unexpected losses and their needs to protect investment account holders and depositors’ wealth alongside the need to comply with strict capital adequacy requirements of Basel II. SEC IBs are likely to be even more capitalized than NON-SEC IBs<sup>11</sup>. Prior literature comparing IBs and CBs provide evidence that IBs are better capitalized than CBs (Beck et al., 2013). Iqbal (2001) finds that IBs are well capitalized and make effective use of the resources at their disposal. In addition, Ariss (2010) argues that IBs are better capitalized and hold significantly higher equity to assets ratios than CBs. It is argued that adequate capital ratios are significant determinants of the financial stability of banks.

In terms of asset quality, IBs are predominantly viewed as risk-averse institutions (Mills and Presley, 1999; Zaher and Hassan, 2001; Iqbal and Molyneux, 2005) and are likely to entail lower credit risk, and thus to deliver better asset quality than CBs. This may be attributable to the added corporate governance layer of the Shariah Supervisory Board (SSB)

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<sup>10</sup>The capital adequacy standard for IBs addresses the different risks faced by this sector, and assigns a different set of risk weights to different Islamic financing modes.

<sup>11</sup>Large banks are likely exploit more finance arbitrage transactions such as securitizations or rephrase agreements than small banks, which might cause less diversified portfolios. Well capitalized banks are likely to have access to cheaper and less risky sources of funds (Bourke, 1989).

in this banking sector. The restricted contractual arrangements and the rigorous governance supervision are associated with lower risk in IBs and lower adverse selection/moral hazards (Iqbal and Molyneux, 2005; Beck et al., 2013). Khan (2010a) finds that IBs in Pakistan during the recent crisis had a higher deposit base and lower credit defaults. In addition, Abedifar et al. (2012), find that IBs are characterized by lower credit risk than CBs, particularly for IBs operating in countries with a population having a high concentration of Muslims. SEC IBs are expected to be prudent in mitigating credit risk given their subjection to greater market and regulatory scrutiny particularly, as new entrants in asset securitization markets. Managing liquidity is more challenging in IBs than CBs given the limited capacity of IBs to attract Shariah compliant instruments (Hasan and Dridi, 2010). Olson and Zoubi (2008) indicate that IBs recently operate within new and unfamiliar structures of finance, which tend to cause long-term liquidity challenges. Islam and Chowdhury (2009) find that IBs showed comparatively weak liquidity management than CBs. The infrastructure and constrained tools for liquidity risk management for Islamic asset securitization is in its infancy in many jurisdictions and sukuk issuance for IBs might not be the magic tool for resolving liquidity challenge for this particular banking sector.

Therefore, we conjecture that the constrained model of Islamic securitization exposes the bank to better capitalization, higher asset quality however lower liquidity. These effects are likely to be more amplified during periods of financial distress. This leads to the development of the first hypotheses:

*H1: SEC IBs are more capitalized and less risky than SEC CBs.*

Previous studies of the impact of securitization on banks' risk before the financial crisis find a positive link. In spite of enabling banks to convert illiquid assets into liquid funds, it has been argued that securitization is likely to increase the expansion of credit and cause banks to hold riskier assets. Existing conventional banking literature on the former issue shows that securitization impairs a bank's financial condition and increases risk (Calomiris and Mason 2004; Cebenoyan and Strahan 2004; Loutskina and Strahan 2006; Purnanandam 2009; Casu et al. 2011). Dionne and Harchaoui (2003) find a positive association between securitization and bank credit risk. Franke and Krahnen (2005) and Haensel and Krahnen (2007) report that collateralized debt obligations increase the systematic risk of the issuing bank. Dell'Ariccia et al. (2009), Mian and Sufi (2009), and Keys et al. (2010) suggests that banks securitized their worst mortgage loans to pass on their credit risks to new investors. In line with Cantor and Rouyer (2000), credit risk for the issuer improves if the riskiness of the

securities sold to investors is higher than that of the issuer prior to the securitization. However, it might be the case that the transaction intensifies the issuer's net exposure to the default risk of its assets. Affinito and Tagliaferri (2010) find that securitization allows the bank to decrease the weight of bad loans to operate with lower capital, or to invest the capital into new businesses. Also, Cebenoyan and Strahan (2004) find evidence to suggest that securitization reduces bank risk, but banks use the achieved risk reduction to undertake new risks. Purnanandam (2009) suggests that banks use the proceeds from securitizations to issue new loans with higher-than-average default risk. In terms of profitability and returns, as securitization provides banks with an additional source of loan financing and liquidity, banks are likely to be motivated to shift their portfolios toward higher risk to obtain higher return assets (Cebenoyan and Strahan 2004; Purnanandam 2009). However, issuing banks will still retain the first-loss of contractual interests in order to provide implicit recourse in securitizations. This indicates that the risks inherent in the securitized assets have not been fully transferred to investors and are, in effect, still held by the issuing bank, but off-balance sheet (Calomiris and Mason 2004; Higgins and Mason 2004; Niu and Richardson 2006; Chen, Liu, and Ryan 2008; Vermilyea, Webb, and Kish 2008). Accordingly, these studies find that banks securitize their riskier loans while retaining safer ones on their balance sheets. They also suggest that the risk remains with the banks through contractual arrangements. This also indicates a positive association between securitization and risk, with a negative association between securitization and financial stability.

*H2: Irrespective of the bank type, retained interest asset securitization is positively associated with capitalization and negatively associated with risk,*

#### **4. Methodology:**

For the assessment of bank capitalization and risk within the banking industry we follow Fonseca and González (2010), Wintokiet al. (2012) and Flannery and Hankins (2013), employing use a two-step generalized method of moments (GMM) estimator, developed for dynamic models of panel data to examine the impact of bank asset securitization on the financial stability of both IBs and CBs. This model is developed by Arellano and Bond (1991) and has been modified by Arellano and Bover (1995), and Blundell and Bond (1998). The model incorporates both difference GMM and system GMM. The in-difference GMM takes the first-difference equation to eliminate the country-specific effects, through using lagged level of dependent variable as instruments. To overcome the problem of weak instruments, Arellano and Bover (1995) and Blundell and Bond (1998) developed system

GMM to combine the level regression and difference equations, using lagged differences as instruments. Therefore, this two-step estimator functions efficiently to control for: (1) time-invariant fixed effects, which we eliminate by taking first-differences of all variables; (2) the autoregressive process in the data for each financial performance indicator. We include lagged dependent variables model to capture the dynamic nature of these variables; and (3) the potential presence of endogeneity of the explanatory variables, using instrumental variables based on three period lagged values of the explanatory variables (Blundell and Bond, 1998). We checked the model specification using Sargan test for over-identifying restrictions.

Using GMM estimations, 6 models are specified and separately estimated as indicators of capitalization and risk. We use asset securitization activity to as an indicator for asset securitization (Casu et al., 2011). This variable is defined as the total amount of securitization issue scaled by the contemporaneous total assets. Non-retained interest is the portion of the securitized assets the bank treats as sold to the SPV. This variable is scaled by the bank's total asset securitization issuance at time  $t$ . (Barth et al., 2011).

