Examining the relationship between default risk and efficiency in Islamic and conventional banks☆

Momna Saeed *, Marwan Izzeldin

Department of Economics, Lancaster University Management School, Lancaster University, UK

A R T I C L E   I N F O

A B S T R A C T

We examine the relationship between efficiency and default risk in Islamic banks (IBs) and conventional banks (CBs) in Gulf Cooperation Countries (GCC) and three non-GCC countries over the period 2002–2010. To the best of our knowledge this is the first study to consider the efficiency–default risk paradigm in a comparative setup which includes IBs. Efficiency and default risk are measured using the Stochastic Frontier Approach and distance to default (Merton's model) respectively. The existence of causality/reverse causality between the two is addressed via a panel Vector Auto Regression (VAR) framework. Our analysis shows that the relationship between profit efficiency and default risk banks across the sample, for CBs and for the GCC is such that a decrease in default risk is associated with lower efficiency levels. With the single exception of IBs, the causality from profit efficiency to default risk is inversely related for all categories. For CBs, the trade-off between efficiency and risk is evident. The absence of a trade-off for IBs suggests that efficiency and default risk are plausible early warning indicators of IB instability. These findings could be of relevance to regulators in countries where both banking system co-exist.

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1. Introduction

The recent financial crisis remains as a stark reminder of the need to monitor the health of the banking industry. An increase in the tendency to default remains a good indicator of riskiness in banks; and this has gained much attention given the association of defaults with financial instability (Porath, 2004). There are only two studies of note: Koutsomanoli-Filippaki and Mamatzakis (2009) and Koetter and Porath (2007) provide comprehensive evidence on the causality between efficiency and default risk.

The emergence of Islamic banking, a banking system consistent with Shariah principles,[1] is an important development in the financial world. While the purpose of IBs is akin to that of CBs, standard loan and deposit products are fundamentally different, because of the prohibition of interest (*riba*) in Islam. IBs are not allowed to offer a fixed rate and are expected to conduct operations on the basis of profit-sharing arrangements or other modes of financing permissible under Islamic law.

Despite growing pains and a loss of confidence in global financial systems, Islamic finance has continued to show rapid growth. Between 2006 and 2011, the volume of Shariah-compliant assets doubled to USD 900 billion Financial Times, 2011. Islamic Finance (Supplement, May 12). Although Shariah-compliant financial assets constitute a small portion of total global banking assets (1.5%), its rapid growth has been noted by academics, policy makers and practitioners (e.g., Sundararajan and Errico, 2002; Čihák and Hesse, 2010; Beck et al., 2013).

Unlike CBs, efficiency and risk for IBs have so far been addressed in isolation. Several studies attempt to assess the efficiency of IBs: (Hassan, 2005; Darrat et al., 2002; Sufian and Noor, 2009); the last of these analyses the determinants of changes in efficiency in IBs. However, there is no study which examines *causality* between efficiency and risk in IBs. This paper attempts to address this lacuna with a comparative study of IBs and CBs operating in the GCC (Bahrain, Kuwait, Qatar, Saudi Arabia, and UAE) and three non-GCC countries (Pakistan, Indonesia and Bangladesh). The paper is restricted to these countries because of the data constraints of using publicly listed banks.

To address the causality between risk and efficiency we consider a three-step approach. First, we employ the Stochastic Frontier Approach (SFA), a parametric approach which takes into account country-level variables and bank specific data. Berger and Mester (1997) were constructive in highlighting the influence of external factors using a sample of U.S. banks. Several studies (e.g. Hasan et al., 2000; Dietsch and Lozano-Vivas, 2000; Lozano-Vivas et al., 2002) elaborate on the importance of capturing such characteristics in multi-country efficiency studies.

Second, and following the calculation of efficiency scores, a bank's default risk is quantified using a Merton type bank default measure.[2] Bank default risk is calculated by means of the distance to default (D-to-D) approach using stock market prices and annual accounts. The choice of D-to-D as a risk measure is justified by its all-encompassing market-based measure of default risk (Gropp et al., 2004). More specifically, it combines information from stock returns with leverage and volatility information, thus capturing the most important determinants of default risk. Aside from a few notable exceptions (Hakim and Neaime, 2005; Beck et al., 2013), little use has been made of equity price data in assessing banks' risks. A restriction on the use of D-to-D is that it limits consideration to publicly listed banks (i.e., banks for which stock price data are available).

Finally, we adopt a Panel VAR (Vector Auto Regression) approach to examine the relation between efficiency and default risk. VAR estimates are then employed to test the hypothesized relationships based on a framework similar to that used by Berger and DeYoung (1997), Gorton and Rosen (1995), Hughes (1999). We also conduct a sensitivity analysis to identify any changes in the relation due to bank type (IB or CB) and location (GCC vs. non-GCC).

The paper continues as follows: Section 2 outlines IB specifics along with the risks inherent in the Islamic banking model. Section 3 reviews the literature. Section 4 describes the hypotheses we test in this study. Sections 5 and 6 outline methodology and data; while Section 7 discusses the results in the context of the hypotheses formulated in Section 4. Conclusions and policy implications are presented in Section 8.

2. CB–IB structural differences and implications for risk exposure

The nature of financial intermediation in IBs, including the function of banking, differs to that in CBs. The key to understanding the different nature of risks – the unique feature that differentiates IBs from CBs – is the profit-and-loss sharing (PLS) paradigm. CBs are intermediaries between depositors and borrowers and bank revenue is the difference in the interest gains between the two entities. Therefore, a CB is principally based on dealing of interest because CB's profit is obtained after expenses are deducted from interest revenues. For an IB, however, the ex-ante fixed rate of return in financial contracting is replaced with a rate of return that is uncertain and determined ex-post on a profit-sharing basis. Only the profit-sharing ratio between the capital provider and the entrepreneur is determined ex-ante. Table 1 compares the two banking frameworks.

A thorough comparison between IBs and CBs in regard to the share of various balance sheet components – assets and liabilities – is a good indication of the levels and types of risk to which a bank is exposed. Table 2, presents a stylized balance sheet of an IB. This table illustrates the different activities and financial instruments and serves as a starting point for understanding the dynamics of the risks inherent in IBs. Assets are listed on the basis of functionality and maturity. A maturity-based view of the balance sheet is fundamental in understanding risk exposure at the institutional level.

The structure of a CB balance sheet has demand deposits and investment accounts from customers on the liability side and its loans (the equivalent of Islamic financing and investing accounts) are on the asset side. While the liabilities present

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[1] Islamic law (Shariah) lays down a set of well-defined rules governing economic behavioural relationships. In addition the prohibition of interest (the Arabic term is Riba), there are rules covering individual and property rights; buyer and seller behaviour in the market; the right and enforce ability of contracts; and the role of the state. For descriptions of the Islamic economic system, see Abbas Mirakhor, "The Economic System in an Islamic Society" Middle East Insight (August/September 1987): 32–45; and Frederick L. Pryor, "The Islamic Economic System" *Journal of Comparative Economics*, (June 1985): 197–223.

[2] Using the Black and Scholes and Merton model, we present a framework to optimally use stock market and balance sheet information of the company to predict its Distance-to-Default/default risk over a horizon of one year. The Merton type default method has the advantage over traditional proxies based on accounting data, by the use of the forward looking information incorporated into security prices Koutsomanoli-Filippaki and Mamatzakis (2009).