Summer 8-9-2017

Social norms and stock trading

Asem Alhomaidi
aalhoma1@uno.edu

Social norms and stock trading

A Dissertation

Submitted to the graduate faculty of the
University of New Orleans
in partial fulfillment of
the requirements for the degree of

Doctor of Philosophy
in
Financial Economics

by

Asem Alhomaidi

B.A. King Saud University, 2006
M.S. Finance, University of Tampa, USA, 2009
M.S. Financial Economics, University of New Orleans, USA, 2016

August, 2017

Table of Contents

List of Tables

List of figures

Abstract

The dissertation consists of two essays. In the first essay we compare the performance of Islamic and conventional stock returns in Saudi Arabia in order to determine whether the Saudi market exhibits characteristics that are consistent with segmented markets and investor recognition effects. We sample the daily stock returns of all Saudi firms from September 2002 to 2015 and calculate important measures, including idiosyncratic volatility (Ang et al, 2006), market integration (Pukthuanthong and Roll, 2009), systematic turnover (Loughran and Schultz, 2005), and stock turnover and liquidity (Amihud, 2002). Integration tests report that Islamic stocks are more sensitive to changes in global and local macroeconomic variables than conventional stocks, supporting the hypothesis that the Islamic and conventional stock markets are segmented in Saudi Arabia. In addition, our results show that Islamic stocks have larger number of investors, lower idiosyncratic risk, higher systematic turnover, and more liquid than conventional stocks, which supports the investor recognition hypothesis. Our results provide new evidence on asset pricing in emerging markets, the evolving Islamic financial markets, and the potential impact of other implicit market barriers on global financial markets. In the second essay we examine the effects of shared beliefs and personal preferences of individual investors on their trading and investment decisions. We anticipate that the process of classifying stocks into Shariah compliant (Islamic) and non-shariah compliant (conventional) has an effect on investibility and acceptance of the stock especially by unsophisticated or individual investors. The wide acceptance of Islamic stocks between individual investors promote and facilitate the circulation of firm-specific information between certain groups of investors. Our results indicate that stock classification has an effect on the stock price comovement through increased stock trading correlation between the groups of Islamic investors. The commonality in preferences between Islamic stocks' holders generate commonality in trading activity and in stock liquidity. We find that classifying a stock as an Islamic stock increases its price comovement with other Islamic stocks and also increases its commonality in liquidity.

JEL Classification: G1, G2, F3, P5

Keywords: Segmented markets, Islamic finance, emerging markets, asset pricing, investor recognition, Behavioral Finance, Stock Return Co-movement, Liquidity.

CHAPTER 1

The Effect of Implicit Market Barriers on Stock Trading and Liquidity

1. Introduction

A key role of financial markets is to produce the information and financial contracts necessary to facilitate the transfer of capital in the most efficient way possible. Advances in technology and regulatory reforms have recently reduced many of the physical and information barriers to trade; however, potential physical, legal, philosophical, information, and cultural barriers can impede capital flows and, ultimately, lead to segmented, potentially inefficient global financial markets. Understanding the dynamics of these barriers may still provide significant new economic insights. Emerging markets, aside from being an important source of economic and financial market growth, can serve as important laboratories for studying the relationship between market barriers, financial market integration, and economic efficiency. In particular, the Islamic emerging financial markets represent a unique opportunity to observe the impact that cultural differences, in the form of religious investment restrictions, can have on the efficiency of the underlying financial markets. We begin to address the effects of cultural market barriers and investor recognition by providing important new results that examine the Islamic and conventional stock markets of Saudi Arabia.

Islamic financial markets have begun to have a major impact in the global economy. In particular, much research has focused on asset-pricing issues in light of emerging and Islamic financial markets. Recently, Merdad, Hassan, and Hippler (2015) find that, by complying with Sharia law, firms have lower stock returns than non-compliant, or conventional, firms. We extend their analysis by examining whether the return difference between the two classes of stocks are due to market segmentation, caused by religious-based restrictions on the portfolios of Islamic investors, or from liquidity effects caused by investor recognition, or both. It is important to examine these issues, because the existence of market

segmentation and investor recognition effects has important implications as to the efficiency of emerging and Islamic financial markets.

We examine the stock market of Saudi Arabia for several important reasons. First, the majority of traders in the Saudi stock market are individual traders, which gives us the opportunity to test the effect of individual recognition on trading behavior. Secondly, Saudi Arabia has a majority Muslim population, and it is known for its strong adherence to Sharia law, which gives us the opportunity to test the effect of religious beliefs on investor investment decisions and portfolio construction. Third, in Saudi Arabia, clerics and Islamic finance scholars voluntarily screen stocks and financial instruments for their Sharia compliance and attempt to disseminate this information to the public through different media channels. This enables us to study the effect of such information on individual trading activity and determine whether this type of stock classification acts to increase the recognition of Sharia compliant stocks. Finally, Saudi banks, especially Islamic banks, encourage individual investment in the stock market through their Murabaha personal loan products, which are Islamic loans whereby a bank sells stock on credit its customers. The customers have the discretion to choose among a portfolio of stocks, but the stocks must be Sharia-compliant. Consequently, potential borrowers that may initially have no interest in investing in the stock market are incentivized to gather information pertaining to Sharia compliant stocks. As a consequence of these trends in the Saudi market, individual investors have become very active in trading Saudi stocks, and, as documented by Saudi Stock Exchange (Tadawul), 90 percent of Saudi stocks are traded by individual investors[1]. Therefore, using the sample of Saudi stocks makes it possible to examine the impact of sharia-compliance on measures of market segmentation and investor recognition.

