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DETERMINANTS OF CAPITAL STRUCTURE: EVIDENCE FROM SHARI'AH COMPLIANT AND NON-COMPLIANT FIRMS[†]

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Abstract

Many Muslim individual and institutional investors seek to invest only in stocks that are compliant with the Shari'ah (i.e. Islamic law). Among others, Dow Jones addressed this demand and has developed their proprietary screening methodologies to identify Shari'ah compliant firms (SC). One key factor that distinguishes SC firms from their non-compliant peers (SNC) is that the former is not allowed to cross the leverage threshold of 33%. Due to the restrictions imposed on them, it is expected that SC firms exhibit different capital structure compared to the SNC firms. The purpose of this initial comparative study is to analyze the most reliable debt determinants identified in the literature on both firm types. This study utilizes static panel data techniques on the sample consisting of SC and SNC firms from 7 countries and 7 industries over the years 2004–2014. Our study is inconclusive and it shows that most of the determinants do exhibit different effects among both firm types. Depending on the leverage measure, the effect of different independent variables on firms' capital structure varies. A uniform effect can be exerted for debt determinants profitability for both leverage measures, and growth opportunities, firm size and tangibility for market leverage only. Our robustness tests reveal that the impact of some debt determinants on firms leverage remains consistent. The coefficient sign and significance suggests, that the capital structure decision of both firm types, both are better explained by the Pecking Order Theory for book and by the Trade-Off Theory for market leverage, respectively.

Keywords: Capital Structure, Leverage, Shari'ah Compliant, Shari'ah Screening, Trade-Off Theory, Pecking Order Theory

JEL codes: C58, E44, G15

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1 INTRODUCTION

Capital structure is the mixture of debt and equity capital of a company. The capital structure of a company is very important since it is related to the ability of the company to fulfill the needs of its stakeholders. Theories of capital structure seek to provide a framework for understanding how financing decisions are made. Since the seminal work of Modigliani and Miller (1958, 1963) a large number of academic works emerged and developed several competing theories in an attempt to arrive at one that is able to explain the financing behavior of companies (e.g. Myers, 1984; Myers and Majluf, 1984; Shyam-Sunder and Myers, 1999; Baker and Wurgler, 2002). Michaelas et al. (1999) partition the theory of capital structure into three categories. These categories are the taxbased, the agency cost and the asymmetric information and signaling theories. The main theory that considers both, taxes and agency costs is the Trade-Off Theory, while the main theory under asymmetric information and signaling theories seems to be the Pecking Order Theory. Despite the large number of academic studies, there is still no agreement among scholars on which determinants are reliably important. Firms generally differ in terms of profitability, growth opportunities, asset structure, operational risk, competitiveness, country's legal and tax frameworks, etc. It is, therefore, important that firms consider all these factors in order to remain operative in the current competitive environment. Consequently, firms' capital structure ratio is expected to be dynamic and vary between countries, industries and the firm sizes.

During the last decades, Islamic finance experienced enormous growth and innovation within the currently global (conventional) financial industry. According to HSBC, the Islamic finance industry showed an annual growth rate of 28% during the years 2006–2009 (despite the Global Financial Crisis in 2007–08).¹ Thomson Reuters reports an average growth rate of 10% per year, with the total assets under management around USD 2 trillion in 2015 and USD 3.25 trillion by 2020.² As of late, the growth has slowed and we believe mainly due to 2 factors. i) the sharp fall in oil prices has had an impact on Islamic banking and Capital Market activity within the Gulf region and ii) the natural reduction in growth as asset size becomes large. No institution or sector can keep growing at double digit rates over a prolonged period. Some reduction in growth after many years of very rapid growth is to be expected. However, in line with this growth, innovative Islamic finance products have been introduced into the Islamic financial market. This can be attributed to the increasing demand for such products by the rapidly expanding Muslim population who require finance products that are compatible with their beliefs (Grais and Pelligrini, 2006). One of the areas which have affected the recent growth of Islamic finance is in investments in international stock markets. An average growth rate of approximately 8% per annum is reported by Thomson Reuters, with the Islamic funds assets under management at around USD 60 billion in 2015 and USD 88 billion by 2020.³

¹ Reuters Islamic Banking and Finance Summit, 2010. Available at: https://customers.reuters.com/wetfetch/index.aspx?CID=30887&doc=Reuters_Islamic_Banking_and_Finance_Summit_10.pdf&base=/community/summits/previous.asp

² See Islamic Finance Development Report 2015, ICD-Thomson Reuters. Available at: <https://www.zawya.com/mena/en/ifg-publications/241115073158K/>

³ Ibid.

Many individual and institutional investors, mainly from Islamic countries, seek to invest only in stocks that are compliant with the Shari'ah (i.e. Islamic law).

To address the mentioned increasing demand, different index providers have started to develop their Islamic indices based on their proprietary screening methodology. The Fatwa for Dow Jones Islamic Market Index (DJIMI) in 1998 can be considered as the birth of the Shari'ah screening methodology. The screening procedure foresees two levels, the qualitative and quantitative screens. The former focuses on the business operations and the latter on the pre-determined financial ratios (e.g. leverage ratio < 33%). Companies, which pass all the screening criteria, are classified as being Shari'ah compliant (SC), otherwise as being Shari'ah non-Compliant (SNC). Due to this limitation imposed on SC firms, these firms are not expected to benefit through the debt tax shield to the extent of their non-compliant peers. Consequently, it is expected that SC firms exhibit different financing behavior.

As of today, only few capital structure literatures exists on firms operating under the Shari'ah principles. Even though limited in numbers, academic studies have been conducted to examine the significance of the existing capital structure theories and the debt determinants in explaining the financing decision of SC firms operating in Malaysia and GCC only. Ahmed (2007) in his study uses a qualitative approach and addresses the capital structure of Islamic firms and suggests that Islamic firms should follow a slightly revised version of the Pecking Order Theory as shown in his paper. Haron and Ibrahim (2012) and Thabet and Hanefah (2014) apply a quantitative analysis on the Shari'ah compliant firms in Malaysia. Their result differs from each other, as Haron and Ibrahim (2012) find support for the dynamic version of Trade-Off Theory, Thabet and Hanefah (2014) find support for the Pecking Order Theory. Akinsomi et al. (2015) enhanced the scope by conducting a comparative analysis among property firms operating under the Shari'ah principle against the conventional property firms in GCC countries. The author finds overall support for Pecking Order Theory, however partially with inconsistent results.

Considering the fact, that the Shari'ah compliance classification is relatively new in the industry, the number of academic research are limited. Consequently, a certain maturity level to establish a specific Capital Structure theory from Islamic perspective, which would explain the financing behavior of these firms, has not been reached yet. Henceforth, the objective of this paper is to identify significant differences of the SC and SNC firms considering the commonly used and reliable debt determinants. This study contributes

to the current literature in different ways. First, it provides further understanding of the capital structure decision of firms identified as being SC compared to their non-compliant peers. This is obtained by estimating the relationship between various debt determinants and the capital structure decision of both firm types operating in different markets over the years 2004–2014. Considering the enormous growth of Islamic Finance as a whole, academic studies especially utilizing “SC firm dataset” are limited, which clearly demonstrates the importance of investigating capital structure decision of these firms. Second, to mitigate endogeneity problems, which is a serious problem in corporate finance studies, we use lagged values of all independent variables and apply Fixed Effects (FE) estimators on our defined static models. Using a sample of 791 SC and 615 SNC firms (based on the screening criterion of Dow Jones), our static estimates

potentially suffer from heteroskedasticity. To mitigate such a problem, we applied “robust” standard errors option in every regression as suggested by White (1980). Last, for comparability purposes we investigated only those debt determinants that are considered as reliable in the literature and those which have predictions made by both capital structure theories namely, Trade- Off Theory and Pecking Order Theory, respectively.

The empirical findings suggest that the determinants under study (i.e. profitability, growth opportunities, firm size, tangibility, business risk and GDP growth) are reliable in explaining SC and SNC firms capital structure. Additionally, in terms of the coefficient sign and statistical significance, the financing decision of SC and SNC firms, both are better explained by the Pecking Order Theory for book leverage and by the Trade-Off Theory for market leverage, respectively.

The remainder of the paper proceeds as follows. In section 2, an overview of the Shari'ah screening methodology will be provided followed by the literature review and the development of the research hypotheses. Section 3 describes the sample data, variables and the methodology used in the empirical analysis. Section 4 outlines the main results and Section 5 concludes.

2 LITERATURE REVIEW & THEORETICAL FRAMEWORK

2.1 Shari'ah Screening Methodology

Islam with Shari'ah as its core, is a religion that provides guidance in all aspects of a Muslim. Hence, all actions conducted by a Muslim are required to be in accordance with the teachings of Islam, including the economic affairs. The concept of screening companies before making investments in them is derived from the Shari'ah principle that Muslims should not participate in an activity that does not comply with the teachings of Islam (Mian, 2008). Muslim investors around the world have been seeking the guidance of Shari'ah scholars on the permissibility of investment in stock markets.

Several stock exchanges and financial institutions have established Shari'ah indices with their proprietary screening methodology to increase participation in equities by Muslim investors. All of the different Shari'ah index providers have one thing in common, to identify the elements that violate the rules and guidelines of Shari'ah law, which are rooted in the Qur'an (considered by Muslims as the revealed word of God) and the Sunnah (the sayings and practices of the Prophet Muhammad (peace be upon him)). Shari'ah law prohibits elements such as *riba* (usury/interest), *gharar* (unnecessary/excessive risk, uncertainty), financial services (conventional) and *maisir* (gambling/speculation), etc. These elements are common and present in many conventional financial activities.

Khatkhatay and Nisar (2007) support Alhabshi's opinion by saying that “*fully Shari'ah compliant equities are extremely rare*”. The reason for this is that, most of the countries do have conventional finance institutions, therefore, companies are exposed to ribarelated activities when dealing with these institutions. A similar expression was made by Donia and Marzban (2008) in which the authors stated: “*it is almost impossible to find companies which are not dealing with conventional banks and either earn or pay interest*”.

To overcome this issue, Shari'ah scholars have agreed on the acceptable level to which companies can involve in such practices and outline the steps to purify the sinful earnings (Adam and Bakar, 2014).

Table 2-1: Dow Jones Islamic Index - Shari'ah Compliance Criteria

Panel A: Qualitative Screening (Impermissible Income*)	Panel B: Quantitative Screening (Financial Ratios****)
Alcohol, tobacco, pork-related products, weapons and defense, conventional financial services** (banking, insurance, etc.), entertainment (hotels, gambling, cinema, adult entertainments, music, etc.)***	<ul style="list-style-type: none"> • Total debt • The sum of cash and interest-bearing securities • Accounts receivables

Source: Own compilation, in reference to Dow Jones Islamic Market Indices Methodology (October 2015).

* Income generated through non-compliant activities (max. 5% of total revenue) are subject for purification (i.e donation to charity).

** Excluding Islamic banking and insurance (Takaful).

*** Although no universal consensus exists among contemporary Shari'ah scholars on the prohibition of tobacco companies, hotels and the defense industry, most Shari'ah boards have advised against investment in companies involved in these activities.