The test variables are likely to depict the general financial health of financial institutions. A bank capital adequacy indicates a measure of the amount of capital that a bank must hold. This is measured using two indicators consistent with Demirgüç-Kunt and Huizinga (2010) and Beck et al. (2013). The first measure is the capital adequacy ratio (CAR), which is calculated as  $(\text{Tier 1} + \text{Tier 2})/\text{total Risk weighted assets}$ . CAR reflects the legal regulatory requirements for capitalization that measures adequacy level and buffers maintained (Fonseca and González, 2010; Buch and Prieto, 2014; Ebrahim et al., 2014). The second is the ratio of the equity capital to total assets. This ratio reflects banks' response to moral hazard, as well as the monitoring incentives (Diamond, 1984). This variable is used to examine whether the relationship between equity capital and risk varies between banks, IBs and CBs in general, and between those which are involved in securitisation (SEC IBs and SEC CBs). We also include equity to total assets as an independent variable in both the credit risk and insolvency models to control for leverage. With respect to credit risk, we used to account for the extent of non-performing assets in the portfolios of the banks and the extent of damage of this asset class on financial performance. Both loan loss reserves to gross loans and non-performing loans to gross loans ratios are used to measure asset quality (credit risk) (Gonzalez et al.,



2005; Lepetit et al., 2008; Abedifar et al., 2013; Beck et al., 2013)<sup>12</sup>. The loan loss reserve represents an estimate of credit losses inherent in a bank's loan portfolio. The liquidity indicator reflects a bank's ability to repay short-term obligations. We use the liquid assets to total deposits and borrowings ratio, as well as the net loans to total assets ratio to measure bank liquidity management (Beck et al., 2013).

Accordingly, our main model is developed as follows:

$$FS_{i,t} = \beta_0 + \beta_1 FS_{i,t-1} + \beta_2 SEC_{i,t} + \beta_3 BK_i + \beta_4 \text{LogTA}_{i,t} + \beta_5 SIZE_{i,t} + \beta_7 AGE_{i,t} + \beta_8 NON\_INT_{i,t} + \beta_9 MACRO_{i,j,t} + \epsilon_{i,t} \quad (2)$$

$FS_{i,t}$  = A set of financial stability indicators using the CAMEL framework for bank i in time t.

$FS_{i,t-1}$  = The first lag of the dependent variable to capture partial adjustments in bank financial stability,

$SEC_{i,t}$  = asset securitization activity measured as the total securitization for bank i at time t issuance deflated by total assets at time t.

$BK_i$  = Dummy variable equal 1 for an IB and 0 for CB.

$Crisis_t$  = Time dummy variable equal 1 for the period 2008 to 2009, 0 otherwise.

$Size_{i,t}$  = Natural logarithm of the total bank assets for bank i at time t.

$AGE_{i,t}$  = Age of bank i at time t since the year of its establishment,

$NON\_INT_{i,t}$  = Total Non-Interest Operating Income for bank i at time t,

$MACRO_{i,j,t}$  = A set of Country level macroeconomic variables for country j at time t,

$\epsilon_{i,t}$  = White-noise error term.

We control for size using the natural logarithm of total bank assets. This control accounts for big banks that might have smaller capital buffers and hence, are more risky, which according to the “too-big-to-fail” hypothesis suggests that large banks will receive support from the regulators during financial distress, or when they have lower risk as a consequence of the enhanced diversification of their asset portfolio (Olson and Zoubi, 2008; Parashar and Venkatesh, 2010; Fonseca and González, 2010; Abedifar et al., 2013; Beck et al., 2013). We control for the age of the bank as proxy for the bank's capability and informational

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<sup>12</sup> Non-performing loans are defined as loans in the bank's portfolio overdue for more than 90 days on interest or principal payments. They are disclosed as supplemental financial statement information (Wahlen, 1994).

advantages to control for risks (DeYoung and Hasan, 1998). We also consider the bank's non-interest income as an indicator for the bank inefficiency. An increase in the share of non-interest income in total operating income is expected to lower bank financial performance and stability, since an increased reliance on non-interest income raises the volatility of bank loan portfolios without a direct link to increased profits (DeYoung and Roland, 2001; Stiroh 2010). Banks with a high share of non-operating income have high insolvency risk (Lepetit et al., 2008).

We control for a set of macroeconomic variables including market power through a proxy for the market share of deposits measures, as the total banks deposits over total banking sector deposits (Berger, 1995; Hasan et al., 2013). We also control for country governance factors including the rule of law and regulatory quality as intuitional measures for the both the enforcement mechanisms and legal systems (La Porta et al. 1997; Djankov et al., 2007; Fang et al. 2014). The country's prevailing inflation rate is included, and the growth in the prosperity of the population is also controlled for by including the growth in GDP per capita (Fang et al. 2014; Mili et al. 2014). According to Demirgüç-Kunt and Detragiache (1998) bank crises are more prevalent in countries having low GDP growth, high real interest rates and high inflation rates. In periods with high economic growth, demands on loans and financial services provided by both IBs and CBs are likely to increase. This is expected to increase bank cash flow, interest earnings and profits. As our study period falls within the crisis, we predict the growth variable, GDP to be a negative determinant of bank performance (Subramanian et al., 2013). Regarding the inflation variable, in conventional banking high inflation rates should lead to higher loan rates which in turns would lead to higher revenues (Bashir, 2000; Haron, 2004). As for IBs, inflation is likely to be positively associated with performance only, if a large portion of IBs profits accrues from debt-based contracts (i.e. Murabaha) (Subramanian et al., 2013). In our study, with the assumption that Islamic banking is currently mostly based on debt rather than equity-based contracts, we expect inflation to have a positive effect on IB performance. In addition, because IBs are prohibited from charging fixed interest rates, profitability is likely to be positively associated with the domestic inflation rate.

## **5. Data:**

Bank-level data collected from “Bankscope” and the “Banker” databases. Country-level variables and macroeconomic data are collected from the World Bank and IMF websites. Our

unique comprehensive asset securitization data set is hand collected from securities' prospectuses and banks' annual reports. For IBs additional data sources included IFIS and Zawya.

We use an unbalanced panel data set and a country variable criterion, reflecting countries with at least four banks, and we also include banks with at least two observations (Beck et al., 2013)<sup>13</sup>. Drawing on prior literature (Dusuki and Mokhtar, 2008; AAOIFI, 2008; Casu et al. 2011; Campbell et al., 2011), we restricted the definition of asset securitization to represent banks involved only in a first-year issuance, either through SPV or the bank itself, for asset securitization (sukuk or conventional securities) backed by underlying assets. We find that sukuk issuance is referred to as asset securitization in Islamic banking, and IBs usually use the two terms interchangeably to report about their securitization process. Additional criteria for Islamic securitization include a non-conditional sukuk asset structure that involves a separate issuance at market price (AAOIFI, 2008).

