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journal homepage: www.elsevier.com/locate/econmodLeverage versus volatility: Evidence from the capital structure of European firms[☆]AbdelKader O. el Alaoui^a, Obiyathulla Ismath Bacha^a, Mansur Masih^{a,*}, Mehmet Asutay^b^a INCEIF, Lorong Universiti A, 59100, Kuala Lumpur, Malaysia^b Durham University Business School, Mill Hill Lane, Durham DH1 3LB, UK

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ABSTRACT

The impact of leverage on financial market stability and the relationship with the real economy is a key concern among researchers. This paper makes an initial attempt to investigate the relationship between a firm's leverage, return and share price volatility from an Islamic finance perspective and capital structure theory. A multi-country dynamic panel framework and the mean-variance efficient frontier are applied to 320 sample firms from eight European countries, divided into portfolios of low and high debt using the shari'ah screening threshold of 33%. We find that the firm's return and volatility change with changes in the capital structure. Islamic-compliant stocks show, in most cases, less volatility than non-compliant stocks but are no different in terms of return. Finally, our results tend to imply a case for limiting debt beyond certain levels.

1. Introduction

The financial sector appears to be playing an increasingly important role in the macro economy. The increasing frequency of financial crises and their much deeper costs on society make the understanding of financial markets a key ingredient of macroeconomic management. Given the globalized nature of financial markets and economies, contagion across borders is a reality. Thus, what begins as a local problem can quickly translate into a regional and global crisis through contagion. The US subprime crisis of 2007–8 is a case in point. What began as a bubble in the American mortgage market - a small segment of the real estate market, produced within a short time span, a recession and a downward spiral, the likes of which the US economy had not witnessed in recent times. This crisis has shown: (i) the centrality of the financial system in the functioning of the real economy (ii) the importance of the leverage in producing shocks and crisis. If as Rogoff and Reinhart (2010) have argued, excesses with debt have been at the root of all modern financial crises, then limits on the buildup of debt would make eminent sense. Interestingly, Islamic finance which emanates from religious philosophy places limits on acceptable levels of debt. The accepted rule is to allow firms to have debt ratios no higher than 33%. In this study, we examine the impact of such limitation on stock price volatility and in stabilizing financial markets.

Specifically, when stocks are screened for their acceptability within Islamic portfolios, one of the key filters used is a maximum debt ratio of 33%, either to “total assets” or to “market capitalization”. Such an imposition may not be in line with capital structure theory which advocates a mix between debt and equity to optimize a firm's value (Modigliani and Miller, 1958, 1963). Thus, this study makes an initial attempt to investigate the impact of this screening filter on the leverage and returns of shari'ah compliant portfolios.

Moreover, understanding the level of corporate debt and volatility in relation to contagion under normal economic conditions and under shocks has been a subject of several studies. Finance theory suggests that volatility and firm's debt are correlated positively (Samuel, 1973; Sporleder and Moss, 2004; Cai and Zhang, 2006; Graham and Leary, 2011). Volatility increases during crisis period by driving contagion into inter-related capital markets which become more correlated during turmoil conditions. In periods of contagion, firms with higher leverage become more vulnerable to market and financial risks (Ahmad et al., 2013; Duncan and Kabundi, 2013; Hwang et al., 2013 among others). The post-2008 global financial crisis (GFC-2008) failure of giant financial firms (e.g., Lehman Brothers, Goldman Sachs) reminds us that high leverage, inter alia, does not necessarily reduce the firm's overall cost of capital, rather it increases company's risk and chance of failure. Risk-averse investors wanting to minimize their investment's risk, expect an

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optimal balance between debt and equity and they fear that an increase of debt could increase default risk. Although risk-loving investors may be ready to accept a project with high leverage, they want to be compensated for the higher risk involved with the leverage.

There is a temptation for firms to raise capital through the market mechanism of debt rather than equity financing, as the tax shield of debt makes the cost of financing, in most cases, considerably lower. Nonetheless, in the absence of the tax deductibility, which is the case in only few countries in the world, the capital structure theory with risk-neutrality assumption (Smith and Conover, 1993), suggests that there is no benefit for borrowing. Accordingly, based on the assumption of risk-neutral market participants (Modigliani and Miller, 1958), firms would be indifferent to the source of capital if the cost of equity is less (or equal) compared to the cost of debt.

Compared to the conventional theory of debt management, Islamic finance advocates for less debt and offers an efficient alternative strategy based on the principle of risk sharing, participation and fair partnership (for example, *musharakah* or *mudarabah* contracts). According to Islamic finance principles, investors have to negotiate the profit sharing ratio and shall expect better reporting quality and transparency. Subsequently, they may expect higher profit sharing ratio in the case of riskier projects. Moreover, the nature of the contracts in Islamic finance encourages the strengthening of good corporate governance since the partnership conditions should be fairly and clearly specified between the contracting parties and validated by the *Sharia'h* board of each contracting party.