We examine the sample of daily Saudi Arabian-listed stock returns from 2002 to 2015, and our results support the segmentation and impediment-to-trade hypothesis; conventional stocks are isolated and segmented from Islamic stocks in the Saudi market, which creates an implicit barrier to trade. We apply the Pukthuanthong and Roll (2009) measure of market integration and find that local and global macroeconomic factors better explain Islamic stock

[1] From Tadawul periodical publications at www.tadawul.com.sa

returns than conventional stock returns in Saudi Arabia. In some regressions, the percentage of macroeconomic factors explaining Islamic stock returns is twice that explaining conventional stock returns. One important implication of this result is that, since conventional securities cannot be traded by Islamic investors, investors who invest in conventional securities must hold undiversified portfolios and, thus, require a return premium for bearing some idiosyncratic risk. To test this implication, we follow Ang et al. (2006) and estimate firm idiosyncratic volatility as the variance of unexplained residuals estimated using the Fama and French (1993) three-factor models, Carhart (1997) four-factor model, and Pastor and Stambaugh (2003) liquidity model. The results show that Islamic stocks have higher visibility and investor recognition, as indicated by estimated idiosyncratic risk, than conventional stocks.

We also test the investor recognition hypothesis and the results indicate that the differences in liquidity and trading activity between Islamic and conventional stock classes comes mainly from the stock visibility and individual investor recognition of these stocks. This finding means that conventional stocks are known to relatively few investors in the Saudi markets, due to the fact that they do not meet Sharia requirements. Grullon et al. (2004) show that stock liquidity increase with the size of a firm's investor base, which he characterizes as "the degree of firm visibility."

Our empirical results indicate that Islamic stocks enjoy higher liquidity and more trading activity than conventional stocks in Saudi markets. We find that Islamic stock turnover is 20 percent higher than conventional stock turnover in the Saudi market. In addition, according to Amihud's (2002) liquidity measure, Islamic stocks are 24 percent more liquid than their conventional counterparts in the Saudi market. Our results also imply that the greater turnover of Islamic stocks comes completely from systematic turnover. We apply a methodology similar to Loughran and Schultz (2005), and the results show that, when investors trade stocks for market-wide reasons, they trade Islamic stocks. Our findings imply that familiarity is an important criterion in determining trading. If investors trade in response to information that concerns a particular stock, they have to trade that stock. On the other hand, if investors can trade a number of different stocks in response to information with

market-wide ramifications, they choose to trade the stocks that they are familiar with; Islamic stocks.

Our paper contributes to multiple strands of the literature. To our knowledge, ours is the first study to examine the liquidity and trading activity differences between Islamic and conventional stocks in the context of the market segmentation and investor recognition, and this represents a significant contribution to the literature on the subject. Our results link market segmentation and stock cross-listing to stock liquidity and trading activity by showing that the market segmentation effect can result not only from explicit, but also from implicit barriers, such as religious beliefs.

While prior studies have shown that firm visibility and recognition by investors can be affected by media coverage (Fang and Peress, 2009), firm geographic location (Loughran and Schultz, 2005), listings on exchanges (Kadlec and McConnell, 1994; Foerster and Karolyi, 1999), initiation of analyst coverage (Irvine, 2003), addition to stock indices (Shleifer, 1986; Chen, Noronha, and Signal, 2004), hiring of investor relations firms (Bushee and Miller, 2012), and increases in advertising expenditures (Grullon, Kanatas, and Weston, 2004). Our paper contributes to this literature by showing that Sharia stock classification affect firm visibility and recognition by equity market participants.

The results link investor recognition to stock liquidity by showing that Sharia stock classification acts as a source of information dissemination to outside investors. Lastly, this paper contributes to the growing literature on Islamic finance by showing that stock screening and Sharia classification increases investor awareness of Islamic finance and the role of Sharia compliance in the Saudi market. Our results imply that Islamic loans can benefit the economy as a whole by increasing trading in stock markets, improving the circulation of money across different economic sectors, and lowering the external costs of funds for Sharia-compliant firms through increased liquidity and recognition. Furthermore, our results suggest that other implicit market barriers may exist in financial markets, due to other philosophical and cultural differences, that provide a new avenue of study for future research.

Our paper is also related to the growing literature on the effect of investor preferences and social norms on portfolio choice and asset prices. Previous studies indicate that stock prices are affected by preferences toward social responsible investing (Heinkel, Kraus, and Zechner (2001), Geczy, Stambaugh, and Levin (2003)), political preferences (Hong and Kostovetsky (2012)), religious and gambling preferences (Kumar, Page, and Spalt (2011)), and social norms (Hong and Kacperczyk (2009)). Our paper contribute to this literature by showing that the market outcomes are affected by the preferences of Islamic investors.

The remainder of this paper is organized as follows. In section 2, we show our hypothesis development and in section 3, we review the relevant literature on Islamic finance. Section 4 explains the data and methodology used in our analyses. Section 5 presents and interprets the results. Section 6 summarizes the findings and concludes.