**** Each ratio is divided by trailing 24-month average market capitalization and the result must be less than 33%.

2.2 Literature review

Since Modigliani and Miller published their paper on the cost of capital, corporate finance and investment theory in 1958 (Irrelevance Theory), a large number of academic works emerged and developed several competing theories in an attempt to arrive at one that is able to explain the financing behavior of companies as well as establishing whether an optimal capital structure exists. As mentioned in the introduction the two most important theories are Trade-Off and Pecking Order Theory.

The Trade-Off Theory addresses the gap in Irrelevance Theory by combining the impact of the cost (bankruptcy) and the benefits (tax shield) of debt in the capital structure decision of firms. The Trade-Off Theory states that the optimal leverage ratio (i.e. debt-to-equity ratio) can be realized by balancing the tax savings benefits of debt financing against the financial distress costs that arise from bankruptcy risk and agency costs (Kraus and Litzenberger, 1973; and Jensen and Meckling, 1976). In contrast to Trade-Off Theory, Pecking Order Theory does not imply that firms' capital structure decision is driven by the notion of optimal capital structure, but rather simply based on the firm's willingness to reduce information asymmetry. Consequently, firms tend to exhaust their internal funds first through retained earnings, followed by the use of safe debt and as a last resort use riskier equity financing.

Both capital structure theories use firm-specific and macroeconomic determinants to explain the financing behavior of firms. Next, the most relevant determinants that have a significant impact on the capital structure decision of firms will be discussed. Since the number of various determinants used in the academic studies is large, we only focus on those reliable determinants following mostly Frank and Goyal (2009) and on those that have predictions made by both the Trade-Off Theory and Pecking Order Theory. Our empirical analysis along with hypotheses development is based on the previous empirical results. The hypotheses are created in order to provide an answer to the following research question: What are the significant determinants of capital structure in the context of Shari'ah compliant (SC) and Shari'ah non-compliant (SNC) companies?

2.2.1 Profitability

Profitability is one of the most tested leverage determinants in academic studies. Capital structure theories have different views on the relationship between leverage and profitability. According to the Trade-Off Theory (which argues two-sided) more profitable firms should use more debt because of the tax shield. This happens since they have the possibility to shield more profit in order to get tax benefits associated with the use of debt tax shields. A positive relationship can also be assumed by the fact that profitable companies incur lower expected cost of financial distress, i.e. making debt financing less costly. This finding is in line with the findings of Graham (2000), Delcours (2007), Deesomsak et al. (2009) and Piaw and Jais (2014a). Similarly, increased debt will serve as a disciplinary factor for managers when free cash flow is likely to increase with increased profitability (Jensen, 1986). However, on the other side of the argument, Fama and French (2002), Frank and Goyal (2003) and others' findings often show a negative relationship between leverage and profitability. For instance, Kayhan and Titman (2007) also finds this relation in their analysis of changes in debt ratios, but the effect is relatively weak. It is argued that in a dynamic environment of the Trade-Off Theory, the relationship between profitability and leverage is negatively related (Gaud et al., 2005; Flannery and Rangan, 2006 and Huang and Ritter, 2009; Haron and Ibrahim, 2012 and Öztekin, 2013). It is argued that profitable firms may choose to hold on to their internal funds (retained earnings) to take advantage of future investment opportunities, consequently resulting in lower leverage level (Strebulaev, 2004 and Hennessy and Whited, 2005).

According to Pecking Order Theory, retained earnings are the preferred financing option which stays in contrast to the predictions made by Trade-Off Theory. As stated in Myers (1984), it is expected that profitable firms retain more earnings which is the preferable source of funding. As such, the amount of leverage needed by the company should decrease. Thus, higher profits will therefore also be used to pay down debt and the companies will achieve a low debt ratio over time.

Academic studies have found a consistently negative relationship between profitability and leverage, as predicted by the Pecking Order Theory. Based on the previous empirical results our hypothesis is as follows: H.1: A significant negative relationship between profitability and leverage is expected among Shari'ah Compliant (SC) and Shari'ah non-Compliant (SNC) companies.

2.2.2 Growth Opportunities

The value of a company's growth opportunities is most likely only valuable to the individual company, or at least less valuable to other companies, in which case the costs of financial distress and bankruptcy will be higher for companies with huge growth opportunities. Myers (1977) states that the problem of shareholders making suboptimal investment decisions is more severe when a company has more growth opportunities as potential investors cannot value or decide which growth opportunities the company should follow. Barclay et al. (2006) present a model showing that the debt capacity of growth options can be negative. Goyal et al. (2002) find that when growth opportunities of defense companies decline, these firms increase their use of debt financing. With this consideration, the Trade-Off Theory suggests a negative

relationship between growth opportunities and leverage. This has also been reported and confirmed for instance by Shyam-Sunder and Myers (1999), Fama and French (2002) as well as by Barclay et al. (2006) and Dang and Garrett (2015).

In contrast, the Pecking Order Theory predicts a positive relationship between growth opportunities and leverage. The rationale is, that higher information asymmetries are involved as shareholders are not willing to expose much information about their investment opportunities. These investment opportunities require investment outlays, which lead to an increase in the companies' financing deficit and thus causes the companies issuing external financing, preferably short-term debt financing (Gaud et al., 2005). A positive relationship has been recorded in academic studies such as, Chang et al. (2009), Guney et al. (2011), Dang et al. (2014) and Andres et al. (2014). Also, current and future growth must arise from (real) investments, which should be financed with more debt according to the Pecking Order Theory. Thus, the negative relation between growth opportunities and leverage is not consistent with the Pecking Order Theory.

Academic studies have found a consistently negative relationship between growth opportunity and leverage, as predicted by the Trade-Off Theory. Based on the previous empirical results our hypothesis is as follows: H.2: A significant negative relationship between growth opportunity and leverage is expected among Shari'ah Compliant (SC) and Shari'ah non-Compliant (SNC) companies.

2.2.3 *Firm Size*

Company size is one of those determinants, similar to profitability and growth opportunity, that provides consistent results in its relationship to leverage. The impact of the size effect on leverage basically depends on which capital structure theory to look at. According to the Trade-Off Theory, a positive relationship can be expected. It is argued that the bigger a company becomes, the less it will face bankruptcy risk. In other words, these companies are too big to fail. Furthermore, the larger a company, the less volatile the cash flows of the company will be due to diversification effects that mostly materialize the bigger a company is (Titman and Wessels, 1988). This prediction is in line with the findings of Ozkan (2001), Deesomsak et al. (2004), Bas et al. (2009), Guney et al. (2011), Mitreva (2014) and Dang and Garrett (2015).

However, according to the Pecking Order Theory, the situation changes drastically, because larger companies are exposed to more monitoring through the capital market and asymmetric information will be lowered due to extensive exposure duties. Accordingly, larger companies will be able to issue equity at lower costs which will mean a lower leverage ratio and furthermore larger companies are assumed to have had an opportunity to retain earnings (Frank and Goyal, 2009). For instance, Rajan and Zingales (1995), Chen (2004), Chakraborty (2010) and Haron and Ibrahim (2012) found a negative relationship between firm size and leverage, which support the notion of the Pecking Order Theory.

Academic studies have found a consistently positively relationship between size and leverage, as predicted by the Trade-Off Theory. Based on the previous empirical results our hypothesis is as follows: H.3: A significant positive relationship between firm size and leverage is expected among Shari'ah Compliant (SC) and Shari'ah non-Compliant (SNC) companies.

2.2.4 *Tangibility*

The quality of a firm's tangible assets is a direct measure of the security that the firm can offer to the existing and potential investors. The Trade-Off Theory predicts that company's leverage increases with tangibility. The reason is that fixed assets, being easier to value in comparison to intangibles, provide more security for potential investors as collateral. This will reduce the risk for debtholders and ultimately reduce the cost of debt for the companies and they will be able to operate with higher leverage ratios without incurring higher financial distress costs (Titman and Wessels, 1988). Furthermore, collateralized debt makes it difficult for investors to conduct asset substitution as the debtholders have collateral in specific assets (Frank and Goyal, 2009). Therefore, agency costs should be lower between shareholders and debtholders, and companies should use more debt relative to the amount of tangible assets they own. See among others Antoniou et al. (2008), Frank and Goyal (2009), Fan et al. (2011), Mitreva (2014), Andres et al. (2014) and Dang and Garrett (2015), who found a positive relationship between tangibility and firms leverage.

The Pecking Order Theory argues in the opposite direction and suggests that tangibility will generate less information asymmetry between potential investors and shareholders, and hence the cost of issuing equity will fall, resulting in lower levels of debt (Frank and Goyal, 2009). A negative relationship is reported by previous studies such as Graham (2000), Cheng and Shiu (2007), Bas et al. (2009), Haron and Ibrahim (2011), Sorokina (2014) and Piaw and Jais (2014a). Unless the cost of equity falls below the cost of debt (as predicted by Trade-Off Theory), the Pecking Order Theory implies that companies will use the cheapest sources of funding, debt would still be the preferred funding to equity, at least for moderate amounts of debt. However, Harris and Raviv (1991) state that it can be expected that companies with little tangible assets would have bigger asymmetric information problems. In this way, firms with few tangible assets will tend to collect more debt over time and become more highly leveraged. Therefore, the prediction of the Pecking Order Theory might not be as explicit as some researchers argue.

Academic studies have found a consistently positive relationship between tangibility and leverage, as predicted by the Trade-Off Theory. Based on the previous empirical results our hypothesis is as follows: H.4: A significant positive relationship between tangibility and leverage is expected among Shari'ah Compliant (SC) and Shari'ah non-Compliant (SNC) companies.

2.2.5 *Business risk*

As the firm's earnings volatility increases, it increases the probability of default on firm's debt payment. This reduces the confidence level among creditors to extend new loans to risky firms and finally ends up with higher financial cost. Thus, according to the Trade-Off Theory, these firms need to lower their debt level in order to minimize their bankruptcy risk. Frank and Goyal (2009) state that volatility in earnings may limit the probability of fully utilizing the benefits from tax shields, leading to lower debt levels. Deangelo and Masulis (1980) argue that the cost of debt will increase for firms that have variability in their earnings since investors will not be able to predict future earnings accurately based on the publicly available information.

Bradley et al. (1984) argue further that the variability of the firm value expected to show negative influence on the debt ratio when the costs of financial distress are significant. Consequently, this suggests a negative relationship between business risk and leverage and it is reported in Booth et al. (2001), Delcours (2007), De Jong et al. (2008) and Deesomsak et al. (2009).

On the contrary, the Pecking Order Theory predicts that higher risk leads to higher leverage and the rationale behind is, that volatility in earnings will lead investors to require a higher rate of return, making it more expensive to issue equity (Rajan and Zingales, 1995). These findings are supported by the academic studies such as Deesomsak et al. (2004), Ariff et al. (2008) and Sorokina (2014).