Islamic asset securitization categories include (a) equity-based sukuk (profit-sharing arrangements) such as Mudaraba, Musharaka; (b) asset-based reflecting sukuk bonds backed by lease backs (e.g. Ijara); and (c) debt-based sukuk such as Murabaha. Conventional securitization categories include ABS (financial security backed by a home equity loans, auto loans, lease or receivables against assets other than real estate) and mortgage-backed securities. MBS include asset-backed security that is secured by a mortgage or collection of pooled mortgages.

The study sample comprises 4889 bank-year observations (672 banks) for both listed and unlisted banks, operating in 22 countries over the sample period from 2003-2012. IBs represents 136 banks (865 year-observations) while CBs banks reflects 536 banks (4024 year-observations). Total banks involved in asset securitizations counts for 4287 year-observations (82 banks). IBs involved in securitization, from the three main categories (Equity-based, debt based, asset based), counts for 64 bank-year observation. CBs securitizing assets, through two categories of ABS and MBS, counts for 223 year-observations. Total retained interests' observations for both IBs and CBs counts for 225 year –observations (56 banks).

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<sup>13</sup>Based on this sample identification process, our final sample includes banks operating within 22 countries, including Algeria, Bangladesh, Brunei, Mauritania, Iraq, Jordan, Kuwait, Bahrain, Egypt Lebanon, Malaysia, Mauritania, Pakistan, Palestine, Qatar, Saudi Arabia, Syria, Tunisia, United Arab Emirates, Turkey, United kingdom and Yemen.

## **6. Results:**

### **6.1 DESCRIPTIVE RESULTS:**

Variable definitions are presented in Table 1. Table 2 reports the sample composition by country and bank type. According to this table, we find that banks with SEC represent 14% of the total sample composition. For IBs, the highest concentration of SEC banks is located in Malaysia, UAE, and Bahrain while for CBs the highest concentration of SEC banks is located in the UK, Turkey and Egypt. Table 3 presents descriptive statistics for the pooled sample. Table 4 shows statistics for banks involved in asset securitization, both SEC IBs sub-sample (Panel A) and SEC CBs sub-sample (Panel B). SEC IBs appear to be more adequately capitalized than SEC CBs, with higher average for both CAR and EtoTA CBs. Ratios for asset quality indicate poorer quality for SEC IBs as compared to SEC CBs, implying higher credit risk though the results show more prudence by SEC IBs holding more loan loss reserves to gross loans as a safety cushion against expected risk. SEC IBs report a higher average of operational efficiency than SEC CBs; with lower means for both the costs to income ratio and overheads to total assets ratio. Comparison on the basis of earnings ability shows that SEC IBs have higher ROAA and higher ROAE, on average, than SEC CBs. SEC IBs report higher liquidity management with higher mean (median) for the liquid assets/total deposits and borrowing ratio as well as higher net loans to total assets ratio than SEC CBs. On average, SEC IBs are smaller in size, younger and appear to be less vulnerable to insolvency risk (lower mean for non-interest income) as compared to SEC CBs.

### **6.2 REGRESION ANALYSES:**

Irrespective of the bank type, we find that securitized banks on average are less capitalized (significantly low CAR) but they are more liquid (they give more net loans total assets). Distinguishing between banks, our results show during the whole period that SEC IBs, are on average more prudent (high loan loss reserve to gross loans ratio), hold higher quality of loan portfolio (low non-performing loans to gross loans) however, they are less liquid than SEC CBs. SEC IBs showed consistently lower credit risk but poor liquidity management position

during the financial crisis (2007-2009). These findings are consistent with prior studies claims (Chapra, 2008; Ahmed, 2009; Ahmed, 2010) that SEC IBs securitizing assets appear to have a more prudent approach, especially during the financial crisis, as compared with their conventional counterparts (SEC CBs) by holding significantly higher capitalization as a safety cushion, and holding a significantly higher reserves ratio for impaired assets. However, tests during the political crisis period (2011-2012) report that SEC IBs showed it's worsen credit risk and liquidity positions in spite of being significantly better capitalized. Further analyses testing, in line with Bart et al. (2011), for the level of control that a bank holds over securitized assets, retained interests, indicate that banks (irrespective of the bank type) with high retained interests over securitized assets are better capitalized, involves lower credit risk and high liquidity<sup>14</sup>.

Results in Table (5) report that, consistent with prediction, banks that are involved in securitizations on average are more risky with high insolvency risk (negative log Z-score), as compared with banks that are not involved with securitisation. These results holds irrespective of the bank type (IBs or CBs) throughout the period of 2003-2012. During the financial crisis (2008-2009), in Table (6) banks (irrespective of bank type) involved in securitizations consistently showed lower financial stability, on average, due to both high liquidity (less liquid) and insolvency (less solvent) risks. However, these banks showed significantly high operational efficiency. These results extend and confirm previous literature suggesting that asset securitizations tend to impair banks' long term financial stability in general terms and particularly during periods of financial stress. Even with the assumptions that asset securitization should promote better liquidity management for banks (irrespective of type), banks still suffer, on average, from high probability to defaults due to high insolvency risk and that asset securitization has not offered the magic technique to rescue banks from exposure to insolvency risk. Our results are consistent with Haensel and Krahnen

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<sup>14</sup> Retained interests' tests are based on determining whether control of the assets has been transferred to the special purpose vehicle (SPV) (Barth et al., 2011). Retained interest securitization is defined by the case, in which the bank holds the control and did not transfer to SPV, then the assets are deemed to be assets of the securitizing bank and the transaction is treated as a borrowing secured by the assets. If control did transfer, then the assets are deemed to no longer be assets of the securitizing bank, and the portion of the assets not retained by the bank is treated as sold to the SPV. This would refer to non-retained interest securitization.

(2007) and Purnanandam (2009) which find evidence that securitization increases the systematic risk and default risk of the issuing bank.

Tests examining the impact of asset securitization within a specific banking sector (SEC IBs versus NON-SEC IBs) in Table (7) show that Islamic banks involved in securitisation (SEC IBs) are, on average, less capitalized, marginally less profitable and more insolvent than Islamic banks which are not involved in securitisation (NON-SEC IBs). These results indicate, consistent with expectations the increased risk exposure for IBs when they get involved in securitisation. Systematic differences between SEC IBs and NON-SEC IBs are plausible. The equity to total asset ratio is 2.8% point lower for SEC IBs. Further, SEC IBs report 1.9% points and 0.18% points lower than NON-SEC IBs for ROAA ratio and log Z-score, respectively. These results indicate that Islamic disintermediation through securitization seems to provide SEC IBs with an expensive source of finance that is not resolving for capitalization and liquidity management issues.

