



Modeling dependence structure between stock market volatility and sukuk yields: A nonlinear study in the case of Saudi Arabia

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Abstract

The aim of this paper is to investigate the dependence structure between sukuk (Islamic bonds) yields and stock market (returns and volatility) in the case of Saudi Arabia. We consider three Archimedean copula models with different tail dependence structures namely Gumbel, Clayton, and Frank. This study shows that the sukuk yields exhibit significant dependence only with stock market volatility. In addition, the dependence structure between sukuk yields and stock market volatility are symmetric and linked with the same intensity.

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1. Introduction

The central characteristic of the Islamic finance is the prohibition of the payment and receipt of interest (or *riba*).¹ The best definition of “*riba*” is the prohibition of charging interest when lending money and of any addition to money that is unjustified (such as a penalty). Islamic principles permit instead for the replacement of interest by a return that is dependent upon the profitability of the underlying investment. Lending money by charging interest permits the lender to increase his capital without any effort because money by itself does not create “valued added”. Islamic finance prohibits also investing in transactions involving gambling, alcohol, drugs, and transactions including uncertainty about the subject matter and contract terms. In addition, the transfer of debt and, therefore, the buying and selling of debt are prohibited under Islamic law. Various *Sharia* compliant financing and

investment structures have been developed. The investment concept of sukuk was created as an alternative to interest-bearing instruments namely conventional bonds. The emergence of sukuk has been one of the most significant developments in Islamic capital markets in recent years.

The main motivation of this study arises from the perception that investigating dependence structure between sukuk and stock markets plays an important role in asset allocation as well as risk management. sukuk market may be influenced by local financial conditions and especially stock returns and volatility. Therefore, the purpose of this paper is to investigate the dependence structure for sukuk yields and stock market (returns and volatility) in the case of Saudi Arabia. The focus on Saudi Arabia is explained by the fact that sukuk market in this country is in development stage. In the GCC region and during the first three quarters of 2013, Saudi Arabia is the most market player with an issue of \$8.69 billion sukuk followed UAE with an issue of \$5.17 billion (Thomson Reuter's *Zawya report*, 2014). This paper differs from and add to the related literature on sukuk and stock market co-movements by investigating the nonlinear structure of dependence by using

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¹ The Islamic name for interest is *Riba*.

Archimedean copula functions with different tail dependence structures namely Gumbel (Upper tail dependence), Clayton (Lower tail dependence) and Frank (symmetric dependence). Using daily data from 23 November 23, 2010 to October 6, 2014, our empirical results show negative and symmetric dependence structure between sukuk yields and stock returns volatility.

There are several advantages when we use copula functions in analyzing the dependence structure. First, copulas allow us to construct any multivariate distributions with given univariate margins. Second, are invariant to increasing and continuous transformations. For example, dependence structure with copula does not change with returns or logarithm of returns. This is not the case for the correlation, which is only invariant under linear transformations (Naifar, 2012). Third, the copula function can provide us the degree and the structure of dependence in the tail dependence. Tail dependence indicates the extreme co-movements and the potential of a simultaneous large loss in the equity markets. Furthermore, tail dependence is an appropriate measure for systematic risk in times of financial crisis and it allows investors and market participants to measure the probability of simultaneous extreme losses.

The remainder of the paper is organized as follows: Section 2 provides an overview of sukuk market. Section 3 presents literature review. Section 4 presents copula methodology. Section 5 presents data and preliminary statistics. Section 6 presents estimation and analysis of results. The article ends with a conclusion.

2. sukuk market development

In May 2003, sukuk was defined officially by Auditing and Accounting Organization of Islamic Financial Institutions (AAOIFI) as “the certificates of equal value representing undivided shares in ownership of tangible assets, usufruct and services or in ownership of the asset of a particular project or special investment activity”. sukuk securities have some similar features with conventional bond. It has fixed term maturity and is tradable in the normal yield price. However, there are major differences between sukuk and conventional bonds, including that conventional bond issuers pay interest to investors in regular intervals. sukuk avoids this type of interest and is based on the sharing of profit and loss between parties in a business transaction. In addition, sukuk are asset-based rather than asset-backed securities.

There are different types of sukuk, which can be arranged and ordered in the form of different financial transactions. The types of sukuk have to be reviewed and approved by “Sharia advisers” to ensure agreement with Sharia law. sukuk structures are based on Islamic mode of financing including “*Ijarah, Musharaka, Mudaraba and Murabaha*”. The AAOIFI has laid down 14 types of sukuk. *Ijara* and *musharaka* sukuk have clearly emerged as the most popular sukuk structures for both investors and issuers. *Ijarah* sukuk are certificates associated with a leasing contract, which includes securities having equal value. *Musharaka* sukuk are certificates based on risk and profit sharing.

Malaysia was an early starter and has been the most dynamic in promoting and creating a exciting local-currency sukuk market through the provision of supportive banking and capital markets legislation. Outside the Gulf countries, Turkey is also beginning to actively develop its domestic sukuk market. The government is highly supportive of Islamic finance and sukuk instrument and has taken serious steps to support it through new legislation and large sovereign issuances. According to Islamic finance news guide (2014), the sukuk market will continue to develop at a good rate of growth. There may have been some ups and downs, but the overall market momentum over the past 10 years has been quite positive. We believe this positive momentum and growth will continue in the foreseeable future.

According to Thomson Reuters Zawya report (2014), the total number of sukuk issuance as at end Q3, 2013 was \$79.70 billion (552 issues) compared to the higher \$109 billion (532 issues) for the same period in 2012. In addition, the total sukuk issuances for Saudi Arabia from Jan 96-Sep13 is \$ 39,296 million. In the first three quarter of 2013, Malaysia issued \$54.33 billion sukuk, followed by Saudi Arabia (\$8.69 billion), UAE (\$5.17 billion) and Indonesia (\$5.03 billion).

3. Literature review

Most of the research on sukuk instruments are theoretical studies and focuses mainly on explaining and developing sukuk structures with an emphasis on legal considerations (Abdel-Khaleq & Richardson, 2007; Tariq & Dar, 2007; Vishwanath & Azmi, 2009). It has been documented in literature that sukuk serve as a crucial tool for resource mobilization and a key instrument for the development of Islamic financial market (Jobst, Kunzel, Mills, & Sy, 2008; Wilson, 2008). In the recent years, some empirical studies are devoted either to research on structured sukuk instruments with case studies (Solé, 2008) or research on macroeconomic influences on sukuk issuance (Ahmad, Dauda, & Kefeli, 2012).

Other studies introduce the effects of stock market in explaining sukuk yield dynamics. Naifar and Mseddi (2013) analyse the links between sukuk yield yields, stock market conditions and macroeconomic variables in the case of United Arab Emirates (*thereafter* UAE) by using linear regression. They find that sukuk yield spread react positively to stock market implying that an increase in stock index return is accompanied with an increase in sukuk yield yields. Godlewski, Turk, and Weill (2014) analyze stock market reaction to types and characteristics of sukuk. Using event study framework and a sample of 131 sukuk of eight countries (Bermuda, Saudi Arabia, UAE, Malaysia, Qatar, Singapore, Caiman Islands and Indonesia) they find that *Ijara* sukuk exert a positive influence to stock prices of issuing firms. Alam, Hassan, and Haque (2013) examine the comparative wealth effect of sukuk and conventional bond announcements on stock returns in major Islamic financial market (Malaysia, Indonesia, Singapore, Pakistan, UAE, Bahrain and Qatar). They find that the stock market reaction is negative for the

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