Academic studies found a predominantly negative relationship between risk and leverage, as predicted by the Trade-Off Theory. Based on the previous empirical results our hypothesis is as follows: H.5: A significant negative relationship between business risk and leverage is expected among Shari'ah Compliant (SC) and Shari'ah non-Compliant (SNC) companies.

2.2.6 GDP growth

Business activities usually go along with the economic growth of a country. During the peak times, companies take the opportunities in expansion and investment programs with the objective to generate more profits, thus enhancing the firm value. The Trade-Off Theory predicts that higher profits make debt financing due to larger tax shield benefits more attractive. De Jong et al. (2008) show that the higher the economic growth, the higher the firms' willingness to employ debts to finance their new investments.

However, according to the Pecking Order Theory, GDP growth is associated with higher profits for companies, being able to make use of more internal capital instead of debt financing.

Academic studies have found a rather mixed result of the relationship between economic growth and leverage. The results show predominantly negative relationship which supports the prediction of Pecking Order Theory. While Bas et al. (2009), Hanousek and Shamshur (2011) and Çekrezi (2013) find a positive relationship, other academics such as Ariff et al. (2008), Haron and Ibrahim (2012) and Piaw and Jais (2014b) find a negative relationship between economic growth and leverage. Based on the previous empirical results our hypothesis is as follows: H.6: A significant negative relationship between GDP growth and leverage is expected among Shari'ah Compliant (SC) and Shari'ah non-Compliant (SNC) companies.

3 Sample, variables and model specification

3.1 Sample design

The sample under study consist of SC firms with their non-compliant peers. All SC firms are taken from the DJIMI constituent list (as of March 2015) with focus on countries with the highest number of firms. The selected countries are the United States, United Kingdom, Canada, Japan, Taiwan, South Korea and India. SNC firms were sourced from the major stock exchanges of the countries under study. We have ensured that all SNC firms operate in the same Industry Classification Benchmark (ICB) Subsector (Level 4), which would potentially pass the qualitative screens of DJIMI (see Section 2.1.). After applying cleansing activities

(e.g. like previous studies, we excluded all financial and utility firms, firms with the age of 4 years and less,⁴ etc.) we faced the issue having 1322 SC and 17,096 SNC firms, which was not feasible to proceed with. The reason was, that there were thousands of SNC firms with very little market capitalization value compared to the number of SC firms. Firms with low market capitalization would not represent the market, hence to our discretion, we have chosen a size floor of US\$1 Billion market capitalization value (as of calendar year 2014). This study requires at least 3 consecutive annual observations and the first year of observation is required for some calculations. This allowed us to have a pool of comparable number of SC and SNC firms (in quantity and in size). The number of SNC firms dropped to 1525, whereas the number of SC firms decreased to 918 representing 98.78% of the total market capitalization value of all SC firms operating in countries under study.

We should keep in mind that the nature of this study is the comparative analysis of the capital structure between SC and SNC firms.⁵ In order to conduct such an analysis, the history (tracking list) of the respective firms are required. Consequently, we applied DJIMI financial criteria (see Section 2.1.) on SC firms for each year over 2004–2014 and ensured consecutiveness of being SC at least in 3 years throughout the time series. Similarly, for SNC firms we controlled for each year under study only for the leverage ratio with a threshold $> 33\%$ ⁶ and ensured consecutiveness of being SNC for at least in 3 years throughout the time series.⁷

All financial data was obtained from Thomson Reuters Eikon/Datastream for firm-specific data and from World Development Indicator (WDI) for macro-specific data. Furthermore, following Baker and Wurgler (2002) and others, we require book leverage between 0 and 1, market-to-book ratio between 0 and 10 and negative equity values. All firms are excluded with incomplete data for relevant variables. To restrict the impact of outliers, all financial variables are winsorized at the 1% and 99% level.⁸ The final sample under study consists of SC (791) and SNC (615) firms unbalanced panel data from seven countries over the years 2004–2014. The structure and the participation pattern of the panel data are represented in the Tables A-1a and A-1b in Appendix A, respectively.

⁴ This study requires at least 3 consecutive annual observations and the first year of observation is required for some calculations.

⁵ We classified each firm as either being SC or SNC throughout the time series.

⁶ According to the DJIMI screening requirements, it is sufficing to disqualify from being SC if one of the criteria (e.g. leverage ratio) is violated.

⁷ This manual calculation approach provides consistent SC and SNC tracking history throughout the series. The limitation of our study is that we did not ensure that the companies always complied with the remaining criteria such as business lines (qualitative screens with its 5% threshold for impermissible income) throughout the years. To reduce the deviation of our selected firms from all sets of criteria, as far for the SC firms we have chosen the DJIMI as our investment universe. For the remaining samples (i.e. SNC), the pool of firms is active stocks traded in the main stock exchange within the sample countries.

⁸ Tables A-2, A-3 and A-4 show the basic econometric tests such as the scatterplot for the effect of winsorizing, normality and linearity tests, respectively.

3.2 Variable measurement and model specification

Following, among others, Baker and Wurgler (2002), Fama and French (2002), and Huang and Ritter (2004, 2009), both book and market leverage (BLEV and MLEV) measures will be used as the dependent variable. As shown in Table 3-1, book debt is very close to total liabilities since the amount of preferred stocks and deferred taxes are little and negligible. In the words of Welch (2011) “*Convertible debt is, for all practical purposes, irrelevant in the average firms, as are minority interest, capitalized leases, income tax payable, and preferred stock.*” In contrast, Rajan and Zingales (1995) highlight that a broad definition of leverage (i.e. total liabilities) is likely to overstate the financial leverage (as it includes non-financial debt like accounts payable and other liabilities) and it may not provide a good indication of the near future default probability. However, for some firms, these non-financial items are very important part of the capital structure. Credit rating agencies (e.g. Standard and Poor's (2006), p.27) state that traditional measures focusing on longterm debt have lost much of their significance and that non-financial debt like pension obligations should be considered as being similar to debt in many respects.

Table 3-1: Definitions of dependent and independent variables

Variables	Definition	Measure	Predictions	
Dependent				
BLEV	Book Leverage	Book Debt / Total Assets (whereby, Book Debt = Total Assets - Book Equity)		
MLEV	Market Leverage	Book Debt / (Total Assets - Book Equity + Market Equity) (whereby, Book Equity = Total Assets - Total Liabilities - Preferred Stocks + Deferred		
Independent				
PROF	Profitability	EBITDA / Total Assets	TOT	POT
GRWTH	Growth Opportunity	Market Value Assets / Book Value Assets	+/-*	-
SIZE	Firm Size	Log Total Sales	-	+
TANG	Tangibility	Fixed Assets / Total Assets	+	-
RISK	Business Risk	StdDev EBIT	-	+
GDP	GDP Growth	GDP growth (annual %)	+	-

* Dynamic Trade-Off Theory

The first independent variable is profitability. Our study defined EBITDA over total assets as a proxy for profitability (PROF). Following Frank and Goyal (2003) and many others, we used Market-To-Book as a proxy for growth opportunity (GRWTH). The firm size variable is based on natural logarithm of firm's total revenue (SIZE). Following Baker and Wurgler (2002) and Frank and Goyal (2009), our study utilized property, plant and equipment, net over total assets as a proxy for tangibility (TANG). Business risk or earnings volatility is measured as the standard deviation of EBIT (RISK). Following Demircuc-Kunt and Maksimovic (2002) our study used the GDP growth (annual %) as a proxy for economic growth (GDP).⁹

Having described the dataset and the dependent and independent variables, we now move on to a formal depiction of the regression models that are utilized. The general form of the models is:

⁹ We have applied various number of other proxies for each of the firm-specific variables such as ROE (for Profitability), Natural Logarithm of Assets (Firm Size), Accounts Receivable (Tangibility), etc. However due to Multicollinearity and Variance Inflation Factor results (unreported) we have removed those variables that are highly correlated with other variables and limit our study to those proxies represented in Table 3-1.

$$y_{it}^* = \alpha + \beta x_{i,t-1} + \mu_i + \mu_t + \varepsilon_{it} \quad (1)$$

Where y_{it}^* is the firm's target debt ratio for firm i in year t which is explained by $x_{i,t-1}$ the vector of 1-year lagged¹⁰ firm-specific and macroeconomic control independent variables, α is the constant term, μ_i the individual error, μ_t a time-specific component of the error term (in other words time dummies were added to account for global financial crisis effects) and ε_{it} the classical error term, which is assumed to be mean equal to zero, uncorrelated with itself, uncorrelated with x , uncorrelated with μ_i and homoskedastic, i.e. $\varepsilon_{it} \approx i.i.d.N(0, \sigma^2)$. Table 3-1, depicts the predicted signs of capital structure theories as discussed in Section 2.2. After replacing the vector $x_{i,t-1}$ with the aforementioned firm-specific and macroeconomic determinants, the static regression model (1) became:

$$\begin{aligned} BLEV_{it} = & \alpha + \beta_1 PROF_{i,t-1} + \beta_2 GRWTH_{i,t-1} + \beta_3 SIZE_{i,t-1} + \beta_4 TANG_{i,t-1} \\ & + \beta_5 RISK_{i,t-1} + \beta_6 GDP_{i,t-1} + \mu_i + \mu_t + \varepsilon_{it} \end{aligned} \quad (2.1)$$

$$\begin{aligned} MLEV_{it} = & \alpha + \beta_1 PROF_{i,t-1} + \beta_2 GRWTH_{i,t-1} + \beta_3 SIZE_{i,t-1} + \beta_4 TANG_{i,t-1} \\ & + \beta_5 RISK_{i,t-1} + \beta_6 GDP_{i,t-1} + \mu_i + \mu_t + \varepsilon_{it} \end{aligned} \quad (2.2)$$

Where $BLEV$ and $MLEV$ are the book and market leverage for firm i in year t , respectively, with firm-specific determinants such as profitability ($PROF$), growth opportunities ($GRWTH$),¹¹ firm size ($SIZE$), tangibility ($TANG$), earnings volatility ($RISK$) and GDP growth (GDP). The μ_i denotes the time-invariant unobservable firm-specific fixed effects (e.g. management performance), and μ_t represents the firm-invariant time-specific fixed effects (e.g. stagflation, interest rates, inflation rates) which are common to all firms and can change through time. The disturbance term is denoted as ε_{it} and is assumed to be mean equal to zero, uncorrelated with itself, uncorrelated with x , uncorrelated with μ_i and homoskedastic, i.e. $\varepsilon_{it} \approx i.i.d.N(0, \sigma^2)$.

Both models (2.1 and 2.2) have the static nature and we utilized common static panel techniques, such as OLS, Fixed Effects (FE) and Random Effects (RE) to test the hypotheses formulated in Section 2.2. However, the problem of choosing between these static estimators remains. Fortunately, through the use of several post estimation tests such as the Breusch & Pagan Lagrange Multiplier (to detect the

¹⁰ Note, that we make use of 1-year lagged for two reasons. First, including lagged values of the explanatory variables address and mitigate endogeneity problems (potentially caused by omitted variables, simultaneity or measurement error). Second, it is believed that the impact of the debt determinants (especially firm-specific determinants) have their impact on firm's leverage decision at least one year later. The notion behind is, that firm's manager need a certain "buffer time" to oversee and evaluate the firm's internal position before making such a strategic decision (i.e. financing decision). The survey of Graham and Harvey (2001) support the notion and report that managers use book values (which indicates past values) as a basis when deciding the capital structure of firm.