Tests within the financial crisis, in Table (8) show that SEC IBs had lower operational efficiency and consistently low profitability as compared with NON SEC IBs. However, SEC IBs reported marginally better asset quality (lower non-performing loans to gross loans) which tends to imply that those banks managed to pass some of the risk to investors through securitisation. These results confirm, Dell’Ariccia et al. (2009), Mian and Sufi (2009), and Keys et al. (2010), argument that banks securitize their worst mortgage loans to mitigate credit risk. In line with Cantor and Rouyer (2000), credit risk for the issuer improves if the riskiness of the securities sold to investors is high.

Moving to conventional banks, results confirm, in Table (9) that conventional banks involved in securitisation (SEC CBs) are more operationally efficient , on average, than conventional banks which are not involved in securitisation (NON SEC CBs). This could be explained by the argument that conventional securitization allows banks to convert non-marketable assets to become more marketable and hence, enlarge the volume of their business without the need to raise their equity capital which improves access to funds at lower borrowing cost (Alkhan, 2006). It also enable banks to build more diversified product portfolios (Aalbers et al., 2011). and benefit from economies of scale (Loutskina, 2011).

During the financial crisis, in Table (10), SEC CBs showed consistently high operational efficiency but were less liquid and had high insolvency risk, hence less stable (more risky) as compared NON SEC CBs. Tests within the banking sectors conforms to prior findings

(Calomiris and Mason 2004; Cebenoyan and Strahan 2004; Loutskina and Strahan 2006; Casu et al. 2011) implying that asset securitization worsen banks' financial conditions.

In Table (11), by examining the impact of securitization on financial stability between the two banking sectors, we find, consistent with expectations, that SEC IBs are more financially stability stable than SEC CBs on average. SEC IBs report significantly better capitalization (16.7 % points higher for equity to total assets) and higher asset quality (60.4% and 53.7% points lower for non-performing loans to gross loans and loan loss reserves to gross loans ratios respectively) than SEC CBs. This implies that SEC IBs through their constrained model of securitisation still can manage to preserve better loan portfolios with lower rates of defaults than CBs involved in securitizations. These results are consistent with predictions. However, SEC IBs are relatively less efficient (32.3% points higher for overhead to total assets) and less profitable (15.1% and 51.8% points lower ROAA and ROAE) than SEC CBs. We explain these results by the absence of some types of financial instruments related to conventional asset securitization (such as hedging or the use of derivatives) in IBs due to their Shariah non-compliance. Complying with Shariah rules requiring the linkage of securitised assets to real economy imposes additional constraints on SEC IBs' assets class and hence lower relative profitability.

In Table (12), interacting the financial crisis time variable with banks involved in securitisation from each type (SEC IBs\*crisis versus SEC CBs\*crisis), indicate that SEC IB within the financial crisis period consistently show higher capitalization and higher asset quality (having lower non-performing loans to gross loans ratio) than SEC CBs. However, SEC IBs report significantly high loan loss reserves to gross loan. The empirical results support the argument that SEC IBs, which issued the constrained version of securitisation, were more successful, during the financial crisis, in managing their credit risk (significantly lower non-performing loans to gross loans) as compared with their conventional counterparts. In addition, the results also indicate a relatively more prudent approach (Siddiqi, 2008) of IBs SEC in protecting their depositors and investors from risk exposure, during the financial crisis. SEC IBs held significantly larger buffers (significantly higher capitalization and significantly higher ratio of loan loss reserves to gross loans) to meet expected losses from asset impairment, during the crisis, as compared with SEC CBs. However, during the financial crisis, SEC IBs exhibit lower efficiency and lower profitability than SEC CBs. We attribute these results to the additional Shariah screening factors imposed on the Islamic banking activities (Beck et al., 2013) generally and the securitization process specifically.

The additional costs resulting from the Islamic securitisation constraints lead to lower efficiency and hence less profitability as they do not benefit from the economies of scale for trading widely and freely in securitization as compared to their conventional peers. However a more prudent approach by SEC IBs through higher capitalisation and loan loss reserves ratios helped IBs to escape the financial crisis shock. Overall results indicate that SEC IBs have a unique risk profile as compared to both NON-SEC IBs and SEC CBs. Even with the additional constraints currently imposed on Islamic securitization structures, this sector significantly show improved financial stability during the 2008 global financial crisis, they were more resilient, but less efficient and less profitable, as compared to conventional counterpart.

## **7. Conclusion:**

This is the first study to compare the impact of securitisation on the relative financial stability of a global sample of both IBs and CBs, using the CAMEL rating framework. Our cross-country evidence shows that consistent with predictions, banks which are involved in securitizations (irrespective of the bank type) are, on average throughout the whole period (2003-2012), and during the financial crisis (2008-2009) more risky (less stable). Comparing the two bank types within the group of banks which are involved in asset securitisation (SEC IBs versus SEC CBs), we find that SEC IBs are, on average, better capitalized and hold higher asset quality but less efficient and less profitable than SEC CBs. These results are also confirmed during the global financial crisis of 2008. Our findings are consistent with prior studies' arguments (Chapra, 2008; Ahmed, 2009; Ahmad, 2010) that SEC IBs securitizing assets appear to have a more prudent approach, especially during the financial crisis, as compared with their conventional counterparts (SEC CBs) by holding significantly higher capitalization as a safety cushion, and holding a significantly higher reserves ratio for impaired assets. The lower efficiency could be explained by the limited market concentration of Islamic asset securitization in many countries. This may indicate that IBs do not benefit from high economies of scale to control the excessive costs of gathering and processing of information about permissible securitization activities and funding sources (Jobst, 2007; AbdulAziz and Gintzbürger, 2009; Loutskina, 2011).

Our results give rise to a number of policy implications pertaining to capitalization and risks for banks involved in securitisation, which are of importance to both local and international regulators as well as different stakeholders in both types of banks. It is recommended that banks hold adequate capital levels as a safety cushion to protect depositors



and investors' money from financial shocks. On the other hand, in spite of IBs relatively higher resilience during the 2008 global financial crisis, in terms of capital adequacy and asset quality, this category of banks is still reporting poor management capability (less efficiency), with high costs to total assets ratio, as compared with CBs. Results imply that efficiency is one of the key challenges that face the Islamic banking industry which raises concerns about whether IBs inefficiencies are attributable to the poor expertise of Islamic bankers in managing bank operations or it is more linked to IBs' complex financing system or to the more prudent (holding higher capital and reserves ratios) approach observed by this type of banks. We also argue that several challenges exist for the development of Islamic securitization: this involves issues related to the lack of clear legal frameworks and accounting standards for structured finance and asset based securitization.. Shariah-compliance represents one of the main challenges for Islamic securitization, with the need to maintain a direct linkage between identifiable assets and sukuk issuance. In addition, there must be a clear identification for the reference assets that meet Shariah requirements and being securitized, to ensure that they are permissible. At the same time this asset must provide attractive returns to their comparable conventional contracts. The scrutiny of securitized collateral is more complicated when there is a requirement for Shariah compliance of assets. Therefore, we suggest that IB operating under asset securitization arrangements should allocate additional efforts and develop expertise to capture good investment opportunities and less risky sukuk arrangements that permit comparable rate of returns and economies of scale to that provided by their conventional counterparts.