2. Market segmentation, investor recognition, and Islamic finance

As a part of efforts by Islamic scholars in providing important information to potential investors, Islamic scholars began screening stocks in order to classify them as Sharia compliant (Islamic), or non-Sharia compliant (conventional). Depending on each investor's level adherence to their Islamic beliefs, Islamic investors typically refrain from trading stocks that are not compliant with Sharia law (conventional stocks) and will only trade Islamic, or Sharia compliant, stocks. On the other hand, non-Muslim investors, who care less about Islamic religious restrictions, will trade stocks regardless of whether they are Sharia compliant (Islamic), or not. Based on this system, Islamic stocks will be accepted by a wider base of both Islamic and conventional investors in Saudi Arabia, while conventional stocks will be traded only by investors that do not place an emphasis on Sharia compliance.

We expect that, since the majority of stock trades in Saudi Arabia are conducted by individual investors, a stock's Sharia classification will affect its trading and liquidity through two channels. First, Sharia classification creates an implicit barrier between two classes of stocks by restricting Islamic investors to trade only stocks that are classified as Islamic, or

Sharia compliant. We call this the market segmentation hypothesis, or the impediment-to-trade hypothesis.

To illustrate the segmentation hypothesis, consider a two-country model of "partial segmentation" similar to that of Errunza and Losq (1985) in which investment barriers are asymmetric: country 1's investors can invest in country 2's securities, but country 2's investors are prohibited from investing in country 1's securities. Errunza and Losq (1985) show that country 2's (eligible) securities are priced as if markets were completely integrated, but country 1's (ineligible) securities command a "super risk premium". If a company from country 1 cross-lists its shares in country 2, comparative statics show that the risk premium disappears, the share price increases, and the expected return decreases. A Similar situation exists in segmented markets, where firms issue restricted shares that only local citizens can hold and unrestricted shares that can be held by both local and foreign investors. Studies uniformly find that unrestricted shares trade at premium prices, relative to those of restricted shares. Also, Bailey, Chung and Kang (1999) find that unrestricted shares generally have large price premiums, compared to restricted shares[2]. Therefore, an explanation of what occurs in the Islamic markets is that there are two types of investors, Islamic and conventional investors. Islamic investors trade only in Sharia-compliant stocks and cannot trade in conventional stocks, whereas conventional investors can trade in both Islamic and conventional stocks.

In addition, Sharia classification actively promotes Islamic stocks by increasing the base of potential investors for Islamic stocks and, therefore, makes Islamic stocks recognized by a greater number of Muslim investors than conventional stocks. The wider base of potential investors for Islamic stocks facilitates the dissemination of new information related to Sharia compliant stocks and, therefore, increases their liquidity and trading activity. We call this the investor recognition hypothesis.

[2] Bailey (1994) suggests that the lack of alternative investments to low-yielding bank accounts drives domestic Chinese savings into stock investments and pushes prices beyond what foreigners are willing to pay. He concludes that local Chinese demand for any available investment vehicle is even greater than the foreign demand to invest in China. Lee (2009) provides another explanation for the price premium of the restricted shares by proposing that they provide better market liquidity than the unrestricted counterparts.

The idea that "neglected" stocks earn a return premium over "recognized" stocks has been in existence for many years (e.g., Arbel et al., 1983). Merton (1987) develops an asset pricing model that explains this apparent pricing anomaly. The key difference between Merton's model and standard asset pricing models such as the CAPM is that Merton's model assumes that investors only know about a subset of available securities and that these subsets differ across investors.

A number of studies examine the effect of firm visibility and investor recognition on stock performance. Loughran and Schultz (2005) examine the effect of firm's geographic location on stock visibility. Specifically, they compare urban and rural firms and find that rural firm (firms with low visibility) stocks trade much less, are covered by fewer analysts, and are owned by fewer institutions than urban firms (firms with high visibility). Additionally, Grullon et al. (2004) use firm advertising expenditure as a measure of firm visibility and they find that firms with greater advertising expenditures have a larger number of both individual and institutional investors, and better stock liquidity. Fang and Peress (2009) argue that media coverage increases firm visibility by increasing the breadth of information dissemination and that stocks with high media coverage have a low idiosyncratic volatility suggesting that it is highly recognized by wider base of investors than stocks with no media coverage. Other examples of the effect of firm visibility on stock market include; listings on exchanges (Kadlec and McConnell, 1994; Foerster and Karolyi, 1999), initiation of analyst coverage (Irvine, 2003), addition to stock indices (Shleifer, 1986; Chen, Noronha, and Signal, 2004), and hiring of investor relations firms (Bushee and Miller, 2012),

There is also a growing literature that relates social norms, ethical screening, and social responsibility to stock visibility and performance. For example, Heinkel, Kraus, and Zechner (2001) examine the price implications of ethical constrained investment on polluting companies. In a similar vein, Geczy, Stambaugh, and Levin (2003) find a sizeable effect of socially responsible investing on the prices of screened stocks. Hong and Kacperczyk (2009) show that sin stocks, i.e., publicly traded companies involved in the production of alcohol, tobacco, and gaming, are priced lower than other mainstream equity stocks because they are

neglected by norm-constrained institutions.