¹¹ Since the dependent variable ($MLEV$) has the market value of equity in the denominator and growth opportunities (MTB) has the market value of equity in the numerator, a mechanical negative relation could also exist between the two variables. However, lagging all independent variables (see above) allows us to apply MTB ratio (frequently used proxy for growth opportunities) without any limitation.

presence of an unobserved effect) and Hausman (to help the choice between RE and FE) the use of efficient and consistent estimators can be assured. Counter measures for the existence of heteroskedasticity and autocorrelation have also been utilized.¹² All post estimation tests results are represented in Table A-6 in Appendix A.

4 RESULTS AND DISCUSSIONS

4.1 Descriptive Statistics

The descriptive statistics of the dependent and independent variables appear in Table 4-1. Following observation can be derived: First, on average SC firms use 40% debt financing in their capital structure, much less than that of their non-compliant peers which report an average debt financing of 66%. Similarly, the market leverage measure shows a mean of 19% and 60% for SC and SNC firms, respectively, indicating that the former relies less on debt which explains the constraints imposed by Shari'ah. Second, the mean firm's profitability, among SC and SNC firms are 18% and 10%, respectively. This result signifies that SC firms are those among the highly profitable firms and generate 80% more for each Dollar invested in assets as compared to SNC firms. Third, market-to-book ratio that measures firm's growth opportunities show substantial differences among SC and SNC firms with a mean value of 2.57 and 1.14, respectively. This indicates that the market as a whole has a general good perception about the firm's future prospects. Four, in terms of firm size the mean values show that SC and SNC are among firms that are of similar size. Five, on average 26% of SC firms' assets are tangible or fixed assets, which is 10% less compared to their non-compliant peers, indicating that SNC firms can offer more of its assets as collateral for debt financing. Finally, the measure of business risk indicates similar variability and spread in returns for both firm types. We have conducted additional analysis to test the differences between the mean and variances of both SC and SNC firms sample. All results are shown in Table B-1 in Appendix.¹³

Pairwise correlation matrix is reported in Table 4-1 for all dependent and independent variables used in the regression analysis. Observations for all variables show that all of the correlation coefficients are below 80%. A correlation coefficient of more than 80% indicates serious multicollinearity problem (Brooks, 2014). As expected the correlation between BLEV and MLEV are high due to their very similar definitions. The same applies for the high correlation between growth opportunities (GRWTH) and MLEV, since both variables have the same market value of equity in their ratio. The maximum correlation among the independent variables is recorded at approximately 46%, which is between profitability (PROF) and

¹² Table A-5 represent the Auto-/Serial Correlation Tests for BLEV and MLEV, respectively.

¹³ Admittedly, on the basis of mean and variance (z-test), our results tend to be inconclusive. However, given the objective of the paper, we would like to proceed on the basis of significant difference (between SC and SNC firms) evidenced in the case of MLEV, bearing in mind the limitation of our results based on BLEV. This limitation should be borne in mind while interpreting these results. As for the independent variables it seems they have the same effect on both firm types. In specific, the effect of profitability, growth opportunities, firm size, tangibility, business risk and GDP exhibits statistical insignificance, indicating that being SC or not - regardless of the country - the effect of all the independent variables under study is the same.

growth opportunities (GROWTH). As such, it can be concluded that the multicollinearity is not detrimental to the results of our regression analysis.¹⁴

Table 4-1: Mean Values and Pairwise Correlation Matrix

Variables		Mean	SD	BLEV	MLEV	PROF	GRWTH	SIZE	TANG	RISK	GDP
BLEV	a	0.40	0.17								
	b	0.66	0.13	1							
MLEV	a	0.19	0.11	0.613*							
	b	0.60	0.14	0.619*	1						
PROF	a	0.18	0.08	0.021	-0.343*						
	b	0.10	0.05	-0.143*	-0.414*	1					
GRWTH	a	2.57	1.38	0.007	-0.630*	0.464*					
	b	1.14	0.25	0.247*	-0.575*	0.370*	1				
SIZE	a	14.55	1.46	0.286*	0.377*	0.070*	-0.254*				
	b	15.44	1.26	0.248*	0.318*	-0.136*	-0.154*	1			
TANG	a	0.26	0.21	-0.098*	0.065*	0.090*	-0.196*	0.053*			
	b	0.36	0.21	-0.054*	0.0260	0.191*	-0.081*	-0.129*	1		
RISK	a	0.02	0.02	-0.064*	-0.132*	0.085*	0.139*	-0.171*	0.038*		
	b	0.02	0.02	-0.040*	-0.030*	0.002	0.013	-0.057*	0.029*	1	
GDP	a	2.23	2.68	0.028*	-0.186*	0.130*	0.271*	-0.173*	0.024	-0.025*	
	b	1.70	2.71	0.024	-0.095*	0.124*	0.151*	-0.072*	0.018	-0.020	1

This table shows both the mean and the coefficient correlations between the variables for the pooled SC and SNC firms. Variable definitions are provided in Table 3-1. ^a and ^b denoted for SC and SNC firms, respectively. * Indicates the coefficient is significant at the 5% level.

4.2 Results of the main model

The following sub-section deals with the empirical findings and all regression results corresponding to our regression model (2.1 and 2.2) are shown in Table 4-2. All independent variables show statistical significance and thus do have an impact on the leverage decision of firms. Column (1) and (2) represent the FE regression results on BLEV for both SC and SNC firms, in similar fashion Column (3) and (4) for MLEV. All regression models contain time fixed effects (time dummies).

4.2.1 Profitability

The results show that the profitability is found to be highly significant and negatively related to both leverage measures and both SC and SNC firms. The negative relationship is consistent with the predictions of the Pecking Order Theory which posits that higher profitability should enable the company to retain more

¹⁴ Another method to test the existence of multicollinearity is by calculating Variance Inflation Factor (VIF) for each independent variable. VIF can be calculated through the equation $VIF = 1/(1 - R^2)$. Under this test, VIF value greater than 10 indicates multicollinearity problem (Gujarati, 2004). From the results shown in in Table B-2 in Appendix B it can be confirmed that multicollinearity is not an issue since the VIF values are far below the cut-off point. Hence, our results from the pairwise correlation matrix can be confirmed and no multicollinearity is evident in the model.

earnings which is the preferable source of funding, hence, the amount of debt needed by the company should decrease (Myers, 1984). Even though the negative relationship is often stated as a contradiction of the Trade-Off Theory (Frank and Goyal, 2009), the development in a dynamic environment of the Trade-Off Theory finds several possible explanations for this negative relationship. For instance, the existence of adjustment costs (higher transaction costs) can lead firms to choose to utilize internal funds (retained earnings) to take advantage of future investment opportunities. This is consistent with the survey results of Graham and Harvey (2001) which states that firms are willing to hold on their cash availability to preserve financial flexibility.

Studies on Shari'ah compliant firms: Similar results were reported in Haron and Ibrahim (2012) and Thabet and Hanefah (2014) in which the authors exhibit a negative relationship between profitability and leverage for SC firms in Malaysia. The authors suggest that profitable SC firms operating in the Malaysian context prefer internal fund to finance their investment activities. The authors argue that profitable SC firms with an excess of cash (internal funds) are not permitted to invest in interest-bearing (riba involved) investments. According to the results in Table 4-2, hypothesis H.1 can be confirmed for BLEV and MLEV for both SC and SNC firms, respectively.

4.2.2 Growth Opportunities

It has been predicted that higher firm valuation (market-to-book) exploits negative impact on the leverage decision of firms. The coefficients of the growth variable do show mix results on both leverage measures. The market-to-book ratio is significantly negative in relation to the MLEV on both SC and SNC firms, as predicted by the Trade-Off Theory and is consistent with our expectation and with most of the academic findings studies (Rajan and Zingales, 1995; Booth et al., 2001; Ariff et al., 2008). Higher market-to-book ratios arise from higher expected future cash flows. The inverse relation supports the view that the cost of financial distress of high growth firms is relatively high, thus lead to an increase in agency cost of debt. Because of the high cost of debt, capital provider demand for higher rate of interest and consequently managers would be discouraged to raise debt capital causing a lower leverage ratio.¹⁵ Finally, this finding further indicates that companies refuse taking leverage when their valuation tends to be rather high.¹⁶ However, contrary to our expectations, GRWTH is positive and significant for SNC firms for BLEV. These results can be explained by the arguments made by among others Welch (2011) who found, that if companies use book measure to determine their optimal capital structure, that market-to-book ratio might be a poor proxy for growth opportunities. The significant positive result for SNC firms supports the notion

¹⁵ For instance, Baker and Wurgler (2002) used the market-to-book ratio to measure the market timing opportunities realized by managers and state: "...low leverage firms are those that raised funds when their market valuations were high, as measured by the market-to-book ratio, while high leverage firms are those that raised funds when their market valuations were low." In this case, high market-to-book ratios may reduce managers' motivation to issue debt and internal equity remains preferable to both managers and shareholders of high growth firms.

¹⁶ This finding mirrors the notion of the capital structure theory called "Market-Timing" which states, that firms issue equity when their firm value is overvalued (higher stock price valuation, i.e. higher market-to-book ratio). Market-Timing analysis is outside of the scope of this research.

of the Pecking Order Theory, with the rationale that higher information asymmetries lead shareholders not willing to expose much information about their investment. Consequently, investment opportunities increase financial deficit that further causes companies to raise external financing, preferable short-term (Gaud et al., 2003). As for SC firms, market-to-book ratio exhibits no statistical significance for BLEV, indicating that the future growth opportunities do not significantly influence their capital structure decision of SC firms.

Studies on Shari'ah compliant firms: Haron and Ibrahim (2012) exhibit similar result of no significance for SC firms in Malaysian context in both leverage measures. Based on the results in Table 4-2 we confirm hypothesis H.2 for MLEV for both SC and SNC firms and reject in the context of BLEV for SNC firms.

Table 4-2: Panel Fixed Effects Regression (BLEV and MLEV)

The following table provides an overview of the determinants of leverage. All variables used in the equation model (2.1) and (2.2) are lagged one year and are regressed on the dependent variable book leverage (BLEV), which is defined as book debt to total assets, and market leverage (MLEV), which is defined as book debt to the result of to total assets less book equity plus market equity, respectively. The independent variables are profitability, growth opportunity, firm size, tangibility, business risk (volatility) and GDP growth rate. The definitions of the variables in the regressions are provided in Table 3-1. Regressions are run for the pooled sample and for the entire period 2004-2014, divided in Shari'ah compliant (SC) and Shari'ah non-compliant (SNC) firms, respectively. The sample firms are determined according to the Dow Jones Shari'ah screening methodologies, with a leverage ratio of 33% (maximum threshold). Firms with leverage ratio below the Shari'ah threshold are considered being Shari'ah compliant (SC), otherwise Shari'ah non-compliant (SNC). Model (1) and (2) represent the regression results for book leverage for SC and SNC firms, respectively. Model (3) and (4) represent the regression results for market leverage for SC and SNC firms, respectively. The regressions in all models contain time fixed effects (time dummies). Econometric estimators applied on each model are shown in the last row. Company cluster robust standard errors are reported in the brackets. *, ** and *** denote significance at 10%, 5% and 1% levels, respectively. All variables are winsorized at the 1% and 99% level.

