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Understanding time-varying systematic risks in Islamic and conventional sectoral indices☆

Syed Aun R. Rizvi [a,*], Shaista Arshad [b]

[a] Suleman Dawood School of Business, Lahore University of Management Sciences (LUMS), Lahore, Pakistan
[b] Nottingham University Business School, University of Nottingham Malaysia Campus, Semenyih, Malaysia

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ABSTRACT

This paper examines the nature of time-varying systematic risk for both Islamic and non-Islamic sectoral indices. The novelty lies in the analysis of behavioural changes in beta according to the global economic state. Using daily stock market return data on 10 global sectors, we show that both Islamic and conventional indices follow a similar cyclical pattern over time. The sectoral beta turns out to be smaller for the Islamic market compared to the conventional market. These results remain robust to multiple additional tests. On this basis, we argue that a lower systematic risk of Islamic equities can offer portfolio diversification opportunities.

1. Introduction

In this paper, we examine the nature of time-varying systematic risk for both Islamic and non-Islamic sectoral indices using time-series data. After the 2007 financial crisis, interest in exploring alternative asset classes for risk diversification and risk mitigation has increased dramatically. This renewed focus has reinvigorated interest in systematic risks in financial markets. That Islamic capital markets have become an important asset class over the last decade or so (see S&P Global, 2017; Ernest and Young, 2016 and GIFR, 2017) has further simulated interests in systematic risks. As the survey article on Islamic banking and finance by Narayan and Phan (2017) demonstrates, there is now a defined focus on comparing Islamic markets with non-Islamic (conventional) markets. Our paper builds on this agenda by specifically examining the behaviour of systematic risks in these two types of markets.

Our investigation is important because understanding systematic risks in markets helps in investment decision making. To this end, while there are some studies (Dewandaru et al., 2015; Sensoy, 2016) that examine systematic risks in Islamic stock markets, nothing has been attempted in terms of understanding time-varying risks. For example, Dewandaru et al. (2015) and Sensoy (2016) undertake a comparative analysis indicating Islamic sectoral indices have significantly lower beta than non-Islamic (conventional) indices. A limitation of these studies is that they undertake a static analysis of estimating beta whereby the systematic risk is estimated for the entire sample only. Static beta fails to capture the shifting risk structures of firms in conjunction with the macroeconomic environment. This makes it more appropriate to capture the time varying properties of beta by capturing the dynamic beta. Jagannathan and Wang (1994), Chan and Chen (1988) and Longstaff (1989) show that a constant beta estimate fails to capture the changes over time in non-diversifiable (systematic) risk.

The current study extends the existing literature on systematic risks along multiple lines. First, our study adds to the limited research on the comparative analysis of systematic risks in Islamic and conventional markets by studying time-varying risks as opposed to static analysis of risks. The key advantage of modelling dynamic risk over static risk is that it allows one to understanding risk over time, noting phases of risk clustering. The type of dynamic risk modelling we propose also allows us to understand behavioural changes in risk according to global economic state. We define the economic states as phases of economic recessions and expansions. This definition of recessions and expansions follows Rizvi, Dewandaru, Bacha and Masih (2014), Arshad, Rizvi and Ibrahim (2014) and Alam et al. (2016). These studies suggest using global events to define recessions.

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* Corresponding author. 4-18, SDSB, LUMS, DHA, Lahore, 54792, Pakistan.
E-mail address: aun.raza@lums.edu.pk (S.A.R. Rizvi).

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Table 1
World Equity Market Sectors in Sample. This table records the number of companies used and their descriptive statistics for the daily returns of the 10 sectors in sample. Column 3 and 4 provide the number of companies in each sector for Islamic and conventional indices respectively.

Sector	Sector Code	No. of Companies	
		Islamic	Conventional
Basic Materials	BM	225	1121
Consumer Goods	CG	480	1464
Consumer Services	CS	267	1355
Financial	FIN	134	2576
Health Care	HC	373	854
Industrial	IND	606	2474
Oil and Gas	O&G	110	641
Technology	TECH	348	1065
Telecom	TELECOM	60	189
Utilities	UTL	36	375

Third, our work complements Sensoy (2016) by studying short term and long term components of systematic risks. Sensoy (2016) only analyses systematic risk over the long run. Understanding risk over short run is equally important for portfolio management strategies and for day traders and speculative investment amongst others. . Lastly, we examine systematic risk at the sector level. Our motivation for sectoral risk analysis has roots in a large body of research that shows that particular sectors of the market behave very differently compared to other sectors and indeed the market itself. This type of behaviour has been documented across a range of firm behaviors. For example, Westerlund and Narayan (2015), Bannigidadmath and Narayan (2016), Narayan and Bannigidadmath (2015), Phan et al. (2015a, 2015b), and Narayan and Sharma (2011) show that stock return predictability (regardless of the type of predictors) is sector-dependent. These studies show that as a result of the predictive ability (which is stronger for some sectors compared to others) trading strategies can be more successful in some sectors than others. Specifically, on Islamic financial markets, a sector-based analysis has been undertaken with respect to stock return predictability (Narayan et al., 2016a) and the profitability of the Indian stock market which has a fair representation of Islamic stocks (Narayan et al., 2014a). These studies show that sectoral predictability and profits are sector-dependent. The overall message emerging from all these sector-based studies is that sectors are homogeneous thus likely to behave differently compared to the market. In order to bring out this heterogeneity it is important that hypotheses test is conducted at the sector-level.

