Panel Modeling of Z-score: Evidence from Islamic and Conventional Saudi Banks

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3 February 2018

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Published in:

International Journal of Islamic and Middle Eastern Finance and Management

08 July 2019

DOI: https://doi.org/10.1108/IMEFM-04-2018-0122

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Abstract

Several studies on the banking sector have shown that Islamic banks are more financially robust and stable compared to conventional banks, mostly in periods of financial crises. The aim of this research is to measure and compare the level of stability between Islamic and conventional banks in Saudi Arabia using quarterly data. The sample covers around two-thirds of banks operating in the Saudi stock market, and data comprises the last global financial crisis. The panel data model shows that Islamic banks relatively reduce the financial stability index; meanwhile, they contribute efficiently to enhance financial stability through the diversification of their assets. According to our findings *Riyad* Bank and *SAMBA* positively impact the financial stability, while *Al-Rajhi* bank has a positive but moderate role in enhancing the banking stability. As well, the Saudi banking sector exhibits a weak competitiveness which negatively impact the banking stability. Consequently, the limited presence of Islamic banks in the Saudi banking sector menaces any efforts to improve the financial stability.

JEL Classification. C12, C23, G21, G28, G33
Keywords. Islamic Banks, Financial Crisis, Financial Stability, Z-score Model, Saudi Arabia.

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1. Introduction

Financial crises are mostly linked to financial and banking systems, along the international financial liberalization sector, where a domestic financial system is no longer isolated from changes of the global system. Islamic banks (IB) were first established during the last decade of the twentieth century and has since had a growing role in the international financial system. General Council of Islamic Banks and Financial Institutions (CIBAFI, 2010) indicated that "total world Islamic finance reached around one trillion U.S. dollars by the end of 2009".

During the last financial crisis (2007-2009), a large number of conventional banks (CBs) around the world announced their bankruptcy (140 U.S. Banks in 2009);[3] however there were no reports that showed any Islamic bank declared bankruptcy. The logical question to ask is; are Islamic banks immune from financial shocks? If so, can this be explained by the free-interest system? Or is it because Islamic banks do not invest in derivatives, "*Tawaruq*" and loans sale?[4] (Siddiqi 2000, Hassan 2006). In other word, could the immunity of Islamic banks against international financial crises be due to its incomplete integration into the global financial system?

Studying the stability of Islamic banks requires the distinction between banks according to the structure of their assets. Firstly, Islamic banks adopted single layer *Mudarabah*, where they mobilize their liabilities directly into diverse investment opportunities.[5] This model has been confronted by lots of operational risks. Consequently, Islamic banks have switched to the use of multi-layers *Mudarabah* Islamic model, *i.e.*, *Mudarabah* of assets (sources) and liabilities (uses), where all assets are financed through Profit Loss Sharing system (PLS).

The purpose of this paper is to test whether the Saudi Islamic banks, compared to conventional banks, are relatively less vulnerable to global financial crisis. The financial and banking system are often threatened by risks that could lead to financial crises. Banking sector could be a major driver of financial crises or one of the channels transmitting the impacts of the crises to other financial sectors and real economies. The historical data of Saudi banks (see Figures 1 in Appendices) and the support by the Saudi Arabian monetary authority (SAMA) indicated that the global financial crisis had impacted and damaged the banking sector to some extent.[6] During the last global financial crisis, the total losses by the banks globally was estimated to be more than 1.8 trillion dollars, followed by insurance companies with around one trillion dollars loss.

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[3] http://www2.fdic.gov/hsob/SelectRpt.asp?EntryTyp=30

[4] The sale of loans is forbidden in Islam even if there are non interest loans.

[5] According to the financial Shariah jurisprudence, when the IBs are involved in financing the economy, there are more than one level of Mudarabah between two parts. The first level or single layer of Mudarabah is between the bank and the depositor of saving; the bank is the first Mudarib and the saver is the capital owner. The multiple layer Mudarabah appears when the bank as a financier contracts an entrepreneur which is the second Mudarib. For more details on the Mudarabah levels see Hasan (2016, 2010), and Hassan and Lewis (2007).

[6] According to AlKholi (2009), during the first nine months of 2009, the profitability of Saudi banks indicated a tenuous decline around 2.6% (18.86 billion Riyals in 2009 versus 19.37 billion Riyals in 2008). He showed that *Al-Bilad* Bank and *Saudi British* bank recorded losses respectively at 66% and 11%; the losses of *Al-Bilad* Bank would be more related to local factors. The Saudi banks have been supported by SAMA to absorb the local shocks of international financial crisis and the banks reserves have been increased by more than three times to face the loan losses.

The importance of this paper stems from the stability of Saudi Islamic banks in response to financial shocks, therefore it was expected that the adoption of the PLS system would contribute positively to global financial stability. This paper is significant to the literature of banking stability for the following contributions; firstly, we use quarterly data, whereas a lot of previous papers used yearly data set. Secondly, we consider the statistical properties of the data by testing for the stationary of both the variables and residuals of the long-run equation, whereas the main related literature disregards such properties. Furthermore, we focused on the country analysis (banks operating in Saudi Arabia), hence the results obtained are more robust and reliable, avoiding the exogeneity biases of the double panel regression (at countries and banks levels). A more reliable conceptual contribution consists of suggesting an alternative measure to z-score by which IBs perceives the financial stability through liquid and illiquid assets of banks.[7]

The Section 2 part of this paper reviews the empirical literature on financial stability of banks. Section 3 exhibits the data set and analyze their statistical properties. A detailed examination of the banking stability measure and its modeling, including the main discussion of the results, are presented in Section 4. Section 5 concludes and reveals some policy implications.

2. Literature review

There are few papers using quantitative models to analyze the financial stability of the Islamic and conventional banks. Cihak and Hesse (2010, 2008) analyzed, using z-score as a criterion of stability, a sample of twenty countries extracted from the BankScope database, which contain both the Islamic and conventional banks. The Islamic banks are classified into small and large banks following their assets-size with a threshold of one billion dollars and having at least 1% of the total assets of banks in the country. The findings of Cihak and Hesse exhibited that small Islamic banks are more stable than small conventional banks and large Islamic banks while large conventional banks are more stable than large Islamic banks. Their findings did not show if the large conventional banks are less stable than small Islamic banks. Nevertheless, the Islamic banks could be affected positively or negatively by financial crisis or bankruptcy of conventional banks even if the Islamic banks operate with its assets following the Islamic financing. The Standard & Poor's Credit Rating indicated that the Islamic financial institutions satisfy 15% of the needs of Muslims for financial services, and that the size of assets compatible to Islamic-*Shariah* reaches 400 billion dollars in 2009 *i.e.* approximately 10% of the global financial market, which is around 4 trillion dollars. The extension of the Islamic finance model inside a mixed banking system of the world could improve the financial stability, but probably reduce the immunity of Islamic banks.