Determinants	Book Leverage		Market Leverage	
	SC (1)	SNC (2)	SC (3)	SNC (4)
Profitability $t-1$	-0.124*** [0.037]	-0.422*** [0.055]	-0.182*** [0.026]	-0.554*** [0.067]
Growth Opportunity $t-1$	-0.004 [0.002]	0.056*** [0.010]	-0.016*** [0.001]	-0.116*** [0.012]
Firm Size $t-1$	-0.008 [0.008]	0.036*** [0.007]	0.024*** [0.005]	0.055*** [0.007]
Tangibility $t-1$	0.066 [0.045]	0.085** [0.043]	0.070*** [0.026]	0.088** [0.043]
Business Risk $t-1$	0.179*** [0.068]	0.029 [0.083]	-0.040 [0.042]	-0.194* [0.100]
GDP growth $t-1$	0.002 [0.001]	-0.002** [0.001]	-0.000 [0.001]	-0.008*** [0.001]
Constant	0.509*** [0.106]	0.071 [0.113]	-0.125* [0.065]	-0.103 [0.107]
R ²	0.029	0.102	0.207	0.344
Adjusted R ²	0.027	0.098	0.205	0.341
Firms	756	577	756	577
Observations	5562	4021	5562	4021
Time Effects	yes	yes	yes	yes
Estimator	FE	FE	FE	FE

4.2.3 Firm Size

Company size is one of those determinants that provide consistent results in its relationship to leverage. While the results for MLEV show positive and significant for both SC and SNC firms, firm size shows a positive relationship on BLEV only for SNC firms. All these results are in line with the notion of the Trade-Off Theory, suggesting that the bigger a firm becomes the less it is exposed to bankruptcy risk (see Section 2.2) and consequently the more leverage the company tends to hold. Additionally, this result can be explained on the basis that bigger firms are well-diversified and have the lower risk of bankruptcy costs. Likewise, they have greater access to the credit market which enhances their debt capacity. While this variable feature strong statistical significance (99% confidence level), it can be concluded that the effect of size on the capital structure decision of especially SNC firms (for both leverage measures) and SC firms (for MLEV) is straightforward. Specifically, the more sales revenue a company generates, the more debt it carries (indebted). The firm size coefficient on BLEV for SC firms exhibits insignificant result. This finding is comparable to those reported by Kim and Sorensen (1986), Titman and Wessels (1988), Chung (1993), Barclay et al. (1995), Johnson (2003) and Sorokina (2014) who also found insignificant results for firm size. The reason size of SC firms might not have an effect on BLEV could be that these firms rely on bank lending (especially in the bank-based countries such as Japan, Taiwan and India), which means that the long-term relationships between banking institutions and companies and the less asymmetric information associated with bank financing cause even important factor such as firm size to be less important. Furthermore, in Sorokina (2014) the author highlights the comments made in Frank and Goyal (2009) in which the authors state that “*If we had been focusing on a book-based definition of leverage, the market-to-book ratio, firm size and expected inflation would all have been excluded from the core model.*¹⁷”, indicating that firm size (and growth opportunities as described before) is a more reliable factor for MLEV rather than BLEV measure.

Studies on Shari’ah compliant firms: Haron and Ibrahim (2012) find the firm size proxy (calculated by the natural logarithm of total assets) negative and significant for SC firms in Malaysia for both leverage measures. The authors argue that larger firms tend to generate higher profit, thus have higher retained earnings (internal funds available) to support their future investment. Based on the results in Table 4-2, hypothesis H.3 can be fully confirmed for SNC firms and partially for SC firms.

4.2.4 Tangibility

Similar to size, firm’s tangible assets are also one of those determinants that show consistent results in its relationship to leverage. Except for BLEV for SC firms, all other models in Table 4-1 exhibit the predicted positive relationship with debt financing. Similar results can be found in academic studies with an international focus such as in Johnson (2003), De Jong et al. (2008), Kayo and Kimura (2011) and Fan et al. (2011). In general, it is predicted that firm’s tangibility leads to an increase in leverage due to the collateral characteristic of tangibility. Specifically, tangible assets (in comparison to intangible assets) provide more security as collateral for potential investors. For this reason, Titman and Wessels (1988) state,

¹⁷ See Frank and Goyal (2009), pp.6.

tangible assets reduce the risk for debtholders and consequently reduce the cost of debt for the companies. Therefore, companies will be able to operate with higher leverage ratios without incurring higher financial distress costs. This is in line with the notion of Trade-Off Theory. The positive relationship between tangibility and leverage also confirms the role of tangible assets in reducing the agency costs for outside investors, which in turn raises firm leverage. The finding is also similar to De Jong, Kabir and Nguyen (2008).

Studies on Shari'ah compliant firms: Haron and Ibrahim (2012) found a positive relationship between tangibility and MLEV but insignificant for BLEV (similar to our findings) thus supports the notion of the Trade-Off Theory. The authors argue with the statements made by Ahmad (2007) that debt must be asset-backed, which means SC firms cannot have debt exceeding the tangible assets. This further implies that firms with more tangible assets will, therefore, have higher debt level and other way around, firm with less tangible assets will consequently have lower debt level. On the contrary, Thabet and Hanefah (2014) found insignificant relationship of tangibility on leverage, which indicates that there is no evidence that SC firms consider their fixed assets when financing decision activities occur. The authors argue their finding by stating Al-Ajmi et al. (2009), in which the authors state that firms with more tangible assets prefer to use equity financing over debt financing. According to the results in Table 4-2, similar to firm size hypothesis H.4 can be fully confirmed for SNC firms and partially for SC firms.

4.2.5 Business Risk

The results of the business risk determinant in Table 4-1 stays in contrast to the predominantly negative relationship of previous academic studies. Similar to the growth variable, the sign and coefficient of business risk show mix results on both BLEV and MLEV. Contrary to our hypothesized relationship, the BLEV result shows a significant positive relationship for SC firms. Similar finding can be found in Gaud et al. (2003), Ariff et al. (2008), Cekrezi (2013) and Sorokina (2014). This supports the notion of the Pecking Order Theory with the rationale, that earnings volatility will lead investors to require a higher rate of return (information asymmetry), hence, the cost of issuing equity will increase. So as long as the cost of equity is higher than the cost of debt, the Pecking Order Theory implies that companies will use the cheapest sources of funding. Consequently, debt would be the preferred external funding to equity. As for the MLEV, business risk exhibits a negative relationship for SNC firms. As firm's earnings volatility increases, the probability of default on debt payment increases. This leads to higher financial cost as discussed in Section 2.2. Therefore, according to the Trade-Off Theory, firms with high-risk exposure need to lower their debt level to minimize their bankruptcy risk.

Studies on Shari'ah compliant firms: The limited number of academic studies on SC firms show contrary results on the relationship between earnings volatility and leverage. For instance, while Thabet and Hanefah (2014) found an inverse relationship, Haron and Ibrahim (2012) report a positive relationship between earnings volatility and leverage and argue that the positive association between business risk and return is central to Islamic finance. The legal maxim "Al-Kharaj bi Al-Daman" underlies all forms on financial contracting in Islamic jurisprudence. The authors referred to Obaidullah (2007) paper, in which the authors state that this maxim requires that liabilities (*risk*) and benefits (*returns*) go together, that indicates, the

higher the risk, the higher the return. According to the results in Table 4-2, hypothesis H.5 must be rejected for the BLEV of the SC firms and confirmed for MLEV for SNC firms.

4.2.6 GDP Growth

The only macroeconomic variable tested in the leverage decision of firms is the GDP growth rate. In line with the notion of the Pecking Order Theory the results in Table 4-1 show for both leverage measures that an increase in GDP growth rate is associated with a decrease in debt financing, however only for SNC firms. These findings suggest that SNC firms issue more equity in times when the economy grows. This financing behavior leads to a decrease in firm leverage. Studies such as Rajan and Zingales (1985), Ariff et al. (2008), Bokpin (2009), Dincergok and Yalciner (2011) also found the significant negative influence of GDP growth on leverage. The coefficient of GDP growth determinant on both leverage measures for SC firms is insignificant, which indicates that there is no evidence that SC firms consider countries economic growth when financing decision activities occur.

Studies on Shari'ah compliant firms: In contrast to our insignificant result for SC firms on both leverage measures, the study of Haron and Ibrahim (2012) report a significant positive relationship between economic growth and financing decision of SC firms in the Malaysian context (for long-term debt of BLEV). This suggests that during a period of higher economic growth, SC firms, especially in Malaysia, prefer debt financing to utilize business opportunities by implementing expansionary and investment programs. According to the results in Table 4-2, hypothesis H.6 must be confirmed for SNC firms only.

Table 4-3: Overview Tested Hypotheses

Determinants	ID	Hypotheses	BLEV		MLEV	
			SC	SNC	SC	SNC
Profitability	H.1	A significant negative relationship between profitability and leverage is expected among SC and SNC companies.	✓	✓	✓	✓
Growth Opportunity	H.2	A significant negative relationship between growth opportunity and leverage is expected among SC and SNC	-	*	✓	✓
Firm Size	H.3	A significant positive relationship between firm size and leverage is expected among SC and SNC companies.	-	✓	✓	✓
Tangibility	H.4	A significant positive relationship between tangibility and leverage is expected among SC and SNC companies.	-	✓	✓	✓
Business Risk	H.5	A significant negative relationship between business risk and leverage is expected among SC and SNC companies.	*	-	-	✓
GDP growth	H.6	A significant negative relationship between GDP growth and leverage is expected among SC and SNC companies.	-	✓	-	✓
	✓	Hypothesis confirmed	Statistically Significant			
	*	Hypothesis rejected				
	-	Regression result: insignificant				

We have conducted additional analysis to test the differences between the coefficients of both SC and SNC firms sample. According to the z-test shown in Table B-3 in Appendix B the beta coefficient test results suggest that the effect of profitability on BLEV significantly differ between both firm types. The significance difference between both firm types in terms of their profitability suggests that, SC firms with their lower leverage ratio by default are not able to retain as much as their counterpart. SNC firms are able to retain more which further leads to a decrease in firms' leverage, since firms can utilize more internal financing.

As for the MLEV measure, the z-test show mix results. In specific, the determinants profitability, growth opportunities and firm size exhibit significant difference suggesting that these determinants do effect differently on both firm types. Similar to the BLEV measure, tangibility exhibits statistical insignificance

indicating that regardless whether being low or high leveraged, firms securitize their fixed assets for debt financing.