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**Table 1 Definition and Descriptions for the Test Variables:**

| <b>Variables</b>                     | <b>Definitions</b>                                                                                                                                                                                                                                          |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1- <math>FS_{i,t}</math></b>      | A set of financial performance indicators for bank i in time t.                                                                                                                                                                                             |
| <b>a. Capitalization:</b>            |                                                                                                                                                                                                                                                             |
| $CAR_{it}$ (%)                       | - Capital Adequacy Ratio                                                                                                                                                                                                                                    |
| $EtoTA_{it}$ (%)                     | - Equity Capital to Total Assets                                                                                                                                                                                                                            |
| <b>b. Credit Risk:</b>               |                                                                                                                                                                                                                                                             |
| $NPLtoGR_{it}$ (%)                   | - Non-Performing Loans to Gross Loans                                                                                                                                                                                                                       |
| $LLRtoGR_{it}$ (%)                   | - Loan Loss Reserves to Gross Loans                                                                                                                                                                                                                         |
| <b>c. Liquidity Management:</b>      |                                                                                                                                                                                                                                                             |
| $LAtoTD_{it}$ (%)                    | - Liquid Assets to Total deposits and borrowings                                                                                                                                                                                                            |
| $NLtoTA_{it}$ (%)                    | - Net loans to Total Assets                                                                                                                                                                                                                                 |
| <b><math>SEC_{i,t}</math></b>        | Asset securitization activity measured as the total securitization for bank i at time t issuance deflated by total assets at time t.                                                                                                                        |
| <b>Non – <math>RET_{i,t}</math></b>  | The Bank's non-interest in the securitized assets. The term “non-retained interest” refers to the amount of the securitized assets the bank treats as sold to the SPV. This variable is scaled by the bank's total asset securitization issuance at time t. |
| <b><math>BK_i</math></b>             | Dummy variable equal 1 for Islamic banks and 0 for Conventional banks.                                                                                                                                                                                      |
| <b><math>Size_{i,t}</math></b>       | Natural logarithm of the total bank assets for bank i at time t.                                                                                                                                                                                            |
| <b><math>AGE_{i,t}</math></b>        | Age of bank i at time t since the year of its establishment                                                                                                                                                                                                 |
| <b><math>NON\_INT_{it}</math></b>    | Total Non-Interest Operating Income scaled by Total Assets for bank i at time t                                                                                                                                                                             |
| <b>Financial Crisis<sub>t</sub></b>  | Time Dummy equal 1 for the financial periods of 2007-2009 and 0 otherwise                                                                                                                                                                                   |
| <b>2- <math>MACRO_{i,j,t}</math></b> | A set of country level macroeconomic variables for bank i in country j at time t,                                                                                                                                                                           |
| $MSD_{i,t}$                          | Bank i deposits at time t over total banking sector deposits at time t                                                                                                                                                                                      |

|               |                                                                                                                                                                                                                                                              |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| $ROL_{i,t}$   | Captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence |
| $RQ_{i,t}$    | Captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development                                                                                           |
| $GDPGR_{i,t}$ | Growth in GDP per capita in country j at time t                                                                                                                                                                                                              |
| $INF_{i,t}$   | Country-prevailing inflation rate for bank i in time t.                                                                                                                                                                                                      |

Notes: Table 1 provides definitions and notations for test variables in the empirical models examined in this study.

**Table 3 Descriptive Statistics for the Pooled Sample for the Period 2003-2012**

| Variables:        | FULL SAMPLE |        |        | IBs Subsample |        |        | CBs Subsample |        |        |
|-------------------|-------------|--------|--------|---------------|--------|--------|---------------|--------|--------|
|                   | Mean        | Median | St.Dev | Mean          | Median | St.Dev | Mean          | Median | St.Dev |
| <b>CAR(%)</b>     | 22.155      | 16.96  | 19.550 | 26.470        | 16.31  | 33.923 | 22.961        | 16.91  | 21.341 |
| <b>EtoTA(%)</b>   | 17.591      | 11.67  | 18.366 | 23.486        | 17.52  | 20.637 | 16.377        | 10.393 | 18.426 |
| <b>NPLtoGR(%)</b> | 8.083       | 3.885  | 12.504 | 10.681        | 2.13   | 23.726 | 9.947         | 4.39   | 16.733 |
| <b>LLRtoGR(%)</b> | 7.140       | 3.419  | 11.528 | 8.513         | 2.675  | 18.409 | 7.809         | 3.311  | 12.973 |
| <b>NLtoTA(%)</b>  | 45.334      | 47.143 | 22.048 | 50.543        | 59.428 | 23.499 | 42.642        | 41.635 | 22.978 |
| <b>LAtotD(%)</b>  | 41.310      | 31.232 | 47.168 | 46.214        | 27.407 | 71.845 | 44.002        | 37.256 | 36.450 |
| <b>Size (%)</b>   | 7.484       | 7.400  | 2.053  | 8.360         | 8.370  | 1.197  | 7.473         | 7.148  | 2.457  |
| <b>NON_IN(%)</b>  | 0.030       | 0.012  | 0.457  | 0.017         | 0.010  | 0.024  | 0.036         | 0.011  | 0.485  |
| <b>AGE</b>        | 36.821      | 27     | 43.051 | 17.536        | 12     | 12.795 | 49.235        | 31     | 63.883 |
| <b>MSD</b>        | 0.048       | 0.012  | 0.091  | 0.034         | 0.013  | 0.088  | 0.049         | 0.008  | 0.100  |
| <b>ROL</b>        | 55.190      | 57.895 | 26.242 | 61.368        | 62.856 | 12.581 | 60.102        | 57.895 | 29.753 |
| <b>RQ</b>         | 57.921      | 56.796 | 26.246 | 64.242        | 69.268 | 11.749 | 62.726        | 59.314 | 30.586 |

|              |       |       |        |       |       |        |       |       |        |
|--------------|-------|-------|--------|-------|-------|--------|-------|-------|--------|
| <b>GDPGR</b> | 8.319 | 7.845 | 11.028 | 8.265 | 7.990 | 11.054 | 9.142 | 8.509 | 10.604 |
| <b>INF</b>   | 5.533 | 4.484 | 4.816  | 4.887 | 3.2   | 4.571  | 5.011 | 3.613 | 4.761  |

Notes: Table 3 presents the descriptive statistics for the test variables for the period of 2003-2012. The study pooled sample reflects banks operating in 22 cross countries with 4889 bank-year observations (672 banks).