3. Previous findings on Islamic and conventional stock performance

A large number of studies have compared Islamic stocks with their conventional counterparts, in terms of returns. However, these studies give non-conclusive empirical evidence of relative risk-adjusted performance of Islamic equity investments vis-à-vis conventional ones. For example, on one hand, we have several studies that show Islamic equities outperformed conventional ones in terms of both raw and risk-adjusted returns (e.g. Alam and Rajjaque (2010); Ashraf and Mohammad (2014); Canepa and Ibnrubbian (2014); Shamsuddin (2014); Charles et al. (2015)). On the other hand, we have other studies that find that the risk-adjusted returns of Islamic equities to be no different from conventional ones (e.g. Ahmad and Ibrahim (2002); Girard and Hassan (2008); Dharani and Natarajan (2011); Walkshausl and Lobe (2012)). To add to this already mixed results, the recent study of Merdad et al. (2015) show that in Saudi Arabia, Islamic stocks have a lower stock returns compared to their conventional counterparts even after accounting for market, size, and book-to-market effects.

In many studies which make comparisons of various aspects of performance and risk-return profiles between Islamic and conventional equities, two common explanations are often mentioned in making sense of the obtained empirical results. First, is that Islamic equities have lower financial leverage and second, is that Islamic portfolios are less diversified (firms are concentrated in fewer sectors). Few papers explore these two perspectives in detail. Bhatt and Sultan (2012) examined whether financial leverage is a distinct and separate risk factor that explains stock returns difference between Islamic and conventional stocks. They found that although Islamic stocks were also quite sensitive to this leverage factor, the sensitivity is significantly lower when compared to that of conventional stocks.

The question of whether Islamic stocks are less diversified has garnered growing research interest. There is debate that Sharia compliant stocks represent a unique investment

class that is distinct from conventional securities. The idea is that as a result of Sharia stock screening, Islamic stock will have its own distinctive characteristics that sets it apart from mainstream stocks. Returns from investment in such an asset class do not move in tandem with conventional investment and the corresponding risk profiles are characteristically different than those of unscreened stock portfolios.

Majdoub and Mansour (2014) and Balcilar et al. (2015) argue that Sharia compliant equity sectors are concentrated in few industries and have a close linkage between real and financial sectors, which result in a weak market integration between Islamic and conventional equities leading to a considerable diversification benefits. Saiti et al. (2014), Abbes and Trichilli (2015), and Mensi et al. (2015) provide similar results and suggested that the diversification benefits are more pronounced in Islamic regions. Dewandaru et al. (2014) argue that concentration of Islamic equities in few sectors and their low level of leverage give rise to their dual exposure to local and global market shocks. Specifically, they find that while Islamic portfolios are generally less exposed to shocks originating from inside the region, they are more exposed to shocks originated from outside of the region.

In terms of stock sensitivity to macroeconomic factors, a number of studies gave documented that Islamic stocks are more sensitive to global macroeconomic factors such as oil prices and U.S. interest rates (e.g. Hammoudeh et al. (2014); Naifar (201); Yilmaz et al. (2015)). Meanwhile, a study by Wahyudi and Sani (2014) examined the sensitivity of Islamic capital market in Indonesia to some key macroeconomic variables and found that the Islamic stocks are more sensitive to local fiscal policies. Canepa and Ibnrubbian (2014) argue that the difference in performance between Islamic and conventional stocks cannot be explained by any variant of the efficient market model and to reason things out, a behavioral finance model is needed.

The conclusion of Dewandaru et al. (2015) support this reasoning. They argue that lower sensitivity of Islamic stocks to local shocks is because their small size and low level of leverage make them less attractive to stock analysts. This however does not necessarily imply that Sharia compliant firms are not accepted by investors, these stocks are mainly traded by

institutional investors who have a preference for, or are constrained to, Islamic stocks. Hoepner et al. (2011) results also support the behavioral model explanation for the difference between Islamic and conventional stocks performance. They find that the performance of Islamic fund is positively related to the influence of Sharia law on consumers in its home economy and that Islamic funds from Islamic economies with Muslim majority perform best.

4. Data and Methodology

We obtain our data from the following resources, daily stock returns and financial information for from Global Compustat and Tadawul, monthly analyst coverage from Institutional Brokers Estimate System (I/B/E/S), monthly macroeconomic factors from The International Monetary Fund (IMF) database, monthly number of investors from Tadawul. Stock returns and financial information data are from 2002 to 2015. Analyst coverage is defined as the number of analysts reporting current fiscal year annual or quarter earnings estimates each month and it covers the period from 2005 to 2015. Number of investors data are on firm-level basis and cover the period from 2010 to 2015.

To classify the firms into Islamic or conventional, we use Sharia stock classification reports published by Sharia scholars. Multiple Sharia stock classification by different Sharia scholars and these classifications differ in the screening process and criteria for selecting Islamic firms. But these classifications share some criteria, like the prohibited activities, which include (1) activities that involve in any form of usury or interest rates (*riba*), for example, borrowing or investing in interest bearing or fixed-income instruments. (2) Activities that involve excessive risk, uncertainty, ambiguity, or deception (*gharar*). (3) Activities that are related by any means to gambling, lottery, or game of chance (*maysir*). (4) Activities that are related to non-halal businesses, such as those that deal with pork, adult entertainment, tobacco, non-medical alcohol, and all other unethical businesses.