The study of Hasan and Dridi (2010) showed the effects of recent global financial crisis, especially during the period (2007-2008), on both conventional and Islamic banks of eight countries, including countries in the Gulf Cooperation Council (GCC). Using a range of banking indicators such as profitability, loan growth, asset growth and the external credit rating, they find that Islamic banks were also affected by the crisis, but in a different way

[7] The empirical analysis using this alternative measure will be addressed in another paper.

compared to conventional banks. The profit realized by Islamic banks during 2008 was absorbed by the negative impact of the international financial crisis. Also, the growth rate of credits and investments assets (loans granted in the PLS system) exhibited that the performance of Islamic banks were better compared to the conventional banks, given the large losses incurred by conventional banks following the crisis. Stability was soon returned to the Islamic banks as each contributed to realize financial stability within the time. Nonetheless, the Islamic banks have some weaknesses related to their risk management that exposes the banks to potential financial shocks, hence the need for a reliable financial instruments to resolve the risk management above all liquidity risk.

The study of Imam and Kpodar (2010) identified the factors affecting the global expansion of Islamic banks, which, in case of success, could be a new alternative financial model for the finance industry. They listed factors such as ‘‘population of Muslim per country, technology of the domestic financial system, competitiveness of the domestic financial system, average per capita income, real interest rate, events of 11 September 2001, crude oil price, and integration degree to Middle East countries’’ to be responsible for the global expansion of the Islamic banks. The findings show that the average per capita income and the competitiveness in the banking system have significant positive impact on the spread of Islamic banks, thus expressing the increase need for Islamic financial intermediation across the world. In addition, they also showed that the decrease in real interest rates -less than 3.5% increased the deposits in Islamic banks. The study of Ariss (2010) focused on the competitiveness between Islamic and conventional banks using several indicators which Panzar and Rosse (PR, 1987) described as the H-statistic index and the Lerner index (market power of bank). Using annual data from 2000 to 2006, she indicated that the weak competitiveness between CBs and IBs is positively and significantly related to the higher level of profitability, and that traditional banks are more competitive than Islamic banks.

Abedifar et al. (2013) showed at a panel level that small IBs are more stable compared to small CBs and that there is little evidence that the IBs charge rents to their customers. In contrast to such findings, our empirical work at a national level in Saudi Arabia exhibits that small IBs, such as Bank *Al-Bilad*, appear to be less stable. Consequently, it is not evident that the IBs have lower credit risk. Bourkhis and Nabi (2013) found, via parametric framework, that the IBs are stable even during the international financial crisis. However using the nonparametric analysis, the results were inconclusive because the Wilcoxon test implies a loss of power in comparison to the parametric test (Twomey and Viljoen 2004).[8] By analyzing the banking market efficiency of the GCC region using the yearly data of the period of 2000-2013, Alqahtani and Mayes (2018) revealed at a panel level that in the long run CBs are more stable than IBs. It remains that the differences in the reaction to shocks between IBs and CBs are an empirical question.[9]

The adoption of the PLS system by several banks around the world may therefore be proposed to have contributed positively to international financial stability and to a reduction in

[8] Wilcoxon test mobilizes the rank of the observations instead of the real values, this implies a less efficiency in comparison to the parametric tests (Twomey and Viljoen 2004).

[9] In Appendices Figures 1 of z-score and assets visualize clearly the impacts of the global financial crisis on each bank of the Saudi banking system.

the volatility of global financial markets (Beck, Demirgüç-Kunt and Merrouche 2013). One possible explanation of the relatively better performance in terms of stability during the recent international financial crisis is the higher capitalization and liquidity reserves of Islamic banks. Another potential explanation is the partial integration of Islamic banks into the global financial system, given that Islamic banks are prohibited from dealing with the sale of derivatives and loans (Hassan 2006). For these reasons, the expansion of Islamic finance, and its further integration into the global banking system, could clearly reduce the immunity, thereby exposing Islamic banks to future financial contagions from conventional banks.

Farooq et al. (2015) used the quarterly data of 40 banks in Pakistan (from Q2 2002 to Q1 2010) consisting of 21 CBs, 6 IBs and 13 mixed banks were analyzed, considering two versions of the z-score index depending on whether the IBs treated PLS saving and investments (S&I) accounts as liabilities or as equity.[10] On the basis that PLS was considered as part of the equity (capital), Farooq et al. (2015) found that IBs show sound financial stability with better asset quality than CBs. This outcome is also well-documented by Rashid et al. (2017). On the other hand, at the branches level based on the structure where PLS is considered as liabilities in IBs, they exhibited that the IBs branch z-score index was lower than that of conventional part of the mixed banks. Therefore, they concluded that the presence of Islamic finance system improves the financial stability.[11]

Dawood *et al.* (2016) used a dynamic model of z-score to capture the persistency of the bank behavior about financial stability. After the international financial crisis, the Basel Committee on Banking Supervision introduced a new regulatory framework. It comprises dealing with financial instability using two new regulatory tool-measures; checking on funding stability as the Liquidity Coverage Ratio (LCR) and the Net Stable Funding Ratio (NSFR). The Islamic Financial Services Board agreed to the new rules by the Basel III accord, but however, modified the last measure so that it conforms to the Islamic banking features. Using a panel data from 136 IBs between 2000 and 2013, Dawood *et al.* (2016) showed that the NSFR has a significant positive effect on the IBs stability index. This result qualifies the NSFR as tool for controlling the soundness of IBs. However, they also exhibited a negative effect of size-NSFR interaction on z-score. There is a contradiction between the negative z-score-NSFR correlation and the positive estimate of the parameter associated to NSFR in explaining z-score.[12]

Most previous research used annual data. Hence by using quarterly data this paper immensely contributes to enrich the previous research, modeling the financial stability of banks in face of shocks due to financial crises. Firstly, the panel data features sample from 2005 to 2011 represents an important part of 64% of the Saudi banking sector including Islamic and conventional banks and covering close to two thirds of banks whose shares are traded on the

[10] When the PLS S&I accounts are considered as equity, the capital asset ratio (CAR or k) tends to be greater than when such accounts are treated as liabilities. It is not obvious that the z-score index will be greater in the first case, because it depends on the volatility of the return on assets ratio.

[11] A detailed review of the literature related to the financial stability in Islamic finance is descriptively well-documented in Belouafi et al. (2015).

[12] In contrast to the regression analysis, the correlation analysis works with random variables without distinction between dependent and explanatory variables, but the algebraic signs of the partial estimate and the correlation coefficient are the same. Gideon (2010) proved the similar signs between coefficients-based correlation and estimates slopes-based regression.

Saudi stock market; and secondly, the sample contains the events of the recent global financial crisis (2007-2009).

3. Banks Data and tests

Saudi Arabia is the largest economy in the Gulf Council Countries region, depending on oil export around the world. The reliance on foreign demand made the Saudi economy vulnerable to any international financial or economic crises (Woertz 2008). The oil revenues are the main financial sources which directly affecting deposits and liquidity in Saudi banks. The 45th economic report of SAMA (2009) indicates that foreign investments of Saudi banks reached a high record during 2009. The increasing international liquidity to GDP from 2005 reveals that the Saudi banks invest their excess liquidity abroad (Ghassan et al. 2013).