While there is a good number of studies analyzing volatility and contagion across different countries and markets, the linkage between volatility and firm leverage is largely unexplored. Moreover, very few studies have applied *Islamic* stock screening filters (quantitative and qualitative) to study volatility and its relation to contagion during the GFC-2008. We fill this gap by introducing the Islamic finance principles relevant to the stock market and investigate whether lower leverage, as suggested by the Islamic principles, can reduce volatility, therefore, bringing more micro-stability to the capital markets.

This study investigates the extent to which the leverage induces the share price volatility. It also, examines whether firms with weak capital and high level of debt ratios (high leverage position) are more vulnerable to volatility spillovers.

Specifically we address the following key research questions: (i) do the firms' return and volatility change with changes in capital structure?; (ii) how do *Shari'ah*-compliant stocks perform in terms of leverage and volatility?; (iii) how do portfolios of *Shari'ah*-compliant stocks and non-compliant stocks compare in terms of their risk-return profiles (including GFC-2008 period)?

The study uses a sample of 320 European companies (representing 8 countries) distributed over different portfolios of high and low debts.

To investigate the leverage effect on volatility and returns, we adopt three different approaches. First, we use the dynamic panel techniques based on vector autoregressive framework to control simultaneously the level of debt (leverage) effect and the country effect on returns and volatility. Moreover, we apply the *Mean-Variance Efficient Frontier (MVEF)* by computing the risk-return profile of a large number of random possible portfolios constructed as high and low debt firms from major European countries. Subsequently, this helped us formalize the debt impact on their different random profitability outcomes and its relation to the European market stability. The portfolios span eight countries including the UK market considered as the biggest financial market in Europe.

Dynamic GMM framework has been used based on the 33% *Shari'ah* stock screening threshold.¹ To make our results robust while

looking to overcome heterogeneity across firms, we use dummy variables linked to the level of debt (measured as total debt over total assets) as suggested by the Islamic stock screening process. Furthermore, considering the nature of the selected firms (mainly from the productive sectors), the firm's size, the level of sovereign debt and the exchange rate have been added to the explanatory variables to capture the foreign currency effect for the firms originating in countries within and outside the Euro zone.

Then, the MVEF approach shows that low debt portfolios are more likely to provide more stability with higher return than high debt portfolios.

Finally, the Wavelet Transform Coherence technique (*WTC*) is then applied to the UK market. It helps us investigate the lead-lag relationships (in terms of contagion effect) at different stock-holding periods or investment horizons of the investors. Based on cross correlation between different variables, this technique can also identify the variables to be considered in the panel data econometric modeling.

Overall, the results tend to indicate significant correlations between "debt to equity" ratio and both returns and volatility, but not necessarily with high debt to assets given the different sizes and growth of firms. The study tends to suggest three main factors which need to be considered by the firms in order to improve their stability in the market: firstly, the level of "debt to equity" as suggested by the capital structure theory rather than "debt to total assets" as suggested by the current practice of Islamic Finance Perspectives (IFP); secondly, the capitalization or the firm size; and finally, the level of the sovereign debt and country dynamics. Although the latter may be beyond the firm's control, it is up to the firm to consider its own market with implications on its leverage policy in relation to the frequency-dependent strategy.

The remainder of the paper is arranged as follows: Section 2 presents the literature review, Section 3 discusses the research methodology of the study, Section 4 discusses the results, and lastly Section 5 provides some reflections on the conclusion and the policy implications.

2. Literature review

This section examines the underlying concept, methodologies and findings from major empirical studies related to total volatility and return.

2.1. Studies on capital structure

Studies of firm's capital structure have evolved and consequently various determinants based on firm characteristics and country specific factors have been generated and included. The relationship between firm leverage and country specific factors has been extensively studied (see among others, Booth et al. (2001), Deesomsak et al. (2004), De Jong et al. (2008), Driffield and Pal (2010), and Kayo and Kimura (2011)). Their findings reveal that not only firm characteristics but also country specific factors do have significant influence on a firm's financing. For example, Booth et al. (2001) found that corporate financing was affected by determinants related to country specific factors in developed countries with country specific differences that spread across countries. The country specific determinants should not be neglected in the capital structure analysis since they have a sizeable explanatory power (De Jong et al., 2008).

Firm debt has been identified as one of the variables representing firm specific factors. Therefore, this study intends to fill the gap by analyzing the impact of firm debt on volatility and contagion.

This study is particularly important with regards to the recommendations provided by AAOIFI (2004, 2010) and the position held by most of the recognized scholars in Islamic finance on corporate debt (Ghoul and Karam, 2007). From the Islamic investment perspectives, portfolios have to be *Sharia'h* compliant both qualitatively and

¹ This quantitative financial debt ratio or leverage threshold of 33% has been specified by the standards N°21 – 3/4/2 rules of AAOIFI (The Accounting and Auditing Organization for Islamic Financial Institutions, 2010). See Appendix D.

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