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Extreme dependence and risk spillovers between oil and Islamic stock markets

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ABSTRACT

This paper examines the downside and upside risk spillovers and dependence structure between five Islamic stock markets (the Islamic Market World index, Islamic indices of USA, UK, Japan and the Islamic Financials sector index) which are of paramount importance for faith-oriented investors and participants in the oil market. The results underscore the presence of time-varying lower tail dependence between the oil and Islamic stock markets. Furthermore, we provide supportive evidence of asymmetric down- and up-side risk spillovers from oil to the Islamic stock markets and vice versa. Finally, these asymmetric risk spillovers have significantly increased after the global financial crisis.

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1. Introduction

Oil plays an important role in fueling the economies of the world, irrespective of their development status. In this significant capacity, oil prices affect the global markets whether they follow conventional or faith-oriented business models. Oil should also command more importance in Islamic economies or financial markets because major oil-producing countries follow the Islamic faith, thereby sharing risk with and transferring it to each other particularly during economic downturns and periods of financial turmoil. The global financial crisis (GFC) of 2008–09, the European sovereign debt crisis of 2011–12 and the recent BREXIT of 2016 have re-ignited international investor's interest in risk spillovers among financial markets during stress and downturn periods. Therefore, the intrinsic relationship between global oil prices and Islamic equity returns is important for international investors, particularly those interested in faith-oriented investments. The spillover effect of extreme downward or upward oil price movements has important implications not only for the Islamic equity trading and risk management but also for hedging strategies used by international investors.

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The Islamic equity markets under study are considered as a representative of the Islamic capital universe, performing activities based on Islamic laws, rules and regulations, thereby prohibiting usury, speculation, gharar (uncertainty) and interest-based transactions. Over the last couple of decades, a variety of Islamic Shariah-compliant investment and financing structures have emerged as an important competitor to conventional equity and fixed income markets. This restructuring of financial markets depicting the Islamic ideology¹ has resulted in the development of Islamic indices which serve as a benchmark to track the performance of publicly-traded Islamic companies. Islamic market indices have gained popularity mainly because of their Islamic ideology which leads to their strict compliance with and adherence to Shariah-approved activities. Their operations do not include non Shariah-compliant activities such as interest-based transactions, alcohol, firearms and pork production, gambling, etc.

Besides Islamic financial institutions, many global banks and international firms have created opportunities for investors to trade in Shariah-compliant stocks and bonds.² A strand of the current literature deals with the relationship between oil price changes and conventional equity returns. However, no study has analyzed the relationship between Islamic equity returns (the Dow Jones World Islamic Index and the Dow Jones Islamic indices for the US, UK and Japan as well as the Islamic Financials index) and oil prices, with consideration of upside and downside risk measures, which is our primary objective. The second objective of this analysis is to quantify and test the impact of upward and downward movements of oil prices on the upside and downside risks in the five Islamic stock returns and vice versa. This analysis has important implications for international investors to enhance returns and anticipate extreme market movements.

Existing literature on the relationship between global oil price changes or shocks and Islamic and/or conventional equity returns presents results based on different methodologies for examples of copula dependence (Aloui et al., 2013), co-spectral analysis (Creti et al., 2014), wavelet analysis (Ftiti et al., 2015), linear and non-linear portfolio optimization methods (Hernandez, 2014), threshold co-integration (Ghosh and Kanjilal, 2016), GARCH in mean and VAR (Alsalman, 2016), etc. The use of different methodologies yields different results which make it hard for readers to reach a subtle conclusion. The application of VaR helps in quantifying the potential loss (if any) the investor may incur by holding long and/or short positions. CoVaR quantifies the spillover from one market to another (both upside as well as downside). Therefore, by employing our proposed methodology, we aim to arrive at a concrete conclusion regarding the relationship between international oil prices and global Islamic stock returns. Our study not only reconciles with the findings of Hussin et al. (2012) and Malik and Hammoudeh (2007) but also provides insights into the bidirectional spillover during the sampled period. Table A1 reports the related literature on the oil-stock markets dependencies.

Our paper contributes to current literature in the following aspects. First, it examines the dependence structure between oil price changes and Islamic equity returns. To the best of our knowledge, no previous study has analyzed the relationship between oil price changes and the Islamic equity universe. To do this, we use different static and dynamic copula functions as they provide a better model fit than the linear correlation coefficients. Second, this study measures the upside and downside spillovers between oil price changes and Islamic equity returns so that international investors can anticipate the prospects of future Islamic equity investments. Concerning the empirical framework for risk measurement, we consider three different measures of upward and downward risks, namely the Value at Risk (VaR), the Conditional Value at Risk (CoVaR) and the delta Conditional Value at Risk (Δ CoVaR) to quantify the risk spillovers between oil and Islamic stock markets. VaR is the potential amount of money that may be lost on a portfolio over a given period of time, with a given level of confidence (Best, 1998). CoVaR is an extension of VaR. This risk assessment measure is used to reduce the probability that a portfolio will incur large losses. The CoVaR of market i is the VaR of this market conditional on market j being in financial distress. In other words, CoVaR accounts for losses exceeding VaR. Thus, this risk management measure offers a complete picture of risks that are reflected in extreme tails. CoVaR is directional (Girardi and Ergün, 2013). The Delta CoVaR measures the systemic risk contribution of a particular market like market j . More specifically, it is the percentage difference of the VaR of the financial system conditional on the distressed state of market j from the VaR of the financial system conditional on the benchmark state of market j (Girardi and Ergün, 2013). Note that the application of VaR methods is useful to measure the upside and downside risks by quantifying potential loss that an investor may incur in a given time period, either by holding a short or a long position. These upside and downside risks represent a good tool for international investors to evaluate the extreme investment losses. Finally, the CoVaR application allows one to capture risk spillovers from one market to another by computing upside and downside conditional VaRs. The conditional VaR captures risk spillovers between different markets by quantifying the VaR of one market conditional on the VaR of another market. Our methodology thus fully characterizes the dependence structure between oil price changes and Islamic equity returns. It also provides information on the upside and downside spillover effects using CoVaR, which is computed by employing a two-step tractable copula procedure.³

¹ See e.g., Ho et al. (2014)

² The Dow Jones Islamic Market Index (DJIMI), created in 1999 in Bahrain, covers equities and fixed income securities with almost 70 Shariah-compliant measures. The FTSE group initiated the Global Islamic Index Series (GIIS) in 1999 based on stocks traded on the London Stock Exchange. In December 2006, the Standard and Poor's launched the S&P Global Investible Shariah Indices series (i.e., the S&P Japan 500, the S&P 500 Shariah index and the S&P Europe 350). The MSCI Barra launched the Morgan Stanley Classification Global Islamic Index based on the Islamic financing principles. In 2008, the Standard and Poor's launched three global Islamic indices (S&P large cap, S&P small cap, S&P UK Shariah) to track a \$20 trillion Islamic equity portfolio. The Standard and Poor's also introduced the S&P/TSX Index covering almost three quarters of the Canadian market equity capitalization. In 2006, Russell and Jadwa launched the RJSJI Index covering almost 2700 securities, the Stoxx limited introduced the Euro STOXX Islamic 50 and the STOXX Europe Islamic 50 in 2011 to compare the performance of Shariah compliant companies against the STOXX Europe 600 Index. In 2013, the Bombay Stock Exchange and the S&P Dow Jones Indices introduced the S&P BSE 500 Shariah index. The S&P Pan Shariah Indices, the S&P 500 Shariah and the S&P Europe 350 Shariah are also included among the major global Islamic equity indices.

³ For more information, see Reboredo and Ugolini (2015).

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