Saudi banking sector consists of a total of eleven banks, categorized into two distinguished groups - Islamic and conventional banks. Four banks are classified as Islamic banks, according to the non-interest financing practice of these group of banks.[13] The rest seven banks are conventional banks. For the purpose of this paper, a sample of six banks were selected, two Islamic banks (*Al-Rajhi* and *Al-Bilad* banks), and four conventional banks (*Riyad* bank, *Saudi Investment* bank, *Saudi British* bank, and *Saudi American* bank). The last two represent offshore banks, having close links to international banks around the world, and hence allow the investigation into the impacts of global financial crisis on these banks and the Saudi financial system.[14]

The stability index (z-score) in sub-annual level is calculated using quarterly data collected and constructed from the Saudi financial market "*Tadawul*" over the period of 2005-2011.[15] The last financial crisis revealed some weaknesses in the Saudi banking system, chiefly among which are: high concentration of bank loans to a limited number of firms and individuals; large portion of banks' investment in foreign assets with relatively high rates of returns compared to the returns on domestic assets, especially after lowering the reverse repo by SAMA; the lack of new government bonds during the same period, and finally the channeling of surplus liquidity into the international markets (Ghassan et *al*., 2011).

Global financial crisis has caused some of the Saudi banks to incur losses, particularly those involved in foreign investment, loans trade, speculation in foreign currency and gold markets, and financial derivatives deals. To mediate the effects of the global financial meltdown, banks became relatively more conservative in issuing new loans. Despite the global financial crisis, the Saudi banking sector through the new conservation policy showed some healthy signs during this period, where its usual profit record level was maintained. Net profits declined only by approximately 2.6% after the conservative measures taken by banks. As a precautionary

[13] This link "http://www.halal2.com/main.asp?id=71" specifies Islamic and non-Islamic features of firms and banks registered in Saudi stock market.

[14] Firstly, the number of Saudi banks in the largest economy of the GCC region appears to be too small. As the Saudi banking system is a hybrid system, we select two banks from each pattern. The first banks declaring the adoption of Shariah compliance finance are *Al-Rajhi* bank and *Al-Bilad* Bank founded in 1976 and 2005, respectively. The two national CBs are *Riyad* Bank (1957) and *Saudi Investment* Bank (1976). The sample includes also two international CBs namely the *Saudi British* Bank (1978) and *Saudi American* Bank (1980).

[15] Source: http://www.tadawul.com.sa. The international database BankScope allows only annual data.

action, to meet any possible losses due to investors' defaults on banks' loans, total reserves, voluntarily, have been boosted to 6.04 billion Riyals, over the period January to September 2009, compared with 1.58 billion Riyals a year before.

It was also noticed during this period that the equities of Saudi banks have increased, and the banks' assets have not suffered the drastic negative impacts that hit the banking sector in industrial countries around the world, where some giant famous banks were forced to announce bankruptcy. Saudi banks' huge reserves, most likely have shielded domestic banks against the tremendous negative impacts of international financial crisis. Moreover, some well-known international credit rating agencies such as Moody's and Standard & Poor's, reported that basic financial forecasts of the Saudi banking sector are relatively stable, flexible and had the ability to absorb negative shocks of the international financial crisis and the declining world economic growth.

The prior step is to implement the panel unit root test on the relevant variables given in equation (2) below (See Descriptive statistics, Tables 1).[16] The widely used panel unit root tests are Hadri (1999) as a common root test and Im, Pesaran and Shin (IPS, 2003) as an individual root test. The Hadri test considers the null hypothesis of no unit root and assumes that persistence parameters are common *i.e.* identical in the panel data. Accordingly, it assumes a common process of the panel unit root under null hypothesis ($\rho_i=\rho, i=1, \dots, 6$) considering this process for panel data $y_{it} = \rho_i + \eta_i t + \varepsilon_{it}$ where $\varepsilon_{it}$is the specific-individual error, t stands for a time-trend which is related to fixed or individual effects. Similar, to KPSS test, this test depends on the residuals from the individual OLS regressions on the constant and time-trend. The statistic LM_1 is formed allowing for homoscedasticity hypothesis and alternatively the statistic ML_2 is related to consistent heteroscedasticity assumption, which leads to Z-statistic values (Table 2.2 in Tables 2). The IPS test considers the null hypothesis of unit root and supposes that the persistent coefficient may vary between banks. Accordingly, it assumes an individual process of the panel unit root under null hypothesis ($\rho_i=0, i=1, \dots, 6$) and considering a following individual Augmented Dickey Fuller (ADF) regression for each bank:

$$\Delta y_{it} = \rho_i y_{it-1} + \sum_{j=1}^{p_i} \beta_{ij} \Delta y_{it-j} + X_{it}^{'} \alpha + \varepsilon_{it}$$

The average of the t-statistics of ρ_i from the individual ADF regressions is adjusted to calculate $\bar{t}_{NT}$ statistics. When the lag order $p_i$is non-zero for some cross-sections, the IPS test shows that a properly standardized $\bar{t}_{NT}$ *i.e.* $W_{\bar{t}_{NT}}$statistic follows asymptotically a standard normal distribution (Table 2.1 in Tables 2). The results of the unit root panel test indicated that banks' variables have unit root using either IPS or Hadri test. This finding suggests that the bank's variables would be cointegrated. The results of unit root tests also exhibited that banking sector and macroeconomic variables are not stationary except the economic growth variable.

[16] The panel unit test is more sensible to high autocorrelation, which involves appropriate lag length in the test equation. Hadri test has a different procedure for choosing the lag length; it requires the choice of kernel method estimation and bandwidth method to weighting the auto-covariances by selecting the small ones.

4. Stability index Model

4.1 Banks Financial Stability Measurement

There are several well-known methods of measuring the stability of financial systems particularly in the banking sector. Among these methods are, Value at Risk (VaR) (Holton 2003, Manganelli and Engle 2001), Stress Test (Aragonés et *al*. 2001, BIS 2000) and z-score model (Altman 1983). The latter is considered the best amongst all other methods, as it has the advantage of predicting the possibilities of future bank insolvency, while other methods just find out if the bank may face a liquidity problem.

In general, insolvency is a more serious and dangerous problem than liquidity, it is state where the bank liabilities exceed its assets, at which state the bank become insolvent. A bank may become illiquid even when it is solvent, if its assets are held in illiquid assets (long term financial assets or real assets) that can only be liquidated at high cost. The bank may be forced to sell such assets at considerable loss, by selling it lower than its nominal value.

The Altman measurement can be applied to both conventional and Islamic banks as well, using the banks' accounting data. Assuming a normally distributed bank return μ, defining insolvency as a state where losses $(-R)$ exceed equity (E) i.e. $-R \geq E \Leftrightarrow R \leq -E \Longrightarrow \frac{R}{A} \leq -\frac{E}{A}$, then the probability of default is

$$p(\mu \leq -k) = \int_{-\infty}^{-k} \mathrm{N}(0,1)\mathrm{d}\mu \Leftrightarrow p\left(\frac{R}{A} \leq -\frac{E}{A}\right) = p\left(\frac{\frac{R}{A} - \mu_{\frac{R}{A}}}{\sigma_{\frac{R}{A}}} \leq -\frac{\frac{E}{A} + \mu_{\frac{R}{A}}}{\sigma_{\frac{R}{A}}} = -z\right) = \Phi(-k)$$

where Φ is called z-score corresponding to tail-distribution or exceedance. A significant low z-score for a bank indicates that this bank is closer to insolvency. The z-score for banks can be defined at quarterly frequency as:

$$z_{t:q} = \frac{k_{t:q} + \mu_t}{\sigma} \tag{1}$$

$$k_{t:q} = \left(\frac{E}{A}\right)_{t:q},\ \mu_{1,t:q} = \overline{\left(\frac{R_{t:q}}{A_{t:q}}\right)} \quad \text{or} \quad \mu_{2,t:q} = \frac{\bar{R}_{t:q}}{\bar{A}_{t:q}},\quad \sigma^2 = V\left(\frac{R}{A}\right)_{t:q}$$

Where k is the ratio of equity capital plus total reserves to assets. μ is the ratio of average returns to assets, where average returns are calculated based of four observations per year; we use the first formula. σ stands for the standard deviation of returns to assets and measures the volatility of returns on assets.[17] The bank's z-score stability index is used for predicting financial distress. It is based on a standard indicator of financial soundness of a group of different financial institutions and focuses on bank's risk of insolvency.[18] The z-score reflects

[17] Strobel (2010) shows that a best measure of standard deviation require high frequency such branch banks data.