The analysis in this section has shown the debt determinants that impact the financing decision of both SC and SNC firms. In essence, most of the debt factors do exhibit different effects among SC and SNC firms, however depending on the definition of the leverage ratio, the effect of different independent variables on the capital structure of firms varies. A uniform effect can be exerted for debt determinants *profitability* for both leverage measures, and *growth opportunities*, *firm size* and *tangibility* for MLEV. Table 4-3 provides a summary of the tested hypotheses.

4.3. Alternative Leverage Proxy (Robustness Test)

In order to check the robustness of our results, we considered an alternative measure of both dependent variables. In Rajan and Zingales (1995), the authors discussed the various definition of leverage and highlighted that *“the effect of past financing decisions is probably best represented by the ratio of total debt to total capital”*. Taking this into consideration, we have replaced both dependent variables in our regression models (2.1 and 2.2) with BLEV2 and MLEV2 (see definition in Table B-4 in Appendix B). The regression results shown in Table 4-4 are interesting, especially for SC firms. While column (2), (3) and (4) remained more or less stable, BLEV2 exhibit significant changes in the sample of the SC firms. While business risk variable has lost its significance (indicating that SC firms do not consider its earnings volatility when financing decision activities occur) other determinants such as growth opportunities, tangibility and GDP growth suddenly show significant relationship with leverage. This proxy of leverage might be a better proxy because many of these well established and reliable determinants of leverage can explain this BLEV2, which further confirms the predictions made by Rajan and Zingales (1995). Interestingly, the coefficient signs of these variables support the notion of the Trade-Off Theory and hence increases the explanatory power of this theory.

Table 4-4: Panel Fixed Effects Regression (Robustness: BLEV2 and MLEV2)

The following table provides an overview of the determinants of leverage. All variables used in the equation model (2.1) and (2.2) are lagged one year and are regressed on the dependent variable Book Leverage (BLEV2), which is defined as total debt to the result of total debt plus book equity, and Market Leverage (MLEV2), which is defined as total debt to the result of total debt plus market equity, respectively. The independent variables are profitability, growth opportunity, firm size, tangibility, business risk (volatility) and GDP growth rate. The definitions of the variables in the regressions are provided in Table 3-1 and Table B.4 in Appendix B. Regressions are run for the pooled sample and for the entire period 2004-2014, divided in Shari'ah compliant (SC) and Shari'ah non-compliant (SNC) firms, respectively. The sample firms are determined according to the Dow Jones Shari'ah screening methodologies, with a leverage ratio of 33% (maximum threshold). Firms with leverage ratio below the Shari'ah threshold are considered being Shari'ah compliant (SC), otherwise Shari'ah non-compliant (SNC). Model (1) and (2) represent the regression results for book leverage for SC and SNC firms, respectively. Model (3) and (4) represent the regression results for market leverage for SC and SNC firms, respectively. The regressions in all models contain time fixed effects (time dummies). Econometric estimators applied on each model are shown in the last row. Company cluster robust standard errors are reported in the brackets. *, ** and *** denote significance at 10%, 5% and 1% levels, respectively. All variables are winsorized at the 1% and 99% level.

Determinants	Book Leverage 2		Market Leverage 2	
	SC (1)	SNC (2)	SC (3)	SNC (4)
Profitability $t-1$	-0.143*** [0.044]	-0.540*** [0.067]	-0.118*** [0.020]	-0.658*** [0.076]
Growth Opportunity $t-1$	-0.010*** [0.003]	0.069*** [0.013]	-0.008*** [0.001]	-0.108*** [0.013]
Firm Size $t-1$	-0.004 [0.011]	0.037*** [0.009]	0.014*** [0.004]	0.055*** [0.009]
Tangibility $t-1$	0.115** [0.054]	0.151*** [0.049]	0.072*** [0.023]	0.162*** [0.048]
Business Risk $t-1$	0.115 [0.079]	0.017 [0.105]	-0.027 [0.030]	-0.243** [0.116]
GDP growth $t-1$	0.004*** [0.001]	-0.001 [0.001]	0.001* [0.001]	-0.008*** [0.001]
Constant	0.213 [0.151]	-0.11 [0.139]	-0.126** [0.057]	-0.281** [0.130]
R ²	0.047	0.11	0.117	0.324
Adjusted R ²	0.044	0.107	0.114	0.322
Firms	756	577	756	577
Observations	5562	4021	5562	4021
Time Effects	yes	yes	yes	yes
Estimator	FE	FE	FE	FE

Similar to our previous finding, most of the debt factors do exhibit different effects among SC and SNC firms, however depending on the definition of the leverage ratio (BLEV2 or MLEV2), the effect of different independent variables on the capital structure of firms varies. However, a uniform effect can be exerted for debt determinants *profitability* and *tangibility* for both leverage measures, and *growth opportunities* and *firm size* remain the same for MLEV2.

5. CONCLUSION

The objective of this study was to investigate the most reliable capital structure determinants of firms classified as SC and SNC. Moreover, it tries to determine comparatively the effect of each determinant on the leverage, since the SC firms face the Shari'ah restriction imposed on them. We applied FE estimator on our static regression model with book and market leverage ratios as dependent variables and six factors

(profitability, growth opportunities, firm size, tangibility, business risk and GDP growth) as determinants of capital structure.

We have found that depending on the leverage measurement (book or market) various independent variables on the capital structure do exhibit different effects among SC and SNC firms. The results of the regression models show that *profitability* is negatively related to leverage uniform across both, the firm types and leverage measures. This finding is consistent with Rajan and Zingales (1995), Fama and French (2002), Frank and Goyal (2003), Haron and Ibrahim (2011) and Cekrezi (2013). Furthermore, as expected uniform relationship between *growth opportunities*, *firm size* and *tangibility* is observed for market leverage measure only for both SC and SNC firms. Not in line with our expectations is the positive relationship between *business risk* and book leverage (SC firms only) however, Gaud et al. (2005), Ariff et al. (2008), Cekrezi (2013) and Sorokina (2014) also found similar results. The relatively high impact (in magnitude of the coefficient) suggests that SC firms consider debt financing (lower cost of debt) as earnings volatility lead investors to require a higher rate of return (higher cost of equity). Overall, our panel regression results tend to suggest that the determinants under study are reliable in explaining SC and SNC firms' capital structure. Additionally, based on the results above, in terms of the coefficient sign and significance, the financing decision of SC and SNC firms, both are better explained by the Pecking Order Theory for BLEV and by the Trade-Off Theory for MLEV, respectively.

This study contributes to the strategic decisions made by the firms' policy-makers and executives. For instance, this work sheds more light to the question how capital structure decisions are driven by different debt determinants. This might further support firm executive managers in their financing decisions to add value to the companies. Even though interest-bearing debt is strictly banned by the Islamic law, it is advantageous to finance the needed capital (financing deficit) as many countries' tax-shelter provision attracts debt financing as a cheap financing option. Also, the less risky and high return projects are generally financed through debt since it prevents ownership dilution effects. Otherwise, the expected return has to be shared with new shareholders, which does not benefit the current shareholders. Consequently, our results (i.e. inconclusiveness among SC and SNC firms in terms of their capital structure) has not any surprising effect due to the current favoring debt-based financial system. Therefore, in an effort to further transform Islamic Financial Stock Markets into a market in which the activities are fully in compliance with Islamic Shari'ah (Sheikh Yaqoubi in Gamaleldin, 2015), policy makers should provide instruments and solutions to encourage participations in this market. In this regard, in order to provide fairness to the Islamic financial system and minimize the interest-bearing debt financing behavior of firms and investors, first, policy makers are required to introduce tax incentive mechanism that favors equity financing. As one of the policy instruments, the tax system should fully offset the tax incentive of corporate debt by giving tax incentives also to corporate dividend payments. Second, policy makers could lift off the tax payment on dividend income on investors. Finally, since preferring debt may lead to high leverage, which in turn increases firm's riskiness (bankruptcy risk), risk-sharing instruments which are fully in line with the spirit of Islamic financial system, should be supported by the policy makers. These instruments should not only

serve the Maqasid-al-Shari'ah but must be competitive and feasible at the same time. Therefore, these risk-sharing instruments should eliminate the drawbacks of debt and equity financing and provide benefits which render them competitive.

The selection of the determinants was influenced by the predictions made by the Trade-Off Theory and Pecking Order Theory. We consider that our analysis could be expanded by incorporating other important firm-/ , industry-/ and macro-level determinants of capital structure. The limitation of this paper is, that the analysis and discussion of the effect of the debt factors remained on the "overall/pooled sample" perspective. Diving into sample country and industry level would have explode the scope of any single research. Therefore, in future research, it is suggested to further divide the sample into countries and industries to identify possible cross-sectional differences in the effect of certain debt determinants and to confirm the applicability of the predictions made by both the capital structure theories.

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Appendices

Appendix A

Table A-1a: The Structure of Panel Data

Panel A and Panel B in this table describes the structure of panel data for SC and SNC firms, respectively. The total number of non-financial firms stands at 791 (SC) and 615 (SNC) firms. Our static models require at least 3 consecutive observations. However, to improve the reliability of diagnostics, firms with missing data on relevant variables are excluded from the sample. The panel data set is unbalanced with a total number of observations of 6618 and 4933 for SC and SNC firms, respectively.

Source: own contribution

	Panel A: Shari'ah Compliant (SC)				Panel B: Shari'ah Non-Compliant (SNC)			
	Sample	%	Obs.*	%	Sample	%	Obs.*	%
Pooled	791	100	6618	100	615	100	4933	100
United States	408	52	3518	53	237	39	1730	35
United Kingdom	74	9	606	9	36	6	272	6
Canada	53	7	441	7	24	4	188	4
Japan	120	15	931	14	196	32	1741	35
S. Korea	31	4	217	3	55	9	437	9
Taiwan	34	4	263	4	38	6	324	7
India	71	9	642	10	29	5	241	5

* Referring to the period 2004-2014

Table A-1b: The Participation Pattern of Panel Data

Panel A and Panel B in this table describes the participation pattern (aka. Consecutiveness) of the panel data for SC and SNC firms, respectively. We have 791 SC and 615 SNC firms in the sample. The minimum and maximum number of years over which any SC (SNC) firm is observed is 3 and 11 (4 and 11), respectively. The most common pattern is participation in full time frame of 11 years (340 or 42.98% are observed in this pattern for SC, while 193 or 31.38% are observed for SNC).

The bottom line of these table give the totals for participation patterns not observed.

Source: own contribution

Panel A: Shari'ah Compliant Sample (SC)				Panel B: Shari'ah Non-Compliant Sample (SNC)			
Code: 1, 2, ..., 791				Code: 792, 793, ..., 1406			
Frequency	Percentage	Cumulative	Pattern	Frequency	Percentage	Cumulative	Pattern
340	42.98	42.98	11111111111	193	31.38	31.38	11111111111
63	7.96	50.95	11111	56	9.11	40.49	1111111
40	5.06	56.01	111111111	36	5.85	46.34	11111111
32	4.05	60.05	1111111111	31	5.04	51.38	1111
29	3.67	63.72	111111	31	5.04	56.42	11111
28	3.54	67.26	1111	25	4.07	60.49	11111111
25	3.16	70.42	11111	23	3.74	64.23	111111
23	2.91	73.32	111111111	22	3.58	67.80	11111111
22	2.78	76.11	1111111	21	3.41	71.22	111111111
189	23.89	100.00	(other patterns)	177	28.78	100.00	(other patterns)
791	100.00		XXXXXXXXXX	615	100.00		XXXXXXXXXX

Table A-2: Effects of winsorizing of variables

The figures in Table A.2 show the individual variables before (left figures) and after they are winsorized (right figures). They are regressed against book leverage by use of scatterplot (Stata command *scatter*). Hence, the "before" figures illustrate if the variables suffered from outliers. All variables are winsorized at the 1% and 99% level.