For many firms, it is quite difficult not to engage in some of these activities especially in activities that involve in any form of interest rates. As a consequence, some Sharia scholars

add certain exceptions to the filtering process and the adherence to Sharia law. For example, if a firm is engaged in an impermissible activity, the ratio of income generated by that impermissible activity to the total income must be less than a certain percentage in order to classify the firm as an Islamic firm, otherwise it will be considered as a non-Sharia compliant or conventional firm. The classifications will differ in what percentage of income generated by impermissible activities that the firm cannot exceed in order to be classified as an Islamic firm.

In this paper, we rely on Dr. Al-Fozan's [3] stock classification reports since it is commonly used by investors, covers stocks listed in all sectors of equity market, and it is one of the strictest classification, which insure that firms that are classified as Sharia-compliant by any other classification must be Sharia compliant according to this classification. Figure 1 shows the distribution of Islamic and conventional stocks across market sectors. It is important to note that Islamic and conventional stocks are not equally distributed across market sectors. For example, Conventional stocks dominate both Petrochemical Industries and insurance sectors, whereas Islamic stocks dominate Real Estate Development and Transport sectors. This distribution heterogeneity could cause endogeneity problem in our results; the difference in visibility and investor familiarity between Islamic stocks or conventional stocks could be attributed to the fact that these stocks belong to certain sectors and not to the fact that they are classified as Islamic or conventional. To address this issue, we control for sector differences by adding dummy variable for industries or market sectors.

The data on stock classification were is obtained from published Sharia stock classification reports issued by Sharia scholars. The first classification report published by Dr. Al-Fozan was released on December 2007 and classifies 28 of the total 117 firms traded in Saudi equity market as Islamic or Sharia-compliant firms. Since our data begins before the

[3] Canepa and Ibnrubbian (2014) and Merdad et al. (2015) use an alternative classification of Dr.Al-Osaimi which has the same level of strictness and popularity as Dr.Al-Fozan's but it does not cover all sectors of equity market. According to Dr. Al-Osaimi, the reason for not classifying stocks in some sectors is because these sectors usually have their own *Sharia* board that take care of classifying stocks. We repeated our tests using Dr.Al-Osaimi's classification and that didn't affect our main conclusion.

first classification report was published we assign firms that were classified as Sharia-compliant as Islamic from the beginning of our data until the date of publication of the second

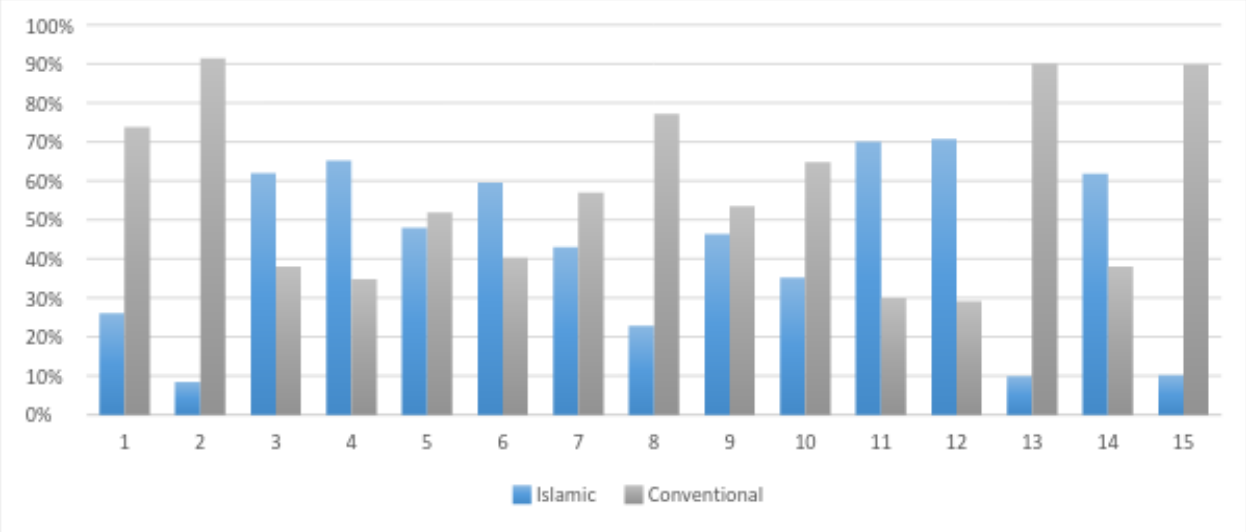

Figure 1 : ***Islamic and Conventional stocks distributions across market sectors***

The industries are as follows: 1: Banks & Financial Services, 2:Petrochemical Industries 3:Cement, 4:Retail, 5:Energy, & Utilities, 6:Agriculture & Food Industries, 7:Telecommunication & Information Technology, 8:Multi-Investment, 9:Industrial Investment, 10:Building & Construction, 11:Real Estate Development, 12:Transport, 13:Media and Publishing, 14:Hotel & Tourism, and 15:Insurance.

report. The classification reports are revised periodically to add or remove firms from Islamic or Sharia-compliant firms according to the criteria mentioned earlier and we update our sample to match these reports. Sharia stock classification reports are publically available on the internet and the total number of published reports until the end of 2015 was nine reports[4] and the total number of stocks that have been classified as Sharia-compliant in the last report was 89 out of 177 firms traded in the Saudi equity market.