[18] In fact, insolvency is a more serious problem than liquidity, in which case the bank liabilities exceed its assets, or the bank become insolvent. A bank may become illiquid even when it is solvent, if its assets are held in illiquid assets (long term financial assets or real assets) that can only be liquidated at high cost. The bank may be forced to sell such assets at considerable loss, by selling it lower than its nominal value. The concept of financial distress, widely used to make financial analysis of banks data, indicates the negative performance of banks. The case of financial distress occurs when the bank becomes insolvent even if bank assets exceed its liabilities.

the probability of insolvency, the point where the bank liabilities exceed assets. The z-score measures the number of standard deviations that a return realization has to fall to deplete its equity (Cihak 2007). Therefore, a greater z-score indicates a lower likelihood of bank insolvency; the index value will be high when capitalization, measured in terms of risk error, is large.

The z-score seems to be an appropriate tool for measuring risk in Islamic banks, because it is not affected by the nature of the bank activities; it focuses only the on risks involved in the investment of bank assets and reserves. It is especially suitable for banks adopting investment strategies that prefer high risk assets given a high rate of return, or low risk assets even at low rate of returns, which guarantees the z-score objectivity (Cihak and Hesse 2010, 2008; Maechler et *al*. 2005). But in the context of financial shocks and crises, high risk investments may result to a negative return, whilst small risks may turn to big returns. These volatilities require a specific modeling of z-score index to explain its determinants in the long run such as generalized autoregressive conditional heteroscedasticity (GARCH) models.

Moreover, the z-score index may also be incompatible with the nature of Islamic banking relying mainly on the PLS system, which leads to a common risk of the investor and bank via "*Mudarabah*" and "*Musharakah*" contracts. It is probable that the capital value and reserves do not reflect the financial strength of Islamic banks, because the investors were expected to bear a part of the risk according to a formula of PLS contracts, and thus reduce fairly the risk of Islamic Banks. These banks may seek for adjustment processes in risk-taking rates by the investors through appropriate contracts of PLS system and new methods of capital investment. The conventional banks also seek for adjustment processes of interest rates on deposits and loans to avoid insolvency (Cihak and Hesse 2010, 2008).

The z-score may not be appropriate for measuring the risk of cooperative and Islamic banks, because the returns on assets depend on the nature of their activities and financing modes. We can focus on the risks involved through the investment of these banks both in liquid and illiquid assets, since IBs adopt only financial Shariah compliant-contracts as the PLS system, it therefore made these banks closer to the real economy. By considering their illiquid assets, we have suggested that the new measure labelled g-score, associated to real economic growth, reflects multiple risks and allows to track the banking stability (For more details see Ghassan 2017).

Following the net stable funding ratio (NSFR) of Basel III (2010) which considers both assets and liabilities of banks, we suggest using the *g* index as an indicator of bank risks related to liquidity and leverage due to its randomness. To display the impact of illiquid assets as long-run investments on bank stability, it would be more accurate to consider the *stock-based g-score* definition:

$$g = \frac{\frac{E(\theta)}{A} + \mu\left(\frac{\mathrm{IA}}{A}\right)}{\sigma\left(\frac{\mathrm{IA}}{A}\right)} = \frac{r_2^{-1} + (1 - r_1)}{\sigma(1 - r_1)}$$

where $r_1 = LA/A$ and $r_2 = A/E$ where r_1 is the liquid assets (LA) to assets (A) ratio labelled LAR, its complement ratio is the illiquid assets (IA) ratio $IA/A = 1 - r_1$) ; θ is the invested share of the deposits as a contribution in the bank capital; and r_2 is the ratio of assets to equity

(E) i.e. capital of bank and total reserves. The suggested stock-based g-score index reflects the long-run dynamics of the real investments of the banks. This index could be associated to the habitual flow-based z-score by focusing on the returns on illiquid assets. Instead of measuring the returns on all assets, we can restrict the measurement to returns of only illiquid assets i.e. long-term assets, which depend more on the real economic growth. The complementarity of the two indices could be a road map of the banking stability (Ghassan 2017).

4.2 Financial Stability Model

The financial stability index is influenced by three sets of variables related to banks, banking sector and macroeconomic, respectively. The bank determinants include these five variables: logarithm of z-score (LZSCOR), logarithm of total assets (LAST), loans to assets ratio for conventional banks or ratio of finance activity to assets in case of Islamic banks (ratio of credits to assets, RCA),[19] ratio of operating costs to income (RCI) and income diversity (IDV).[20] The banking sector has two variables which are: logarithm of Herfindahl-Hirschman index (LHHI), which measures banks' competitiveness, that ranges between zero for highly competitive and 10000 for a least competitive market (Ariss 2010). It also includes the share of Islamic banks *i.e.* ratio of Islamic banks' assets to total assets of the banking sector (SHIB_A), which may also be measured by the ratio of Islamic banks' deposits to total bank sector deposits (SHIB_D). The macro variables are both real rate of economic growth (GRW) and rate of inflation (INF).

To capture the impacts of a specific bank on financial banking stability, two bank dummy variables were introduced, one for conventional banks (CBD) and the other for Islamic banks (IBD). These variables are expected to take on a negative sign indicating the financial weakness of the related bank group, whereas a positive sign reflecting the financial strength of the related bank group and its contribution to the banking sector stability. It is also possible to use a composed variable in testing the hypothesis that ''Islamic banks contribute to the financial stability of the banking sector''. The IDV variable interacts with both dummy variables IBD and CBD. If the interaction with IBD takes on a positive sign, it implies that the diversity of Islamic banks' income enhances the stability of the banking sector.

Given that cross-section observations are less than the time series observations ($N < T$), and assuming the existence of serial correlation between banks' data, the unobserved random errors are expected to have variance covariance matrix $\Omega \otimes T$, with $\Omega = (\sigma_{ij})$, $i,j = 1, \dots, N$ where σ_{ij} is not necessarily equal to zero (Heij et *al*. 2004). These features require using a Seemingly Unrelated Regression (SUR) model, which leads to formulating a pooled data model and the use of several estimation techniques of z-score model.[21]

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[19] Instead of interest income (commissions) and interest charges used in conventional banks, we used finance income and finance charges for Islamic banks.

[20] We calculated the income diversity by $idv = 1 - \left|\frac{Net\ interest\ income - Other\ operating\ income}{Total\ operatimg\ income}\right|$, where the net interest income, for Islamic banks, includes positive and negative income flows related to many model of PLS system. The higher value of this index indicates a higher diversification of income.

