J. Int. Financ. Markets Inst. Money 44 (2016) 148–165

Contents lists available at ScienceDirect

Journal of International Financial Markets, Institutions & Money

journal homepage: www.elsevier.com/locate/intfin

Dependence structure between sukuk (Islamic bonds) and stock market conditions: An empirical analysis with Archimedean copulas

Nader Naifar [a,b], Shawkat Hammoudeh [c,d,*], Mohamed S. Al dohaiman [a,e]

[a] Department of Finance and Investment, College of Economics and Administrative Sciences, Al Imam Mohammad Ibn Saud Islamic University (IMSIU), PO Box 5701, Riyadh, Saudi Arabia
[b] Higher Institute of Business Administration of Sfax (ISAAS), University of Sfax, Tunisia
[c] Lebow College of Business, Drexel University, 3141 Chestnut Street, Philadelphia, PA 19104, United States
[d] IPAG LAB, IPAG Business School, Paris, France
[e] Saudi Electronic University, College of Administration and Finance, Saudi Arabia

ARTICLE INFO

Article history:
Received 29 May 2015
Accepted 11 May 2016
Available online 20 May 2016

JEL classification:
G02
G15

Keywords:
Sukuk
Islamic finance
Conditional volatility
Dependence structure
Archimedean copula
Non-linear analysis

ABSTRACT

We investigate the dependence structure between major local sukuk (Islamic bonds) yields in three Muslim countries and various stock market conditions as represented by national, regional and global stock market returns and conditional volatility. We consider the three largest country sukuk markets in the world which are for Malaysia, United Arab Emirates and Saudi Arabia, as well as their stock markets, the global Islamic stock index as the global representative of faith-based investing, the S&P index for Asia as the proxy for the regional stock market and the S&P 500 index as the global stock factor. We use the Archimedean copula models: Gumbel, Clayton, Frank and AMH which have different tail dependence structures. The results show that the three largest country sukuk indices exhibit significant dependence but only with the volatility of the considered stock markets. Moreover, the dependence structure between the local sukuk yields and the various stock markets' volatility is asymmetric and oriented toward the upper side for Malaysia and United Arab Emirates, while it has a symmetric dependence for the Saudi Arabian market. We also find that the country sukuk yields are more sensitive to the global conventional stock market rather than to the global Islamic, regional and local stock markets.

1. Introduction

Islamic finance has been a fast-growing area in finance and recently has officially moved into the mainstream of the global financial markets. This business model conducts finance in compliance with the principles of the Islamic law (or *Sharia*). According to Yilmaz et al. (2015), the pace of demand in Islamic finance is accelerating as a result of the accumulation of a large pool of oil wealth and a strong participation from Muslim investors, combined with keen willingness of regulators to support the development of Islamic markets. The central characteristic of the Islamic finance is the prohibition of payment

* Corresponding author. Tel.: +610 949 0133.
E-mail addresses: naneifar@imamu.edu.sa (N. Naifar), hammousm@drexel.edu (S. Hammoudeh), mdohaiman@gmail.com (M.S. Al dohaiman).

http://dx.doi.org/10.1016/j.intfin.2016.05.003
1042-4431/

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).[2] According to Naifar (2014), all profits should match work effort. Islamic principles permit 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/her capital without any effort because money by itself does not create "value added". Islamic finance also prohibits investing in transactions involving gambling, alcohol, drugs, nuclear energy, weapons, and any transactions that involve 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 the Islamic law.

The strong condemnation of interest has led Muslim scholars to explore ways and means by which firms and investors may be financed on an interest-free basis. Various *Sharia*-compliant financing and investment structures including sukuk and other Sharia-compliant securities have been developed as an alternative financing scheme to conventional financing. In the international Islamic financial debt markets, sukuk (i.e., Islamic bonds) are the most important financial securities. The emergence of this financial instrument has been one of the most significant developments in Islamic capital markets in recent years. The investment concept of sukuk is created as an alternative to interest-bearing instruments, namely conventional bonds.

The main motivation of this study arises from the perception that the Islamic finance instruments (sukuk in this case) may provide a cushion against increasing risk and instability in the conventional financial markets, particularly in the wake of the recent major financial crises. Moreover, there is a strong motivation for many investors of different faiths to use faith in investing. The intention of this study is to present a clearer view of the dependence structure for the local country sukuk yield dynamics, analyzed against the backdrop of different stock market conditions by using recent data and a nonlinear methodology based on Archimedean copulas. This study also deals with the issues related to whether the local (country) sukuk market dynamics are coupled or decoupled from the global conventional, regional, local and global Islamic stock market conditions by considering mutual dependence in both the center and the tails (extremes) of the distributions.

We study the dependence structure between the local sukuk yields, stock market returns and conditional volatility (estimated by GARCH models) using different copula approaches. We consider the three largest country sukuk markets in the world which are for Malaysia, United Arab Emirates and Saudi Arabia, their stock markets, the global Islamic stock index, the regional Asian stock market index and the S&P 500 index. The study also uses the Archimedean copula models: Gumbel, Clayton, AMH and Frank which have different tail dependence structures. These copula models are suitable to the objectives of the study because these they are more suitable to modeling two dependent variables and capture all dependence structure in the right tail (Gumbel and AMH copula), the left tail (Clayton copula) and the symmetric dependence (Frank copula). We have chosen these three Islamic countries based on the size of their local sukuk markets and the passion of their decision makers to design better sukuk strategies. We also include their local stock markets because of their strong relationships with their own bond markets. Additionally, we include regional conventional and faith-oriented markets to account for any regional or relevant broader shocks. The powerful global stock market which sways many country markets has also been represented in this study.

This Archimedean copula family addresses within its members symmetry, asymmetry and tail distributions which are common statistical features in financial series, particularly in the wake of major recent global financial crises. We address the following unanswered questions. Does dependence exist between the sukuk yields and the Islamic and conventional stock market conditions under consideration? Is there any symmetric or asymmetric dependence? Has the dependence structure changed across markets?

The remainder of the paper is organized as follows. Section 2 provides an overview of the sukuk market development. Section 3 presents the literature review and Section 4 discusses the copulas' methods. Section 5 presents the data and preliminary statistics. Section 6 discusses the estimation results. The study ends with the conclusion section.

2. Overview of the sukuk market development

In this section, we review the recent developments of the sukuk markets. We also present a discussion of the main differences between sukuk and conventional bonds.

2.1. Common types of sukuk

There are different types of sukuk, which can be arranged and ordered in the form of different financial transactions. The types of issued sukuk have to be reviewed and approved by "Sharia advisers"[3] to ensure their agreement with the Sharia law. The sukuk structures are based on Islamic modes of financing including "*Ijarah, Musharaka, Mudaraba and Murabaha*". The most commonly used modes of Islamic financing are *Murabaha* (cost-plus financing at an agreed profit margin), *Mudarabah* (a special

[1] The Islamic name for interest is Riba.

[2] We notice a parallel between J.M. Keynes' thinking on interest and the institution of Riba. Quoting from Keynes (1936, Chapter 24, p. 375): "*Interest today rewards no genuine sacrifice, any more than does the rent of land. The owner of capital can obtain interest because capital is scarce, just as the owner of land can obtain rent because land is scarce. But whilst there may be intrinsic reasons for the scarcity of land, there are no intrinsic reasons for the scarcity of capital*".

[3] Sharia advisers are professionals specialized in Islamic finance who serve the role of insuring advising consistency with the Sharia law.