5. Results and interpretation

5.1. Descriptive Statistics

Before we examine liquidity and trading activity of conventional and Islamic stocks, we analyze the differences in firm characteristics and performance between the two classes.

[4] We collect the reports from the main source of Dr. Al-Fozan's stock classification reports http://www.islammessage.com

Table 1 shows the summary statistics of firms during the sample period, which spans from Jan 2002 to Dec 2015. We separate firms into two groups, Islamic and conventional firms, based on Al-Fozan's stock classification. Conventional firms tend to have a wider firm size distribution than Islamic firms, as indicated by their firm market capitalization standard deviation which is twice as large as that of Islamic firms. The mean firm size of conventional firms is higher than that of Islamic firms but conventional firms have a median firm size that is lower than the median firm size of Islamic firms.

In terms of book-to-market ratio, both groups have a similar statistics and the difference between the two class is very small. Islamic firms have a lower leverage ratios and this is expected since one of the main Sharia-compliance classification criteria hinges on firm leverage level. In term of profitability, Islamic firms are more profitable than conventional firms as indicated by their higher return-on-assets ratio. The mean and median ROA for Islamic firms are three times as much as that of conventional firms, but Islamic firms' profitability is slightly less stable than that of conventional firms as indicated by their ROA volatility. Islamic firms are also older than conventional firms and the have a higher number of firms that pay dividends as indicated by their high average of dividends payer dummy.

In terms of stock liquidity and trading activity, conventional stocks are more actively traded but less liquid than Islamic stocks as indicated by their high turnover ratio and less ILLIQ and ILLIQMA statistics. The price range of Islamic and conventional stocks are very similar, which suggests that investors will have no preference of one class over the other based on stock prices. Islamic stocks have a lower daily stock return than conventional stocks which is consistent with the results of Merdad et al. (2015). Average stock return volatility and momentum are lower in Islamic stocks than conventional stocks and this should attract the attention of more individual investors, however, Islamic stocks have a higher number of investors and analyst coverage than their conventional counterparts.

Table 1 : Summary statisitcs

This table shows summary statistics for Saudi stocks during the period from 2002 to 2015 separated based on Al-Fozan's classification into Islamic and conventional stocks. "**Size**" is the market capitalization calculated as the stock closing price at the end of the year times the number of shares outstanding, "**BM**" firm quarterly Book-to-market ratio," Leverage" firm quarterly debt to assets ratio, "**ROA**" firm quarterly return on assets, "**VROA**" is firm quarterly ROA volatility over the past 3 years, "**Firm Age**" is the number of months since the stock is available in our data, "**DD**" is a dummy variable that equal one if the firm pay dividends, zero otherwise, "**Turnover**" stock daily trading volume over total shares outstanding, "***ILLIQ***" stock daily Amihud's (2002) illiquidity, "***ILLIQMA***" stock daily Amihud's illiquidity relative to the market average, stock "Closing price", stock "**Daily returns**", stock daily "Return volatility" during the month, "**Momentum**" is the average monthly returns during the past six months "**Number of analyst**", " **Number of investors**" reported at the end of each month, and " **Number of firms**" in each class every year.

Variable	Islamic firms					Conventional firms				
	Mean	Median	Std. Dev.	Min	Max	Mean	Median	Std. Dev.	Min	Max
Size	6,062	1,887	14,789	212	115,230	12,200	1,490	35,932	136	365,094
BM	0.57	0.50	0.34	0.08	2.60	0.58	0.51	0.33	0.08	3.55
Leverage	16.1%	9.1%	17.0%	0.0%	58.4%	27.5%	25.9%	20.5%	0.0%	65.8%
ROA	6.0%	6.1%	10.4%	-77.5%	38.5%	2.3%	2.1%	8.4%	-131.0%	47.1%
VROA	0.027%	0.009%	0.046%	0.000%	0.340%	0.026%	0.007%	0.047%	0.000%	0.355%
Firm Age	83.36	81.00	48.61	1.00	162.50	76.64	70.50	43.79	1.00	162.50
DD	0.42	0.00	0.49	0.00	1.00	0.36	0.00	0.48	0.00	1.00
Turnover	3.4%	0.8%	8.0%	0.0%	39.8%	3.9%	1.0%	9.2%	0.0%	44.2%
ILLIQ	2.94	0.05	346	0.00	6.13	25.10	0.05	2600	0.00	13.00
ILLIQMA	0.93	0.42	2.25	0.00	7.50	1.04	0.39	3.11	0.00	10.66
Closing price	38.26	29.64	27.67	5.35	142.00	32.36	26.61	20.51	3.75	134.25
Daily returns	0.04%	0.03%	2.55%	-9.34%	9.60%	0.06%	0.04%	2.99%	-9.76%	9.86%
Return volatility	0.065%	0.080%	0.042%	0.003%	0.423%	0.090%	0.102%	0.056%	0.005%	0.510%
Monthly Momentum	1.35%	0.71%	8.03%	-22.36%	396.24%	1.91%	0.99%	9.16%	-58.94%	352.73%
#Analyst	1.42	0.00	2.80	0.00	19.00	1.27	0.00	2.83	0.00	15.00
#Investors	62,760	22,788	106,649	1,849	699,437	56,251	20,530	93,853	2,054	608,361
#Firms	70	64	13	28	89	83	83	4	77	89

1.1. Breadth of ownership

In this section we examine if investors are more likely to buy stocks of firms that have been classified as Islamic or Sharia-compliant. To do this, we are going to perform a cross-sectional regression to test the difference between the two stock classes in terms of number of investors investing in each firm. The summary statistics in table 1 suggests that Islamic firms have an average number of investors of 62,760 compared to 56,251 for conventional firms. The table also shows that Islamic firms are higher than conventional firms in terms of median, minimum, and maximum number of investors. Since Islamic and conventional firms differ in their firm characteristics, the univariate analysis is not sufficient to draw conclusion.