Source: own contribution

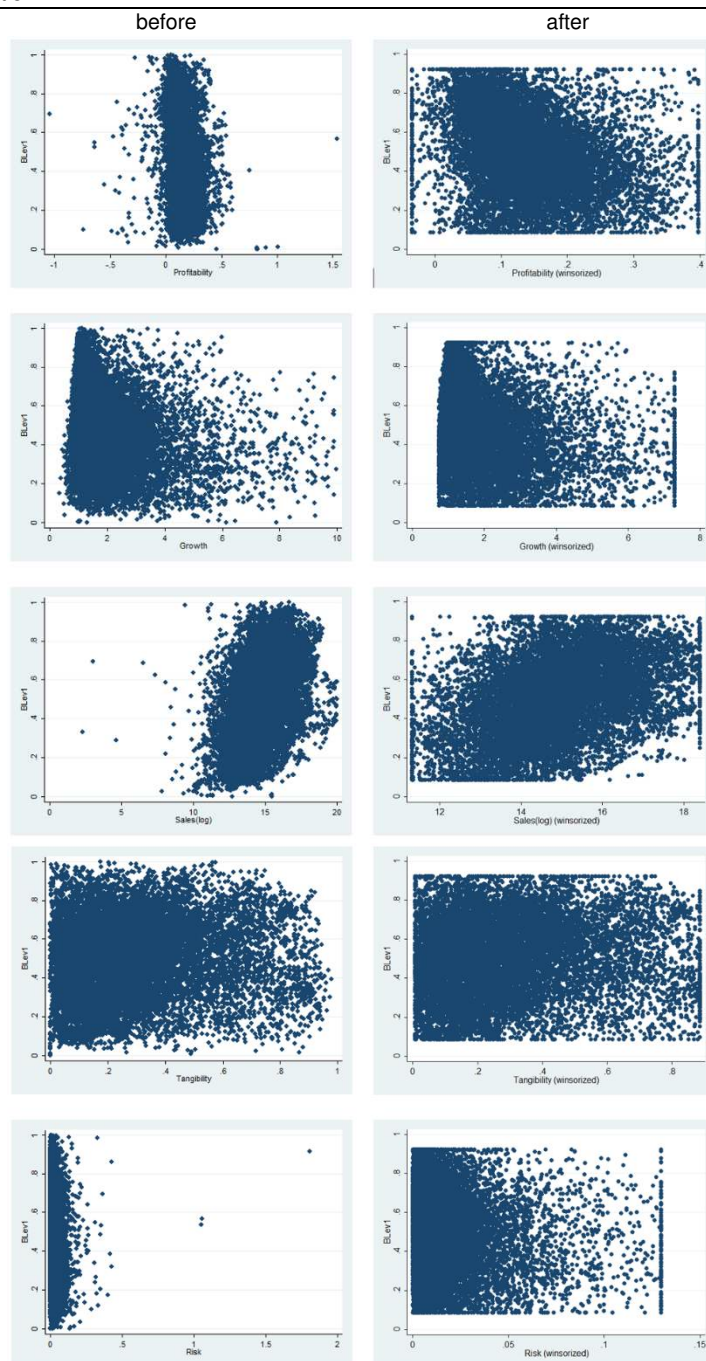


Table A-4: Linearity Test

The most frequently used method to test the assumption of linearity is to create a plot showing **residuals versus fitted values**. In general, the estimation model assumes that the relationship between the dependent and independent variables is linear. If a linear regression model is fitted to variables that do not have a linear relationship with the dependent variable, the results can be flawed. Perfect linearity is rarely existent in empirical research, but non-linearity should be examined and detected as it can indicate that variables should have a different functional form.

The left (right) side figures provide scatter plot of the variables against the residuals derived from the estimation model with book leverage (market leverage) as dependent variable. If the residuals are plotted randomly around a horizontal line from 0 on the y-axis, the assumption that the relationship is linear is reasonable. Some outliers are detected in the linear relationships, but as a whole, all the variables provide a satisfactory degree of linearity. All variables are winsorized at the 1% and 99% level.

Source: own contribution

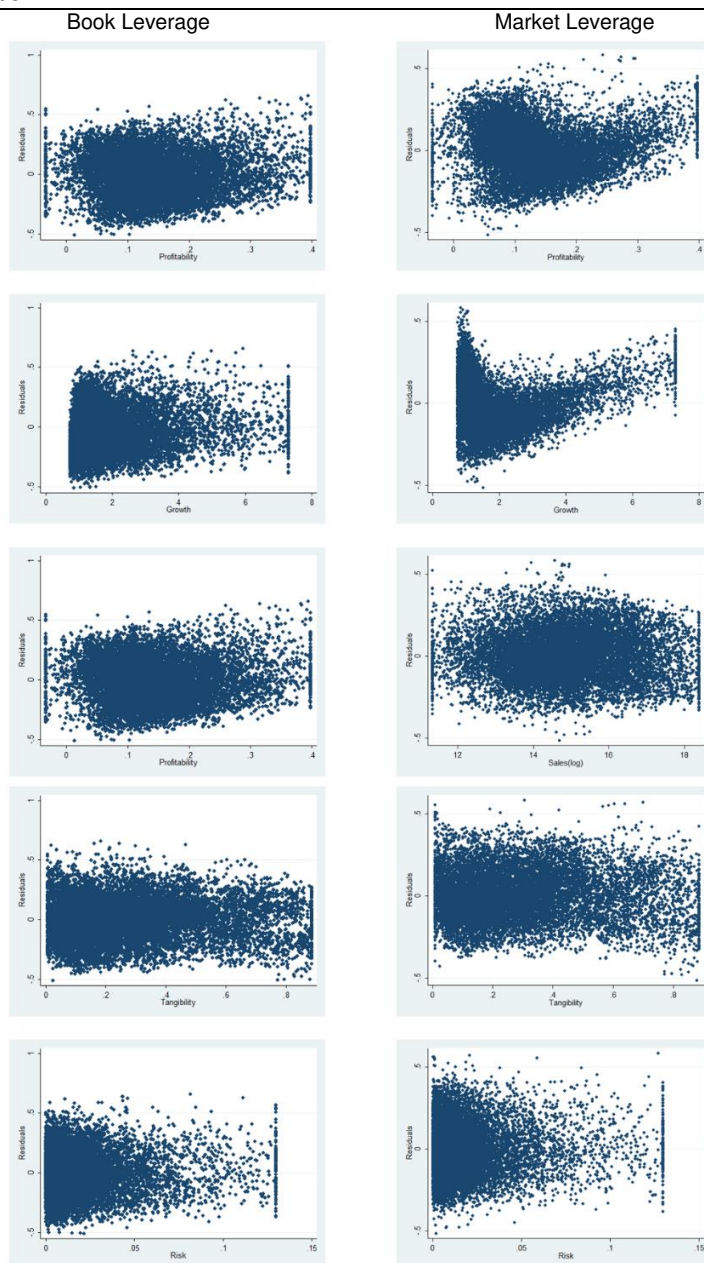


Table A-3: Normality Test

Normality in the residuals is necessary in order to conduct valid hypothesis testing because it assures that the p-values for the t-statistics and the F-test is reliable. The two most common ways to test the assumption of normality is by conducting either a Skewness/Kurtosis test or running a Kernel Density Estimate followed by *pnorm* and *qnorm* plots. The first test is numerically, while the latter tests illustrate the issue graphically.

Note: The left (right) side figures provide the results derived from the estimation model with book leverage (market leverage) as dependent variable.

The skewness/kurtosis test (Stata command *sktest*) measures the skewness and excess kurtosis for normality. The null hypothesis states that there is no significant deviation from normality in the data. However, the Kernel Density Estimate it is used to test the assumption of normality in the models. This tests the error term in the regression models. Figures in A.3a show the kernel density estimate with the blue line representing the residuals and the red line representing the normal distribution. The figures illustrate that the residuals are close to normally distributed. Hence the assumption of normality holds. However, in addition to the kernel density estimate, as mentioned above a standardized normal probability plot (Stata command *pnorm*) and a plot showing the quantiles of a variable against the quantiles of normal distribution (Stata command *qnorm*) is created to further examine the normality assumption.

For *pnorm*, the data is plotted against a straight line of normal distribution. The data points are then plotted around this line. If the data deviates from the straight line, this indicates a violation of the normality assumption. Figures in A-3b exhibit no or slight deviation from the normality line. However, *pnorm* is very sensitive to non-normality in the middle range of the data. Overall it can be concluded that the observations satisfy the assumption or normality.

Qnorm is sensitive to non-normality near the tails. Figures in A.3b-3c exhibit that there are some deviations from normality in both, the upper and lower tail, thus it can (or might) be considered as a (slight) discrepancy. However, overall it can be concluded that the residuals are close to a normal distribution. All variables are winsorized at the 1% and 99% level. These results suggest to proceed and conduct additional tests to evaluate the basic OLS assumption, which will be applied and discussed further in the main body of this dissertation.

Source: own contribution

Figure A-3a: Kernel Density Estimates

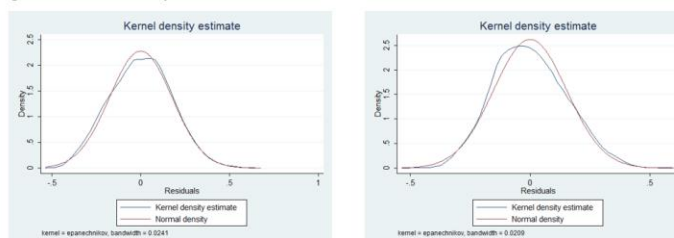


Figure A-3b: Standard Normal Probability Plot (pnorm)

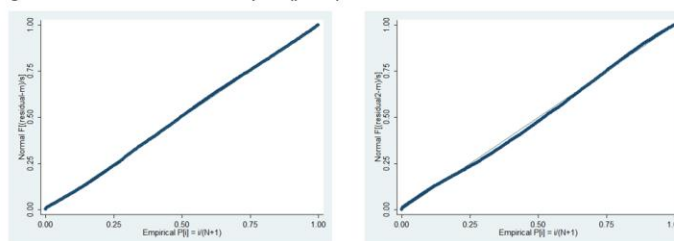


Figure A-3c: Quantile Normal Distribution Plot (qnorm)

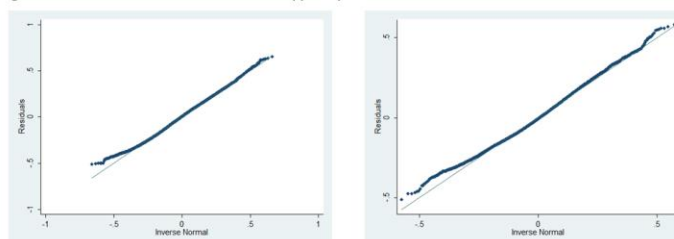


Table A-5: Auto- Serial Correlation Test

The model tested is $\hat{\epsilon}_{it} = \rho\hat{\epsilon}_{it-1} + \epsilon_{it}$. The null hypothesis is that $\rho=0$, i.e. no first-order autocorrelation. Similar to the consequences of heteroskedasticity, the presence of autocorrelation leads to incorrect standard errors. In order to test for autocorrelation, the proposed test by Wooldridge (2010, p. 311) is used. This test involves regression the residuals from the estimation upon its lag. If the coefficient of the lagged residuals is significant, first-order autocorrelation is present and the standard errors need to be adjusted. The test is conducted using the *xtserial* function in Stata, which equals the test proposed by Drukker (2003) and Wooldridge (2010).