[21] Such as the Pooled Least Square (PLS) method, without cross-section weights and using standard errors and covariances; the Generalized Pooled Least Squares (PGLS) method, with cross-section weights (correcting for both cross-section heteroscedasticity and contemporaneous correlation) and using SUR errors and covariances;

Based on the previous determinants of financial stability, the z-score model could be written as follows:

$$z_{it} = \alpha_i + \beta_i B_{it-1} + \gamma_i S_{t-1} + \omega_i M_{t-1} + \pi_i D_i + \varepsilon_{it} \quad (2)$$

where B_{it-1} is the banks variables, S_{it-1} and M_t represent banking sector and macroeconomic variables, respectively. We also used D_i as dummy variable to exhibit the distinction between the impacts of conventional and Islamic banks on the financial distress of bank i. The term ε_{it} indicates the unobserved stochastic errors. The variables on the right side of Eq. (2) are considered with one lag length to capture their effects on the expected z-score index.

Considering that the sum of the cross fixed effects is zero or very close to zero (bottom of Table 3), these effects appear in Figure 3 and represent the deviations from the global rate of z-score. The findings show that *SIB*, *SAB* banks and mainly *BLD* bank contribute positively to financial stability, whereas *SAM* and *RJH* banks and mostly *RYD* bank negatively impact the financial index stability. To exhibit the global effect on Saudi's banking sector, we formulated a Panel data model using numerous estimation methods:[22]

$$z_{it} = \alpha_i + \beta B_{it-1} + \gamma S_{t-1} + \omega M_{t-1} + \pi D_i + \varepsilon_{it} \quad (3)$$

The fixed effects model allows to differentiate across individual units through the differences in the constant term. The equation (3) represents a fixed effects model when there is no random effect in the parameter α_i. In this case, the fixed effects model lets us distinguish between the individual units via the differences in the constant term α_i. We can use the dummy variables by considering that $\alpha_i = \alpha_1 + \sum_{i=2}^{N} \delta_i c_{it}$ where $c_{it} = 0$ for $i = 1$ and $c_{it} = 1$ for $2 \leq i \leq N$. The parameter α_1 is as the benchmark unit, and the differential intercept coefficients are $\alpha_i = \alpha_1 + \delta_i$ for $2 \leq i \leq N$. The Table 5 in Appendices shows the values of the parameter δ_i for each bank in the sample.

The findings indicate that on the average Islamic banks reduce the financial stability index, but they contribute to financial stability in the banking sector through the income diversity index. The serial correlation due to the dummy variable (IBD) relativizes these results. The results of Table 4 have some goodness statistical features; they show that Islamic banks contribute to improving financial stability with an average rate of 8.3% (*i.e.* $\frac{0.309}{3.717}$) through the diversification of financial products.[23] As previously defined, the income diversity index of IBs is based on activity diversification and means that its increase indicates a properly diversified income. The contractual financing of IBs, through trading contracts (as Murabahah, Ijarah, Istisnaa) and contracts of participation (as Musharakah, Mudarabah, Muzaraah), prevents any

the P2GLS method, with cross-section weights and using SUR errors and covariances, and set of common, cross-section specific and period specific instrumental variables.

[22] Obviously, when we consider panel banks, the fixed effects are less appropriate than the stochastic effects, but the small number of banks in our sample does not authorize such hypothesis. Another technical point consists of testing if the residuals of the long-run equation of z-score are stationary. This step was run to validate equations (2) and (3).

[23] By applying the same panel GLS estimation to the specific income diversity of CBs, in contrast to IBs we find a negative coefficient which means that marginally the CBs activity diversification does not contribute to the banking stability.

form of Riba (usury) and sharing the risks inherent in any contracts.[24] In conventional finance, most authors supported that the more diversified credit unions have lower risk and return (Esho et al. 2005), and thus proposed that economic diversity reduces bank risk (Shiers 2002). We argue that if IBs focused on Marabahah, there is no real adhesion to the large spectrum of the Islamic finance in banks, and consequently there is less diversification which would lead to financial instability in IBs.

The results presented in Table 5 from Panel GLS estimation indicate that the fixed cross effects on z-score vary between banks. *Al-Bilad* bank has the highest negative impact on z-score compared to *SIB* which also performed more negatively than *SAB* (1.5% on average). On the other hand, the *Riyad* Bank has the highest significant positive contribution on the banking financial stability, *SAMBA* group enhances this stability significantly, and *Al-Rajhi* Bank has a slightly positive contribution (1.1% on average). In another point of view, looking at the LZSCORE Figures 1 (see Appendices), it could be observed that *Riyad*, *SAMBA* and *Al-Rajhi* banks appear to be more resilient to financial crisis than the other banks in the sample. By disregarding the other determinants of the banking stability, such resilience-differences are explained by the autonomous effects of the banks on the z-score index. It would be expected that since *Al-Bilad* bank is not sufficiently diversified, it cannot have a positive contribution to the banking stability. Although the economic and financial conditions of the economy and the related factors are important in measuring banking stability, yet the degree of risks of the banks, the degree of the competitiveness between banks, and the manner in which they manage their expected revenues are better determinants for the banking stability. From the estimation of equation (3), it appears that the variables of the banks, banking sector and macroeconomic variables significantly affected the financial stability to some extent.

Table 4 indicates that the index of operating cost to income has a small effect to improve the financial stability index, so it is reduced slightly at rate 0.01%. But, *Al-Bilad* bank has a high and unstable ratio of cost to income, while *Al-Rajhi* Bank proved to be highly competitive over to *Riyad* Bank. This ratio appears to be more unstable and less competitive in both *SIB* and *SAB*. It also appears from Table 4 that the variables of banks have the expected signs, as the banks that have a high level of RCA variable move toward low index of financial stability (Table 5), such as *Al-Bilad* Bank and *SIB*. But it seems that the marginal propensity (0.622) associated to the ratio of loans to assets (for conventional banks) or to the ratio of finance to assets (for Islamic banks) has a significant positive sign, which emphasizes the effects of banks with moderate RCA ratios.

The modest presence of Islamic banks in the Saudi banking sector does not qualify them to effectively improve banking or financial stability. The dominance of conventional banks reflects that they contribute to increase the z-score index, although some may experience financial distress as in *SIB* and *SAB*. But the presence of Islamic banks leads to a net improvement of the financial stability. The fixed cross effects (Table 3) exhibit that *Al-Bilad*

[24] Concerning the Riba and interest concepts, there is a consensus that Riba concept is not restrictive as the interest concept. Because, the Riba can appear in any unfair transaction, but the rental price called interest rate on loans is involved specifically by financial transactions of banks (Algaoud and Lewis, Chapter 3 in Hassan and Lewis 2007; Iqbal 2003). Both Riba and interest rate as a renting money lead to the concentration of wealth and then to economic and social inequalities (Al-Suwailem 2000).

bank, with small size compared to *Al-Rajhi* Bank, tend to better the z-score index, while *Al-Rajhi* bank tends to reduce the Islamic financial stability index. These results may be explained by the involvement of *Al-Rajhi* bank, through the Profit-Loss Sharing system, in direct investment operations or long run and high risk financial investment intermediation. These results are similar in part to the findings of Cihak and Hesse (2010, 2008), that the small Islamic banks are more stable than the large ones.