Nest, we analyze in a multivariate regression framework the difference between the two stock classes in term of breadth of ownership. We regress the natural logarithm of the number of shareholders against a classification dummy variable that takes one if the stock is classified as Islamic and zero otherwise, and a set of control variables suggested in Grullon et al. (2004) to explain cross-sectional variations in the breadth of ownership. We expect the number of shareholders to increase with firm size (capitalization) and this is because larger firms more likely to have greater analyst coverage and press coverage and also have more shares available to potential investors. Therefore, we include the market capitalization as a control variable to account for such size effects. We also include the inverse of the share price since some investors prefer stocks within certain price ranges due to the transaction cost associated with these stocks. Stock liquidity may also be preferred by a larger group of investors, therefore, we include stock turnover as an additional control variable. Investors also prefer profitable stocks and stocks that have a positive return momentum so we use return on assets "ROA" and stock price performance over the last six months as control variables.

Stock return volatility, firm age, and debt to assets ratio are employed as proxies for differences in total risk between the two classes of stocks and to reduce the potential impact of

skewness and outliers in stock return volatility and firm age, we use the natural logarithm of these variables. It is important to note that many of the above variables control for any effect related to stock visibility, familiarity, or investor
recognition and the only left effect should be related to the effect of investor preference toward one of the two classes of stocks. Since Islamic and conventional stocks are not uniquely distributed across equity market sectors, we include a dummy variable for every industry except one industry to control for difference in investors' preferences toward certain market sectors or industries.

For each of the 72 months over 2010 to 2015, for which we have the number of investors in each firm is available in our data, we run monthly cross-sectional regressions as follow:

$$\begin{aligned}\text{Log(investors)}_{i,t} = {} & \alpha_t + \beta_{1t}\, Islamic + \beta_{2t}\, Log(Size) + \beta_{3t} ROA + \beta_{4t}\, Log(Age) + \\ & \beta_{5t} Momentum + \beta_{6t} Log(RV) + \beta_{7t} Invp + \beta_{8t}\, Log(Turnover) + \beta_{9t} DD + \\ & \beta_{10t}\, Leverge + \varepsilon_{i,t} \qquad (1)\end{aligned}$$

where $Islamic$ is a dummy variable that takes one if the firm is classified as Islamic and zero otherwise, $Size$ is firm market capitalization, ROA is the firm return on assets ratio, Age is number of months since the stock was available in our data, $Momentum$ is the average monthly stock returns for the past six months, RV is daily stock return volatility over the past month, $Invp$ is the inverse of share price, $Turnover$ is stuck turnover in the past month, DD is a dividends payer dummy variable that takes one if the firm paid dividend during the year and zero otherwise, , and $Leverge$ is the firm debt to asset ratio. We also control for additional differences across industries by including a dummy variable for industry.

Table 2 presents the results from the multivariate analysis. We calculate the time-series average of the coefficients across the monthly regressions. To take into account serial correlation in the coefficient estimates, we compute Newey-West (1987) standard errors with twelve lags.

Table:2: Breadth of ownership

In the regressions, the dependent variable is the log of number of investors for firm i at the end of the month t. Explanatory variables are an Islamic dummy variable which equals to one if the firm is classified as Islamic and zero otherwise, "**Size**" is the natural log of firm market value, "**ROA**" firm return on assets, "**Age**" is the number of month since the firm appears in our data, "**Momentum**" is the average stock monthly return for the last six months, "**RV**" is daily stock return volatility over the past month, "**1/p**" is the inverse of share price, , "**Turnover**" is the stock monthly turnover for the past month calculated as the ratio of traded stock volume over firm total shares outstanding, and "**DD**" is a dummy variable that equals one of the firm pay dividends and zero otherwise. We also control for industry by including a dummy variable for each industry. The cross-sectional regressions weight each day equally. The parameter values are the average of the monthly cross-sectional regressions. In parentheses are the Fama–MacBeth t-statistics calculated using Newey-West corrected standard errors. Intercepts and coefficients on the industry dummies are not reported to save space.