**Table 4 Regression analyses for the full sample, comparing SEC versus Non-SEC banks during the whole period (2003-2012)**

|         | (1)<br>CAR          | (2)<br>EttoTA       | (3)<br>NPLtoGR       | (4)<br>LLRtoGR       | (5)<br>LAtotD       | (6)<br>NLtoTA      |
|---------|---------------------|---------------------|----------------------|----------------------|---------------------|--------------------|
| SEC     | -0.113*<br>(0.029)  | 0.0194<br>(0.555)   | -0.0521<br>(0.909)   | -0.0212<br>(0.560)   | 1.463<br>(0.206)    | 0.160*<br>(0.005)  |
| ROL     | 0.382**<br>(0.000)  | 0.0276<br>(0.495)   | 0.0380<br>(0.511)    | 0.213**<br>(0.000)   | 0.814*<br>(0.036)   | 0.0182<br>(0.800)  |
| RQ      | -0.0882<br>(0.140)  | 0.0128<br>(0.723)   | -0.0865<br>(0.125)   | 0.0212<br>(0.621)    | 0.756*<br>(0.018)   | 0.0845<br>(0.188)  |
| LnTA    | -6.121**<br>(0.000) | -5.640**<br>(0.000) | -2.233**<br>(0.000)  | -2.168**<br>(0.000)  | -9.359*<br>(0.006)  | -0.139<br>(0.823)  |
| GDPGR   | 0.00481<br>(0.738)  | 0.00224<br>(0.802)  | -0.0493**<br>(0.000) | -0.0474**<br>(0.000) | -0.00798<br>(0.923) | 0.0258<br>(0.131)  |
| MSD     | -11.41<br>(0.346)   | -19.50*<br>(0.011)  | -5.927<br>(0.572)    | -43.80**<br>(0.000)  | -42.72<br>(0.625)   | -29.80*<br>(0.025) |
| SNON_IN | 56.07**<br>(0.000)  | 44.84**<br>(0.000)  | -14.04<br>(0.502)    | -24.17*<br>(0.032)   | -286.7**<br>(0.000) | 5.636<br>(0.725)   |
| AGE     | 0.188*<br>(0.001)   | 0.303**<br>(0.000)  | 0.174*<br>(0.002)    | -0.0660<br>(0.272)   | 0.548+<br>(0.088)   | 0.0146<br>(0.741)  |
| INF     | -0.105*<br>(0.039)  | -0.0401<br>(0.185)  | 0.107*<br>(0.028)    | -0.0121<br>(0.759)   | -0.346<br>(0.263)   | 0.107*<br>(0.047)  |
| EttoTA  |                     |                     | -0.0744<br>(0.181)   | -0.0928*<br>(0.007)  | 2.867**<br>(0.000)  | -0.150*<br>(0.001) |
| CAR t-1 | 0.143**             |                     |                      |                      |                     |                    |

|             |         |         |         |         |         |         |
|-------------|---------|---------|---------|---------|---------|---------|
|             | (0.000) |         |         |         |         |         |
| EtoTA t-1   | 0.342** |         |         |         |         |         |
|             | (0.000) |         |         |         |         |         |
| NPLtoGR t-1 |         | 0.592** |         |         |         |         |
|             |         | (0.000) |         |         |         |         |
| LLRtoGR t-1 |         |         | 0.857** |         |         |         |
|             |         |         | (0.000) |         |         |         |
| LAtoTD t-1  |         |         |         | 0.411** |         |         |
|             |         |         |         | (0.000) |         |         |
| NLtoTA t-1  |         |         |         |         | 0.638** |         |
|             |         |         |         |         | (0.000) |         |
| Cons        | 46.05** | 41.80** | 19.11** | 12.19*  | -45.82  | 14.66*  |
|             | (0.000) | (0.000) | (0.000) | (0.004) | (0.156) | (0.016) |
| Sargan-chi2 | 331.4   | 878.9   | 543.5   | 2671.2  | 1572.4  | 361.4   |

Notes: Table 4 presents the results for GMM estimations comparing SEC with Non-SEC banks during the period of 2003-2012. p-values in parentheses, +p<0.10, \*p<0.05, \*\*p<0.001. Variables definitions (see Table 1).

**Table 5 Regression analyses comparing SEC IBs and SEC CBs during the whole period (2003-2012)**

|         | (1)<br>CAR          | (2)<br>EtoTA        | (3)<br>NPLtoGR     | (4)<br>LLRtoGR      | (5)<br>LAtoTD        | (6)<br>NLtoTA      |
|---------|---------------------|---------------------|--------------------|---------------------|----------------------|--------------------|
| DIFF    | 1.709<br>(0.662)    | 4.00<br>(0.104)     | -4.11*<br>(0.008)  | 1.71**<br>(0.000)   | -3.27*<br>(0.019)    | -4.40*<br>(0.002)  |
| ROL     | 0.0497<br>(0.782)   | 0.341<br>(0.217)    | 0.327+<br>(0.067)  | 0.162+<br>(0.055)   | 0.175<br>(0.889)     | -0.966*<br>(0.014) |
| RQ      | -0.629**<br>(0.000) | 0.0477<br>(0.814)   | -0.174<br>(0.391)  | -0.168*<br>(0.044)  | 0.136<br>(0.904)     | 0.258<br>(0.424)   |
| Size    | -1.265<br>(0.250)   | -11.64**<br>(0.000) | -0.243<br>(0.869)  | 1.468*<br>(0.005)   | 20.94**<br>(0.001)   | -5.692*<br>(0.001) |
| GDPGR   | 0.00211<br>(0.945)  | 0.0486<br>(0.243)   | -0.0200<br>(0.559) | -0.0351*<br>(0.046) | 0.272<br>(0.242)     | -0.0482<br>(0.490) |
| MSD     | 3.204<br>(0.886)    | 22.31<br>(0.584)    | 9.565<br>(0.704)   | -24.55+<br>(0.068)  | -178.4<br>(0.356)    | 23.34<br>(0.680)   |
| NON_IN  | 9.063<br>(0.830)    | -26.03<br>(0.338)   | 314.3**<br>(0.000) | -34.99*<br>(0.002)  | -1034.0**<br>(0.000) | 210.7**<br>(0.000) |
| AGE     | 0.208**<br>(0.001)  | 0.318**<br>(0.000)  | 0.0868*<br>(0.011) | -0.0553*<br>(0.012) | -0.276+<br>(0.068)   | 0.119*<br>(0.016)  |
| INF     | -0.337+<br>(0.086)  | -0.464*<br>(0.039)  | 0.174<br>(0.487)   | 0.0665<br>(0.492)   | -1.018<br>(0.486)    | 0.677+<br>(0.083)  |
| EtoTAt  |                     |                     | -0.229<br>(0.338)  | 0.249**<br>(0.000)  | 5.099**<br>(0.000)   | -0.257<br>(0.120)  |
| CAR t-1 | 0.425**<br>(0.000)  |                     |                    |                     |                      |                    |

|             |         |         |         |          |         |         |
|-------------|---------|---------|---------|----------|---------|---------|
| EtoTA t-1   |         | 0.150+  |         |          |         |         |
|             |         | (0.052) |         |          |         |         |
| NPLtoGR t-1 |         |         | 0.551*  |          |         |         |
|             |         |         | (0.004) |          |         |         |
| LLRtoGR t-1 |         |         |         | 0.573**  |         |         |
|             |         |         |         | (0.000)  |         |         |
| LAtoTD t-1  |         |         |         |          | 0.0786  |         |
|             |         |         |         |          | (0.238) |         |
| NLtoTA t-1  |         |         |         |          |         | 0.275** |
|             |         |         |         |          |         | (0.001) |
| Cons        | 51.04** | 77.56*  | -20.24  | -13.56** | -216.6* | 142.4** |
|             | (0.000) | (0.004) | (0.144) | (0.000)  | (0.002) | (0.000) |
| Sargan-Chi2 | 127.9   | 482.6   | 1339.4  | 5838.2   | 350.0   | 111.8   |

Notes: Table 5 presents the results for GMM estimations comparing SEC IBs with SEC CBs during the period of 2003-2012. DIFF is a dummy bank type variable equal 1 if the bank is SEC IBs and 0 if it is SEC CBs. p-values in parentheses , +p<0.10, \*p<0.05, \*\*p<0.001.