It seems that the impact of competitive bank index LHHI has a negative sign and high significant parameter, which indicates that the Saudi banking sector relatively displayed weak competition, reflecting a negative effect on the financial stability. In addition, the estimated equations exhibit that the inflation rate negatively and significantly affected the z-score index, which illustrates the importance of economic and financial policies of the government in support of the financial stability in banking system.

Although this paper is focused on the banking stability in a mixed banking system, we find that generally there is no real distinction in term of stability between CBs and IBs, but there are some specific aspects related to the nature of the main activities of each bank that could improve or deteriorate the banking stability. Also, the subsample of IBs is not homogenous, the same remark holds for the CBs, this heterogeneity complicates the government treatment of banks in terms of financial policy. Another policy question that needs to be managed deeply in the long-run is to shift the competitiveness between CBs and IBs from negative to positive, and thus enhancing the banking stability. In addition, another aspect of the government policy which would foster loyal competitiveness between CBs and IBs is by eliminating the Islamic windows in the CBs to encourage more competition. We suggest that by increasing the number of IBs and encouraging income diversity of banks from the real sector of the economy, the financial market will work with more competitiveness, and thereby contribute more efficiently to the stability in the Saudi banking system. The foundation of the Shariah financial contracts would support IBs and CBs to overcome any banking challenges, but the wide variety of banking practices should be compliant to the Shariah finance and must diversify their banking activity as allowed by the large spectrum of the Islamic finance. Furthermore, we add that financial technology should be incorporated into IBs to improve the operation and implementation of Shariah financial contracts and thus enhance the connectedness between the banks in developing the inter-IBs market. Such connectedness would facilitate the running of macroprudential regulation of the financial stability through reliable information about banks activities.

5. Conclusions and policy implications

This article uses the z-score as financial distress index to analyze the stability of some selected conventional and Islamic banks in Saudi Arabia. The financial stability model is explained using variables of the individual banks, banking sector and macroeconomic, respectively. The models are designed for both pooled and panel data and estimated by several methods. Pooled data model (see, Figure 3 and Figure 4) shows that *SIB* and *SAB* and *Al-Bilad* bank positively contribute to financial stability, with *Al-Bilad* making the highest contribution. On the other hand, the *SAMBA* group, *Al-Rajhi* Bank and *Riyad* bank have a negative impact on its financial

stability with *Riyad* having the highest negative impact. However, panel data model shows that Islamic banks relatively reduce banking stability index; meanwhile, they efficiently enhance the financial stability through the diversification of their assets. The fixed cross effects on z-score indicate that *Al-Bilad* Bank had the highest negative contribution to the financial stability, followed by *SIB* and the *SAB*, the latter has the least negative impact on z-score. The findings indicate that *Riyad* Bank and *SAMBA* group efficiently support the financial stability of the banking sector, while *Al-Rajhi* bank has a positive but relatively moderate role in enhancing the banking sector stability.

The findings also indicate that the operating cost-income ratio has a small role in improving the financial stability. *Al-Bilad* Bank has a high and unstable ratio of cost to income, while *Al-Rajhi* Bank proved to be highly competitive over to *Riyad* Bank. This ratio appears to be more unstable and less competitive in both *SIB* and *SAB*. Conventional banks with high ratio of loans to assets or Islamic banks with high finance to assets ratio mostly have lower stability indices, for instance the *Al-Bilad* bank and *SIB*. However, this ratio has a positive and significant marginal propensity, which emphasizes the effects of banks with moderate ratios. The competitiveness index seems to be negatively high and strongly significant, which indicates that the Saudi banking sector has relatively less level of competitiveness, and therefore negatively affects the financial stability. The limited presence of Islamic banks in the Saudi banking sector threatens any effort to improve the financial stability.

The overall results indicate that there is no real distinction in term of stability between CBs and IBs. The heterogeneity among Saudi banks complicates the impacts of any public financial measures aiming at achieving the financial stability. Since the competitiveness index negatively contributes to the financial stability, it is important for the financial and monetary authorities to run the required measures to encourage the competitiveness between CBs and IBs shifting it from negative to positive, and thus enhance banking stability. We suggest that the policy measure of eliminating Islamic windows in the CBs could boost more competition in the banking sector. In addition, by increasing the number of IBs and matching the income diversity of banks to the real economy, the banking market will contribute more efficiently to stability of banks. Moreover, we also suggested that improving the financial technology could foster the implementation of Shariah financial contracts and would improve the connectedness between banks in establishing an inter-IBs market. The development of the competitiveness and connectedness in banking system would successfully enhance running the macroprudential regulation of the financial stability.

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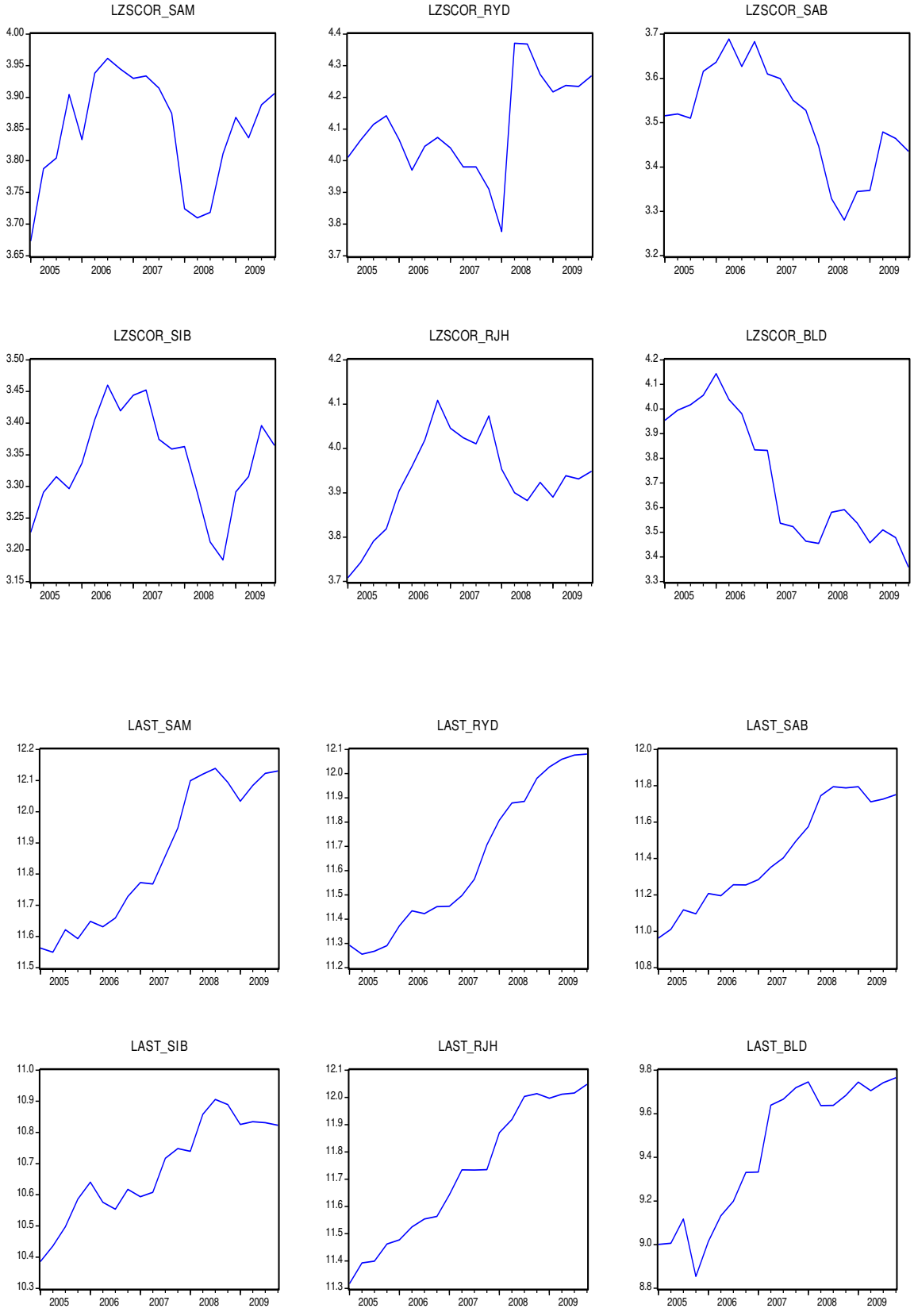
Appendices