The results in Panel A and Panel B (book leverage and market leverage, respectively) show that all estimated models in the study suffer from first-order serial correlation, therefore standard errors robust to serial correlation are employed. Petersen (2009) discusses several robust standard errors and recommends using cluster robust standard error in finance panels. This further confirms and strongly recommends to apply “robust” option in all model estimations in this study.

Source: own contribution

Panel A: Serial Correlation Test (BLEV)				Panel B: Serial Correlation Test (MLEV)			
			Prob.				Prob.
Pooled	F(1, 1329)	727.969***	0.000	Pooled	F(1, 1329)	706.500***	0.000
United States	F(1, 641)	292.477***	0.000	United States	F(1, 641)	338.030***	0.000
United Kingdom	F(1, 109)	162.940***	0.000	United Kingdom	F(1, 109)	95.734***	0.000
Canada	F(1, 75)	82.947***	0.000	Canada	F(1, 75)	31.102***	0.000
Japan	F(1, 315)	323.623***	0.000	Japan	F(1, 315)	278.324***	0.000
S. Korea	F(1, 75)	136.427***	0.000	S. Korea	F(1, 75)	31.973***	0.000
Taiwan	F(1, 71)	124.510***	0.000	Taiwan	F(1, 71)	59.081***	0.000
India	F(1, 99)	102.465***	0.000	India	F(1, 99)	39.147***	0.000

Table A-6: Post Estimation Tests (Estimator Selection)

This table presents the results of the post estimation tests conducted on the capital structure model (2.1 and 2.2). The test is based on the recommendation of among others, Baltagi (2005) and Wooldridge (2010). All test has been reported in the last 3 rows of each table. The corresponding p-value estimates of each test namely, BPLM, Hausman and Heteroskedasticity test are presented. Company cluster robust standard errors are reported in the brackets. *, ** and *** denote significance at 10%, 5% and 1% levels, respectively. All variables are winsorized at the 1% and 99% level.

The BPLM test has been conducted to identify the appropriateness of using Fixed-/Random Effects vs. OLS estimator. The BPLM test for unobservable effects, tests the null hypothesis of equal variances across companies; $H_0: \text{Var}(\alpha_i) = 0$. The results show that in all models the null hypothesis is rejected and hence it can be documented that unobservable effects are present.

Next, Hausman test has been applied in order to estimate the consistency and efficiency of the RE estimation vs. the FE estimation. The Hausman test examines whether the estimated coefficients from the FE estimation and the RE estimation is statistically significant; $H_0: \hat{\beta}_{RE} = \hat{\beta}_{FE}$. The rejection (p-value<0.05 (5%)) of the test is commonly interpreted as a rejection of the RE model estimation, although Wooldridge (2010) lists a number of potential drawbacks of this interpretation. The results show, that for both, book leverage (BLEV) and market leverage (MLEV) measure, FE is the appropriate estimator. We relied on these results to conduct our study accordingly.

The presence of heteroskedasticity or serial (auto-) correlation lead to incorrect standard errors. A modified Wald test is used to test for the presence of heteroskedasticity. A simple test of first-order autocorrelation consists of regressing the residuals from the model estimation onto their lagged counterparts; $H_0: \hat{\epsilon}_t = \rho \hat{\epsilon}_{t-1} + \epsilon_t$ Verbeek (2008). It tests the null hypothesis that the variances are equal across all firms. The results from the test are presented in the last row. The Wald test results show, that in all models the test for homoskedasticity is rejected, which means that heteroskedasticity is present, consequently "robust" option has been applied in all models.

Source: own contribution

	Book Leverage			Market Leverage		
	RE	FE	FE	RE	FE	FE
Profitability _{t-1}	-0.266*** [0.019]	-0.196*** [0.020]	-0.196*** [0.029]	-0.388*** [0.021]	-0.227*** [0.021]	-0.227*** [0.027]
Growth Opportunity _{t-1}	-0.001 [0.001]	-0.000 [0.001]	-0.000 [0.002]	-0.025*** [0.001]	-0.018*** [0.001]	-0.018*** [0.001]
Firm Size _{t-1}	0.025*** [0.002]	0.012*** [0.002]	0.012*** [0.004]	0.045*** [0.002]	0.030*** [0.002]	0.030*** [0.003]
Tangibility _{t-1}	0.061*** [0.013]	0.057*** [0.015]	0.057* [0.031]	0.122*** [0.013]	0.075*** [0.016]	0.075*** [0.025]
Business Risk _{t-1}	0.125*** [0.037]	0.140*** [0.037]	0.140** [0.054]	-0.045 [0.041]	-0.007 [0.040]	-0.007 [0.044]
GDP growth _{t-1}	0.002*** [0.000]	0.002*** [0.000]	0.002*** [0.000]	0.001** [0.000]	0.000 [0.000]	0.000 [0.000]
Constant	0.156*** [0.028]	0.335*** [0.034]	0.335*** [0.068]	-0.231*** [0.029]	-0.044 [0.036]	-0.044 [0.050]
R ²		0.019	0.019		0.068	0.068
Adjusted R ²		-0.141	0.018		-0.083	0.068
Firms	1333	1333	1333	1333	1333	1333
Observations	9583	9583	9583	9583	9583	9583
Post Estimation Tests						
BPLM	0.000			0.000		
Hausman		0.000			0.000	
Heteroskedasticity			0.000			0.000

Standard errors in brackets, * p<0.10, ** p<0.05, *** p<0.01

Appendix B

Table B-1: Mean and Variance Test

The following table provides an overview of the mean and variance test of all independent variables for both sample under study, i.e. SC and SNC firms. The z-test results show whether both sample means are significantly different from each other. The test statistic is assumed to have normal distribution. Referring to Table A-3 in Appendix A, the normality test suggests and concludes that the residuals are close to a normal distribution.

$$Z = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\sigma_1^2 + \sigma_2^2}}$$

Z-values > 1.96 represent significant difference, whereas Z-values < 1.96 represent insignificance. All means (x) and their respective standard errors are retrieved from Tables 4-1 respectively B-5 in Appendix B.

Source: own contribution

	z-test
BLEV	1.24
MLEV	2.29
PROF	0.88
GRWTH	1.02
SIZE	0.46
TANG	0.34
RISK	0.23
GDP	0.14

Table B-2: Variance Inflation Factors

The following table shows the VIF for all independent variables. VIF is determined as $1/(1-R^2)$.

Note: ^a Denoted for Shari'ah compliant (SC) firms. ^b Denoted for Shari'ah non-compliant (SNC) firms.

Source: own contribution

Variables		VIF	1/VIF
PROF	a	1.42	0.70
	b	1.25	0.80
GRWTH	a	1.64	0.61
	b	1.24	0.81
SIZE	a	1.18	0.85
	b	1.06	0.94
TANG	a	1.11	0.90
	b	1.09	0.92
RISK	a	1.06	0.95
	b	1.00	1.00
GDP	a	1.11	0.90
	b	1.03	0.97
Mean	a	1.25	
	b	1.11	

Table B-3: Beta Coefficient Test

The following table provides an overview of the beta coefficients test of both sample under study, i.e. SC and SNC firms. The z-test results show whether both sample means are significantly different from each other. The test statistic is assumed to have normal distribution. Referring to Table A-3 in Appendix A, the normality test suggests and concludes that the residuals are close to a normal distribution.

$$Z = \frac{\beta_1 - \beta_2}{\sqrt{\sigma_1^2 + \sigma_2^2}}$$

Z-values > 1.96 represent significant difference, whereas Z-values < 1.96 represent insignificance. All coefficient results (β) and their respective standard errors are retrieved from Table 4-2.

Source: own contribution

	BLEV	MLEV
PROF	4.50	5.18
GRWTH	5.88	8.30
SIZE	4.14	3.60
TANG	0.31	0.36
RISK	1.40	1.42
GDP	2.83	5.66

Table B-4: Dependent Variables (Robustness Test)

The following book and market leverage proxies will be used as the dependent variable for robustness tests.

Source: own contribution

Variables	Definition	Measure
Dependent		
BLEV2	Book Leverage	Total Debt / (Total Debt + Book Equity*)
MLEV2	Market Leverage	Total Debt / (Total Debt + Market Equity)

*whereby, Book Equity = Total Assets - Total Liabilities - Preferred Stocks + Deferred Taxes

Table B-5: Descriptive Statistics

This table shows the mean, standard deviation, minimum, maximum and the number of observation of book- and market leverage proxies and all independent variables for all firms in the sample, for the entire period 2004-2014. The sample firms are determined according to the Dow Jones Shari'ah screening methodologies, with a debt-to-equity ratio of 33% (threshold). Firms with leverage ratio below the Shari'ah threshold are considered being Shari'ah compliant (SC), otherwise Shari'ah non-compliant (SNC). The definitions of the variables can be retrieved from Table 3-1. All variables are winsorized at the 1% and 99% level.

Source: own contribution

SC Sample	Mean	SD	Min	Max	Obs
BLEV	0.40	0.17	0.08	0.92	6618
MLEV	0.19	0.11	0.02	0.70	6618
PROF	0.18	0.08	-0.03	0.40	6593
GRWTH	2.57	1.38	0.75	7.30	6618
SIZE	14.55	1.46	11.33	18.39	6608
TANG	0.26	0.21	0.01	0.89	6618
RISK	0.02	0.02	0.00	0.13	6614
GDP	2.23	2.68	-5.53	10.26	6355
SNC Sample	Mean	SD	Dev.	Min	Obs
BLEV	0.66	0.13	0.22	0.92	4933
MLEV	0.60	0.14	0.22	0.88	4933
PROF	0.10	0.05	-0.03	0.38	4924
GRWTH	1.14	0.25	0.75	3.09	4933
SIZE	15.44	1.26	11.33	18.39	4933
TANG	0.36	0.21	0.01	0.89	4933
RISK	0.02	0.02	0.00	0.13	4929
GDP	1.70	2.71	-5.53	10.26	4609