**Table 6 Regression analyses Comparing SEC IBs and SEC CBs during financial crisis 2007-2009**

|                          | (1)<br>CAR          | (2)<br>EtoTA        | (3)<br>NPLtoGR      | (4)<br>LLRtoGR      | (5)<br>LAtotD        | (6)<br>NLtoTA       |
|--------------------------|---------------------|---------------------|---------------------|---------------------|----------------------|---------------------|
| DIFF*Financial<br>Crisis | -1.199<br>(0.531)   | -1.107<br>(0.724)   | -5.28**<br>(0.000)  | 1.40**<br>(0.000)   | -4.58*<br>(0.031)    | -8.388+<br>(0.053)  |
| ROL                      | 0.0593<br>(0.743)   | 0.00553<br>(0.977)  | -0.00369<br>(0.973) | -0.103<br>(0.411)   | 0.994<br>(0.387)     | -0.486<br>(0.158)   |
| RQ                       | -0.600**<br>(0.000) | 0.0171<br>(0.935)   | 0.222+<br>(0.054)   | 0.0590<br>(0.635)   | -0.284<br>(0.793)    | -0.0676<br>(0.822)  |
| Size                     | -1.557+<br>(0.086)  | -12.06**<br>(0.000) | -1.203<br>(0.145)   | 2.050*<br>(0.009)   | 25.24**<br>(0.000)   | -6.227**<br>(0.001) |
| GDPGR                    | -0.00750<br>(0.805) | 0.0320<br>(0.455)   | -0.102**<br>(0.000) | -0.0574*<br>(0.029) | 0.243<br>(0.289)     | -0.0351<br>(0.625)  |
| MSD                      | 5.286<br>(0.812)    | 25.91<br>(0.530)    | 14.83<br>(0.351)    | -15.29<br>(0.445)   | -120.8<br>(0.516)    | -13.07<br>(0.815)   |
| NON_IN                   | 7.506<br>(0.863)    | -36.55<br>(0.197)   | 15.35<br>(0.726)    | -86.18**<br>(0.000) | -1093.2**<br>(0.000) | 213.0**<br>(0.000)  |
| AGE                      | 0.201*<br>(0.002)   | 0.246**<br>(0.000)  | 0.00715<br>(0.597)  | -0.0804*<br>(0.014) | -0.350*<br>(0.019)   | 0.154*<br>(0.001)   |
| INF                      | -0.291<br>(0.134)   | -0.452*<br>(0.049)  | 0.217<br>(0.180)    | -0.00800<br>(0.956) | -0.637<br>(0.655)    | 0.711+<br>(0.076)   |
| EtoTA                    |                     |                     | 0.367*<br>(0.014)   | 0.288**<br>(0.000)  | 5.301**<br>(0.000)   | -0.263<br>(0.120)   |
| CAR t-1                  | 0.451**<br>(0.000)  |                     |                     |                     |                      |                     |
| EtoTA t-1                |                     | 0.166*              |                     |                     |                      |                     |



|              |         |         |         |         |          |         |
|--------------|---------|---------|---------|---------|----------|---------|
|              |         | (0.040) |         |         |          |         |
| NPLtoGR t-1  |         |         | 1.067** |         |          |         |
|              |         |         | (0.000) |         |          |         |
| LLRtoGR t-1  |         |         |         | 1.127** |          |         |
|              |         |         |         | (0.000) |          |         |
| LAtoTD t-1   |         |         |         |         | 0.108+   |         |
|              |         |         |         |         | (0.092)  |         |
| NLtoTA t-1   |         |         |         |         |          | 0.341** |
|              |         |         |         |         |          | (0.000) |
| Cons         | 51.33** | 117.6** | -8.303  | -13.45* | -298.3** | 130.6** |
|              | (0.000) | (0.000) | (0.215) | (0.017) | (0.000)  | (0.000) |
| Sargan- Chi2 | 127.2   | 471.9   | 3322.5  | 2545.9  | 363.8    | 101.3   |

Notes: Table 6 presents the results for GMM estimations comparing SEC IBs with SEC CBs during the financial crisis period of 2003-2012. DIFF is a dummy bank type variable equal 1 if the bank is SEC IBs and 0 if it is SEC CBs. This variable is interacted with the financial crisis dummy time equal 1 for the crisis period of 2007-2009 and 0 otherwise. p-values in parentheses, +p<0.10, \*p<0.05, \*\*p<0.001.

**Table 7 Regression analyses Comparing SEC IBs and SEC CBs Financial Stability during the Period 2008-2009**

|                          | (1)<br>CAR          | (2)<br>EtoTA        | (3)<br>NPLtoGR      | (4)<br>LLRtoGR      | (5)<br>LAtoTD       | (6)<br>NLtoTA       |
|--------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| DIFF*Political<br>Crisis | 5.926<br>(0.192)    | 1.62**<br>(0.000)   | 2.73**<br>(0.000)   | -6.982<br>(0.112)   | -4.71*<br>(0.026)   | -1.06+<br>(0.056)   |
| ROL                      | 0.0802<br>(0.659)   | 0.289<br>(0.116)    | 0.197<br>(0.224)    | -0.0763<br>(0.661)  | 0.529<br>(0.649)    | -0.427<br>(0.218)   |
| RQ                       | -0.600**<br>(0.000) | -0.208<br>(0.278)   | -0.0194<br>(0.911)  | 0.00171<br>(0.992)  | 0.00421<br>(0.997)  | -0.136<br>(0.649)   |
| Size                     | -1.171<br>(0.214)   | -9.305**<br>(0.000) | -2.602*<br>(0.036)  | 2.468*<br>(0.030)   | 25.73**<br>(0.000)  | -6.923**<br>(0.000) |
| GDPGR                    | 0.000947<br>(0.974) | 0.00582<br>(0.880)  | -0.0426<br>(0.174)  | -0.0971*<br>(0.007) | 0.260<br>(0.244)    | 0.00352<br>(0.960)  |
| MSD                      | 9.374<br>(0.676)    | 48.39<br>(0.202)    | 51.17*<br>(0.038)   | -2.716<br>(0.923)   | -129.0<br>(0.482)   | -30.76<br>(0.585)   |
| NON_IN                   | -62.28<br>(0.374)   | -96.45**<br>(0.000) | 65.06<br>(0.406)    | -81.28**<br>(0.001) | -805.8**<br>(0.000) | 255.6**<br>(0.000)  |
| AGE                      | 0.173*<br>(0.010)   | 0.160*<br>(0.001)   | 0.0182<br>(0.374)   | -0.112*<br>(0.013)  | -0.263+<br>(0.072)  | 0.195**<br>(0.000)  |
| INF                      | -0.381+<br>(0.056)  | -0.289<br>(0.172)   | 0.0716<br>(0.771)   | 0.0259<br>(0.898)   | -1.009<br>(0.474)   | 0.512<br>(0.214)    |
| EtoTA                    |                     |                     | -0.855**<br>(0.000) | 0.330**<br>(0.001)  | 6.017**<br>(0.000)  | -0.248<br>(0.153)   |
| CAR t-1                  | 0.468**             |                     |                     |                     |                     |                     |