Figures 1. Some Banks data (Log of z-score and Log of assets)



Tables 1. Descriptive statistics and Preliminary Tests

Table 1.1. Descriptive Statistics for LZSCOR

CROSSID	Mean	Quant.*	Std. Dev.	Skew.	Kurt.
SAM_1	3.848	3.872	0.088	-0.588	2.122
RYD_2	4.107	4.070	0.155	-0.025	2.482
SAB_3	3.511	3.518	0.120	-0.333	2.129
SIB_4	3.340	3.348	0.078	-0.272	2.292
RJH_5	3.928	3.935	0.106	-0.393	2.637
BLD_6	3.717	3.586	0.260	0.271	1.433
All	3.742	3.797	0.296	-0.039	1.937

Table 1.2. Descriptive Statistics for LAST

CROSSID	Mean	Quant.*	Std. Dev.	Skew.	Kurt.
SAM_1	11.858	11.816	0.226	0.019	1.330
RYD_2	11.640	11.531	0.305	0.237	1.486
SAB_3	11.426	11.377	0.289	-0.008	1.550
SIB_4	10.683	10.678	0.155	-0.229	1.950
RJH_5	11.721	11.734	0.249	-0.061	1.544
BLD_6	9.434	9.638	0.319	-0.459	1.574
All	11.127	11.428	0.889	-1.033	3.005

Table 1.3. Descriptive Statistics for RCA

CROSSID	Mean	Quant.*	Std. Dev.	Skew.	Kurt.
SAM_1	0.533	0.538	0.036	-0.566	2.829
RYD_2	0.566	0.568	0.041	-0.969	4.065
SAB_3	0.591	0.600	0.037	-0.301	1.719
SIB_4	0.524	0.517	0.046	0.370	2.118
RJH_5	0.862	0.869	0.015	-0.791	2.475
BLD_6	0.809	0.874	0.104	-0.937	2.300
All	0.647	0.596	0.146	0.663	1.843

Table 1.4. Descriptive Statistics for RCI

CROSSID	Mean	Quant.*	Std. Dev.	Skew.	Kurt.
SAM_1	0.484	0.451	0.184	2.123	7.829
RYD_2	0.868	0.735	0.453	2.260	7.207
SAB_3	2.914	0.689	9.944	4.126	18.036
SIB_4	-0.552	0.412	3.427	-1.663	5.249
RJH_5	0.499	0.472	0.189	0.554	2.386
BLD_6	14.619	3.213	39.916	2.683	8.498
All	3.139	0.574	17.314	6.993	52.995

Table 1.5. Descriptive Statistics for IDV

CROSSID	Mean	Quant.*	Std. Dev.	Skew.	Kurt.
SAM_1	0.667	0.640	0.159	0.208	1.802
RYD_2	0.668	0.690	0.149	-0.440	2.584
SAB_3	0.725	0.711	0.132	0.410	1.904
SIB_4	0.717	0.701	0.192	-0.498	2.597
RJH_5	0.441	0.412	0.115	0.304	2.356
BLD_6	0.709	0.719	0.086	-0.682	3.706
All	0.655	0.684	0.171	-0.236	2.464

Note: *Quantiles computed for p=0.5, using the Rankit (Cleveland) definition.

Tables 2. Preliminary Tests

Table 2.1. Panel unit root

	LZSCOR	LAST	RCA	RCI	IDV
Model	IE	IE, IT	IE	IE	IE, IT
IPS W-stat	-0.506	-0.773	-0.636	-0.398	-0.866
(Prob.-value)	(0.31)	(0.22)	(0.26)	(0.34)	(0.19)
IPS $\bar{t}$ -stat	-1.713				
(Critical-value)	(-2.42)				
Decision	NS	NS	NS	NS	NS

Table 2.2. Panel unit root

	LZSCOR	LAST	RCA	RCI	IDV
Model	IE, IT	IE, IT	IE, IT	IE, IT	IE
Hadri Z-stat	2.968	2.817	4.064	3.065	4.020
(Prob.-value)	(0.0015)	(0.002)	(0.0000)	(0.001)	(0.0000)
Hadri HC_Z-stat	2.978	2.190	3.312	23.982	3.436
(Prob.-value)	(0.0015)	(0.014)	(0.0005)	(0.0000)	(0.0003)
Decision	NS	NS	NS	NS	NS

Note: IE, IT and NS are Individual Effects, Individual linear Trends and Non-Stationarity, respectively.

Table 3. Double GLS-SUR Estimation of z-score model

Dependent Variable: LZSCOR?
Method: Pooled IV/Two-stage EGLS (Cross-section SUR)
Sample (adjusted): 2005Q2 2009Q4
Included observations: 19 after adjustments, Cross-sections included: 6
Total pool (balanced) observations: 114
Linear estimation after one-step weighting matrix
Instrument list: c lhhi(-1) shib(-1) inf(-1) @cxinst last?(-1) rca?(-1) rci?(-1) idv?(-1)_ibd?(-1)
Cross-section SUR (PCSE) standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	11.44979	3.608446	3.173053	0.0021
LHHI(-1)	-0.697518	0.400972	-1.739566	0.0857
SHIB(-1)	0.338608	1.026395	0.329900	0.7423
INF(-1)	-0.514414	1.170320	-0.439550	0.6614
LAST_SAM(-1)	-0.089445	0.108586	-0.823731	0.4125
LAST_RYD(-1)	0.308048	0.161393	1.908682	0.0598
LAST_SAB(-1)	-0.241410	0.081078	-2.977523	0.0038
LAST_SIB(-1)	-0.316347	0.118227	-2.675763	0.0090
LAST_RJH(-1)	0.189620	0.094400	2.008680	0.0479
LAST_BLD(-1)	-0.736098	0.103118	-7.138387	0.0000
RCA_SAM(-1)	0.082126	0.558142	0.147141	0.8834
RCA_RYD(-1)	-0.724942	0.889108	-0.815359	0.4173
RCA_SAB(-1)	-1.489424	0.448639	-3.319869	0.0014
RCA_SIB(-1)	-0.104803	0.255478	-0.410222	0.6827
RCA_RJH(-1)	-0.337315	0.825487	-0.408625	0.6839
RCA_BLD(-1)	0.052518	0.281525	0.186549	0.8525
RCI_SAM(-1)	0.032819	0.077780	0.421954	0.6742
RCI_RYD(-1)	0.003192	0.066286	0.048155	0.9617
RCI_SAB(-1)	0.097760	0.076668	1.275112	0.2059
RCI_SIB(-1)	-0.001052	0.002741	-0.383748	0.7022
RCI_RJH(-1)	-0.446947	0.097857	-4.567328	0.0000
RCI_BLD(-1)	0.000331	0.000484	0.683699	0.4961
IDV_SAM(-1)	0.101979	0.125921	0.809865	0.4204
IDV_RYD(-1)	-0.187360	0.161289	-1.161646	0.2488
IDV_SAB(-1)	0.030768	0.111730	0.275374	0.7837
IDV_SIB(-1)	-0.166351	0.052959	-3.141103	0.0024
IDV_RJH(-1)	-0.163738	0.134712	-1.215464	0.2277
IDV_BLD(-1)	0.066311	0.270120	0.245485	0.8067
Fixed Effects (Cross)				
_SAM—C	-0.652164			
_RYD—C	-4.378241			
_SAB—C	1.614018			
_SIB—C	1.456042			
_RJH—C	-3.141821			
_BLD—C	5.102171			