The objectives this study are to: (1) analyse whether systematic risk behaves differently for Islamic and conventional sectors across economic states; and (2) assess whether Islamic sectors are less risky over an extended period of time.

Our approaches to addressing the proposed research questions follow a multi-step process. First, to extract time-varying risk (beta) for Islamic and conventional sectoral indices, we run a time-series regression of sectoral daily returns on the global Islamic index returns, and on the global conventional market index returns. Second, we utilise the wavelet decomposition technique to decompose sectoral indices (of both market types) into short- and long-term horizons. Third, we identify economic states based on Alam et al. (2016). Fourth, we estimate the beta of Islamic and conventional sectoral indices by running a regression of each sector's excess daily return over a rolling window of 36 months. Fifth, we use the F-test and *t*-test to find statistical differences in the betas of the indices. Last, using exponential generalized autoregressive conditional heteroscedastic (EGARCH) model, we calculate the time-varying volatility of both sectorial indices.

Our approaches lead to three new results. First, across all sectors and time periods, the Islamic sectoral beta tends to be smaller than conventional beta, implying a subdued reaction to stock market changes. This adds to the general volatility of stock return literature (in the Islamic finance space) from the systematic risk perspective. Second, we observe that across all sectors, the beta of Islamic equities had relatively similar volatility during the crisis and post-crisis periods compared to their conventional counterparts. Third, in our analysis, we observe that the beta of health care, oil & gas, and technology sectors have a remarkably lower volatility in the post-crisis period, especially in the long term.

Our findings contribute to three different strands of the literature. First, our finding of time-varying risk in Islamic market, its evolution over the post-crisis period, and how it is different from conventional markets connects to the literature more broadly on time-varying analysis of Islamic markets, such as those on price discovery. For example, Narayan et al. (2016b) estimate time-varying price discovery for a large sample of Islamic stocks and show that this time-varying price discovery predicts Islamic stocks returns. Bannigidadmath and Narayan (2016) show that sectoral stock returns of the Indian market are predictable (using a range of financial ratio predictors) and that the average of the time-varying profits (obtained using a mean-variance utility function) are economically meaningful.

Second, our study contributes to a relatively recent strand of literature on the impact of systematic risk on Islamic stock markets. Relating to the global financial crisis of 2007–2009, several studies argue that Islamic indices offered more stability compared to most conventional indices (Girad and Hassan, 2008; Charles et al., 2011). Moreover, Islamic stocks are often low-leverage stocks with high asset backing, thus characterised by a lower beta (see Sensoy, 2016; Dewandaru et al., 2015). Our findings support the notion that firms with higher debt to equity ratio have significantly negative relation between return and stock volatility as compared to those with lower debt/equity ratios (Black, 1976; Christie, 1982). In recent related literature on Islamic equities unique findings are documented. While Narayan and Bannigidadmath (2015) reach the conclusion that Islamic stocks are more profitable than their conventional counterparts, in another study Narayan et al. (2016a, b) argue that the credit quality of Islamic stocks matter for profitability.

Third, our estimates of risks suggesting that sectoral indices are different complements recent literature on sectoral heterogeneity, (see Hong et al. 2007; Narayan et al., 2011; Narayan and Sharma, 2011; Rapach et al., 2014). Moreover, by showing that systematic risk is time-varying we complement the broader literature that has documented time-varying systematic risk in conventional stocks (See Oh and Patton, 2017; Babenko et al., 2017 etc.). In the literature on Islamic stocks, our study is the first to document time-varying systematic risk for decomposed short-term and long-term components. This is a significant contribution as evidence of time varying systematic risk can have several investment/risk management-oriented implications. The main implication in this regard is that a lower systematic risk of Islamic equities can offer diversification opportunities for optimization of portfolios. Moreover, the relatively lower beta of the Islamic markets arising out of lower debt suggests a benefitting long position during recessions but similar long positions in Islamic stocks will be a disadvantage in expansions. It is important to note that while we do not specifically test this hypothesis, it is something that future studies will find worthy of investigation.

To reaffirm our results, the empirical analysis is subjected to three robustness checks. First, we recalculate time-varying beta at a different (weekly) frequency, and our results are broadly consistent with those obtained using daily data. This suggests that our results are insensitive to data frequency. Second, we split the sample period in different economic states and study the systematic risk, and observe similar patterns as our full 18 year period. Third, instead of time-varying beta, we proxy volatility with the GARCH variance term extracted from an exponential GARCH(1,1) model, and find trivial changes in our main results.

Following the introduction, Section 2 explores the data. The methodologies used are discussed in Section 3 and then an empirical analysis in Section 4. Lastly, the conclusion is presented in Section 5.

2. Data

Following the works of Kong et al. (2011), Narayan et al. (2014a,b,c,d), Phan et al. (2015b) and Alam et al. (2016), we focus on