|             |                    |                    |                    |                    |                     |                    |
|-------------|--------------------|--------------------|--------------------|--------------------|---------------------|--------------------|
|             | (0.000)            |                    |                    |                    |                     |                    |
| EtoTA t-1   |                    | 0.310**<br>(0.000) |                    |                    |                     |                    |
| NPLtoGR t-1 |                    |                    | 1.003**<br>(0.000) |                    |                     |                    |
| LLRtoGR t-1 |                    |                    |                    | 1.104**<br>(0.000) |                     |                    |
| LAtoTD t-1  |                    |                    |                    |                    | 0.0264<br>(0.710)   |                    |
| NLtoTA t-1  |                    |                    |                    |                    |                     | 0.374**<br>(0.000) |
| Cons        | 48.37**<br>(0.000) | 87.51**<br>(0.000) | 16.10<br>(0.118)   | -12.70<br>(0.119)  | -301.7**<br>(0.000) | 135.5**<br>(0.000) |
| Sargan-chi2 | 128.5              | 586.8              | 1413.7             | 1286.2             | 376.2               | 98.41              |

Notes: Table 7 presents the results for GMM estimations comparing SEC IBs with SEC CBs during the political crisis period of 2003-2012. DIFF is a dummy bank type variable equal 1 if the bank is SEC IBs and 0 if it is SEC CBs. This variable is interacted with the political crisis period 2011-2012. p-values in parentheses, +p<0.10, \*p<0.05, \*\*p<0.001.

**Table 8 Regression analyses testing non-retained interests securitization within sample SEC IBs and SEC CBs subsample during the whole period 2011-2012**

|                     | (1)<br>CAR          | (2)<br>EtoTA        | (3)<br>NPLtoGR      | (4)<br>LLRtoGR      | (5)<br>LAtoTD        | (6)<br>NLtoTA       |
|---------------------|---------------------|---------------------|---------------------|---------------------|----------------------|---------------------|
| NONRET              | 0.467<br>(0.779)    | -0.0386<br>(0.988)  | 0.0931<br>(0.959)   | 6.673**<br>(0.000)  | -3.75+<br>(0.061)    | 1.350<br>(0.729)    |
| Financial<br>Crisis | -0.351<br>(0.584)   | -1.607+<br>(0.086)  | -0.802<br>(0.270)   | 0.642<br>(0.396)    | 6.283<br>(0.194)     | -0.0691<br>(0.965)  |
| ROL                 | 0.0501<br>(0.780)   | -0.0487<br>(0.810)  | 0.109<br>(0.545)    | -0.00283<br>(0.986) | 1.488<br>(0.209)     | -0.287<br>(0.428)   |
| RQ                  | -0.608**<br>(0.000) | 0.0718<br>(0.731)   | 0.132<br>(0.502)    | -0.111<br>(0.498)   | -0.649<br>(0.562)    | -0.204<br>(0.519)   |
| LnTA                | -1.381<br>(0.136)   | -11.86**<br>(0.000) | -2.413+<br>(0.077)  | 2.746*<br>(0.007)   | 21.53**<br>(0.001)   | -7.033**<br>(0.000) |
| GDPGR               | -0.00839<br>(0.793) | -0.00114<br>(0.981) | -0.0685+<br>(0.073) | -0.0737*<br>(0.047) | 0.456+<br>(0.071)    | -0.00470<br>(0.954) |
| MSD                 | 4.872<br>(0.826)    | 32.64<br>(0.438)    | 28.48<br>(0.282)    | 10.90<br>(0.669)    | -140.2<br>(0.462)    | -28.14<br>(0.624)   |
| SNON_IN             | 9.705<br>(0.819)    | -41.37<br>(0.135)   | 319.0**<br>(0.000)  | -87.80**<br>(0.000) | -1062.9**<br>(0.000) | 228.0**<br>(0.000)  |
| AGE                 | 0.199*<br>(0.002)   | 0.235**<br>(0.000)  | 0.0187<br>(0.420)   | -0.156**<br>(0.000) | -0.240<br>(0.119)    | 0.189**<br>(0.000)  |

|             |                    |                    |                    |                    |                     |                    |
|-------------|--------------------|--------------------|--------------------|--------------------|---------------------|--------------------|
| INF         | -0.316<br>(0.103)  | -0.426+<br>(0.068) | 0.151<br>(0.573)   | 0.100<br>(0.589)   | -1.128<br>(0.442)   | 0.674<br>(0.103)   |
| EtoTA       |                    |                    | -0.601*<br>(0.005) | 0.266**<br>(0.001) | 5.346**<br>(0.000)  | -0.295+<br>(0.091) |
| EtoTA t-1   |                    | 0.162*<br>(0.040)  |                    |                    |                     |                    |
| NPLtoGR t-1 |                    |                    | 1.024**<br>(0.000) |                    |                     |                    |
| LLRtoGR t-1 |                    |                    |                    | 1.013**<br>(0.000) |                     |                    |
| LAtotD t-1  |                    |                    |                    |                    | 0.113+<br>(0.095)   |                    |
| NLtoTA t-1  |                    |                    |                    |                    |                     | 0.377**<br>(0.000) |
| Cons        | 51.42**<br>(0.000) | 116.5**<br>(0.000) | 6.188<br>(0.574)   | -11.55<br>(0.118)  | -269.9**<br>(0.000) | 130.4**<br>(0.000) |
| Sargan-chi2 | 127.0              | 461.9              | 1163.0             | 1539.8             | 348.8               | 92.32              |

Notes: Table 8 presents the results for GMM estimations comparing SEC IBs with SEC CBs during the political crisis period of 2003-2012. Non-retained interest is the portion of the securitized assets the bank treats as sold to the SPV. This variable is scaled by the bank's total asset securitization issuance at time t. p-values in parentheses, +p<0.10, \*p<0.05, \*\*p<0.001.