Effects Specification
Cross-section fixed (dummy variables)

Weighted Statistics			
R-squared	0.996480	Mean dependent var	51.41742
Adjusted R-squared	0.995089	S.D. dependent var	16.43169
S.E. of regression	1.151517	Sum squared resid	107.4053
Durbin-Watson stat	1.721575	Instrument rank	33.00000

Figures 2. Double GLS-SUR Residuals of z-score model

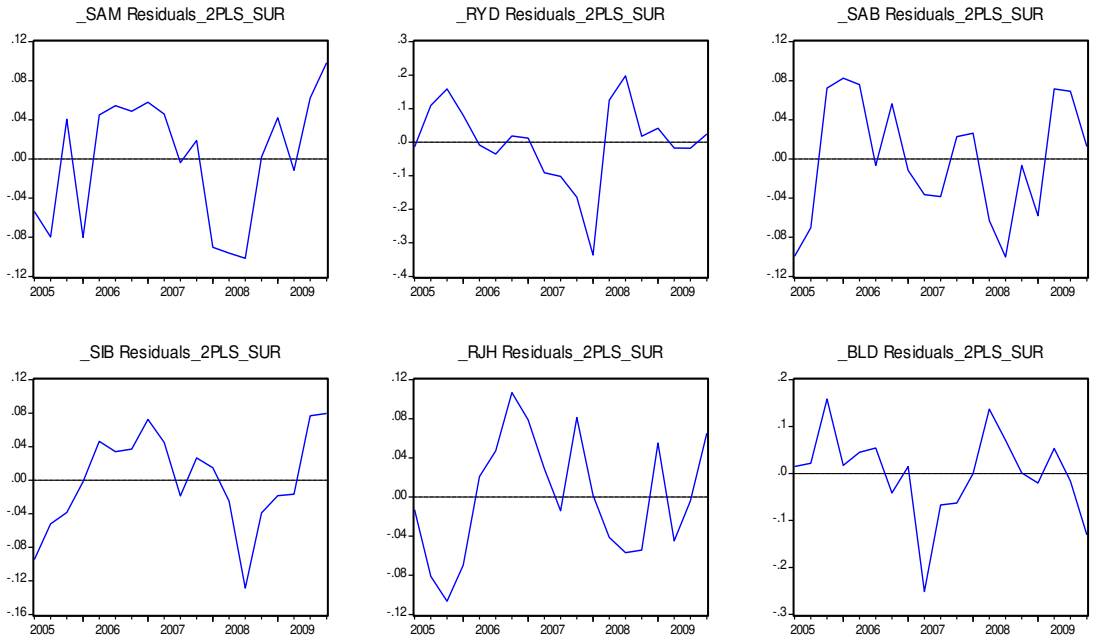


Figure 3. Panel Fixed Effects using 2GLS-SUR method

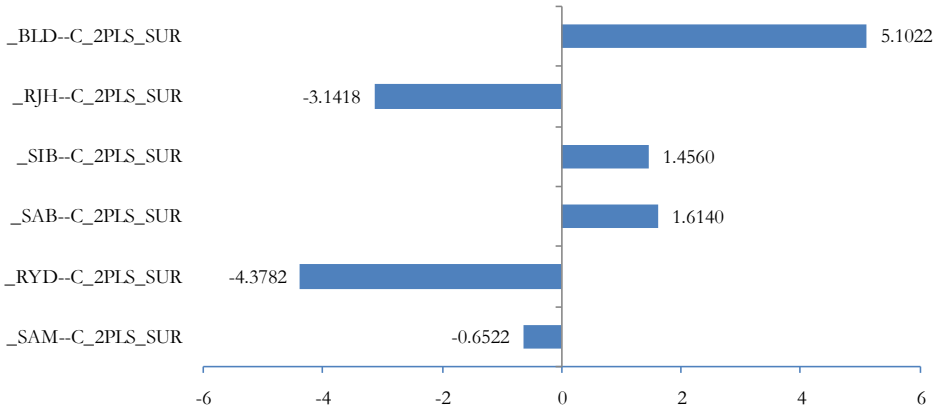


Table 4. Panel GLS Estimation of z-score model

Dependent Variable: LZSCOR
Method: Panel EGLS (Cross-section SUR)
Sample (adjusted): 2005Q2 2009Q4
Cross-sections included: 6. Total panel observations: 114
Linear estimation after one-step weighting matrix
Cross-section SUR (PCSE) standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	518.6609	140.8547	3.682242	0.0004
RCA(-1)	0.661983	0.053565	12.35854	0.0000
RCI(-1)	-0.000499	0.000284	-1.756318	0.0821
IDV(-1)	-0.278767	0.028729	-9.703381	0.0000
LHHI(-1)	-56.16464	15.41028	-3.644621	0.0004
SHIB(-1)	-87.79749	24.26524	-3.618241	0.0005
LAST(-1)	-0.209518	0.033495	-6.255232	0.0000
IDV_IBD(-1)	0.309485	0.096961	3.191847	0.0019
GRW(-1)	-0.133255	0.056492	-2.358812	0.0203
INF(-1)	-3.341631	0.803610	-4.158273	0.0001

Effects Specification

Cross-section fixed (dummy variables)

Weighted Statistics

R-squared	0.999381	Mean dependent var	39.48141
Adjusted R-squared	0.999294	S.D. dependent var	38.78086
S.E. of regression	1.030454	Sum squared resid	105.1218
F-statistic	11425.07	Durbin-Watson stat	1.309055
Prob (F-statistic)	0.000000		

Table 5. Cross-Section Fixed Effects on z-score using Panel GLS method

CROSSID-Cste, Panel GLS Method	Effect
Saudi American Bank (*SAM*, Cste)	0.402613
Riyad Bank (*RYD*, Cste)	0.590647
Saudi British Bank (*SAB*, Cste)	-0.055532
Saudi Investment Bank (*SIB*, Cste)	-0.332961
Al-Rajhi Bank (*RJH*, Cste)	0.039923
Al-Bilad Bank (*BLD*, Cste)	-0.644689

Figure 4. Standardized Residuals using Panel GLS method