	Log (Number of investors)		
	(1)	**(2)**	**(3)**
Islamic dummy	**0.17** [b]	**0.15** [c]	**0.15** [c]
	(2.95)	(2.59)	(2.38)
Size	**0.36** [a]	**0.40** [a]	**0.41** [a]
	(39.10)	(27.67)	(30.64)
ROA	**-0.93** [a]	**-0.84** [a]	**-0.68** [c]
	(-4.57)	(-4.12)	(-2.53)
Log (Age)	**-0.95** [a]	**-0.97** [a]	**-0.95** [a]
	(-18.97)	(-18.65)	(-17.20)
Momentum	**0.64**	**0.57**	**0.52**
	(1.02)	(0.87)	(0.78)
Log (RV)	**0.07**	**0.06**	**0.06**
	(1.81)	(1.69)	(1.45)
1/p	**18.77** [a]	**18.58** [a]	**18.02** [a]
	(11.61)	(11.65)	(13.53)
Log (Turnover)		**0.06** [a]	**0.06** [a]
		(5.76)	(5.23)
DD			**-0.15**
			(-1.64)
R-squared	0.54	0.54	0.55
Number of obs.	72	72	72

(**a)** significant at 1% , (**b)** significant at 5% and (**c)** significant at 10%

Consistent with the results in table 1, we find that Islamic firms have a larger number of investors investing in their stock than that of conventional firms. The coefficient on Islamic dummy variable

is positive and statically significant at 1% level of significant except for the model where we include firm leverage level.

The results are also economically significant. For example, an interpretation of the coefficients on Islamic dummy variable suggests that Islamic firm have a 15% to 17% more number of investors than a conventional firm that have the same size, profitability, trading activity, and risk. The results also suggest that the number of common shareholders is positively related to firm size, past returns, and stock return volatility and liquidity but negatively related to firm profitability and age. The results also suggest that investors do not prefer dividends paying stocks and stocks with high price range.

To sum up, the results above suggest that after controlling for variables that may proxy for familiarity, visibility, or investor recognition, Islamic stocks are have a larger number of investors compared to conventional stocks. This is consistent with our conjecture that Islamic stocks are accepted by a wider
base of equity market participants, those who care about Sharia rules and stocks classification and others who are careless about such classification. Thus Islamic stocks are held by both group of investors, Islamic and conventional investors, whereas conventional stock are held by a fewer number of investors, conventional investors only.

1.2. Investor Recognition

Since Islamic stocks are traded by both Islamic and conventional investors, they have a broader clientele and, thus, have higher media and analyst coverage, which leads to a higher degree of investor recognition. In addition, it is important to note that, in Islamic countries, a major mechanism for Islamic banks to provide Islamic or Sharia-compliant loans is through the purchase and sale of Islamic stocks. The use of Islamic compliant stocks to facilitate Islamic bank loans can have a major effect on Islamic stocks through two channels. First, it increases the

liquidity of Islamic stocks. Secondly, it increases the Islamic stock investor base by introducing new investors, bank borrowers, to the Islamic stock market.

If Islamic stock classification improves investor recognition, then its effect should be stronger among stocks that would otherwise have a lower degree of recognition. In Merton's (1987) framework, firm idiosyncratic risk is priced, because of the imperfect diversification that stems from a lack of investor recognition. Firms with higher idiosyncratic volatility should offer a return premium to compensate shareholders for the undiversified risk they impose. In this way, idiosyncratic volatility measures the amount of idiosyncratic risk borne by investors due to imperfect diversification. Hence, there should be a clear difference in the idiosyncratic risk between the two classes of stocks. The intuition behind this is that, since conventional stocks cannot be traded by all the market participants, investors hold undiversified portfolios and idiosyncratic risk should be priced in the Saudi market.

Following Ang et al. (2006), we estimate firm idiosyncratic volatility as the variance of the residuals from regressing stock i daily excess returns using Fama and French (1993) three-factor, Carhart (1997) four-factor, and Pastor and Stambaugh (2003) models as follow:

$$R_{i,t} = \alpha_{i,t} + \beta_{i,t}\, MKT + s_{i,t}\, SMB + h_{i,t} HML + \varepsilon_{i,t} \quad (2a)$$

$$R_{i,t} = \alpha_{i,t} + \beta_{i,t}\, MKT + s_{i,t}\, SMB + h_{i,t} HML + u_{i,t} UMD + \varepsilon_{i,t} \quad (2b)$$

$$R_{i,t} = \alpha_{i,t} + \beta_{i,t}\, \mathrm{MKT} + s_{i,t}\, SMB + h_{i,t} HML + l_{i,t} LIQ + \varepsilon_{i,t} \quad (2c)$$

The variance of the residuals $\varepsilon_{i,t}$ is estimated using firm-month regressions of daily stock returns. Because the data for these factors are not available for Saudi Arabia, we followed Fama and French (2012) and construct size (SMB), value (HML), and momentum (UMD) factors. Specifically, we sort stocks on size (market capitalization) and momentum and on size and the ratio of book equity to market equity (B/M). Size sorting is done at the end of June of each year whereas value and momentum sorting are done monthly. Big stocks are those in the top 70% of market cap, and small stocks are those in the bottom 30%. the intersection of the independent 2

by 3 sorts on size and B/M and size and momentum produces six portfolios for value and momentum factors.

We compute daily value-weight returns for each portfolio. The size factor (SMB) is the equal-weight average of the returns on the three small stock portfolios from the 2 by 3 size-B/M sorts minus the average of the returns on the three big stock portfolios. The value and momentum factors, (HML) and (UMD), are the equal-weight average of the returns of small and big value minus growth and winners minus losers respectively. To construct the, Liquidity factor (LIQ), we follow Pastor and Stambaugh (2003) and sort stocks based on their sensitivity to market liquidity. High liquidity stocks are those in the top 70% of liquidity beta, and small stocks are those in the bottom 30%. The liquidity factor is the equal-weight average of the daily returns of high minus low liquidity beta stocks.

If stock classification increases investor recognition and improves diversification, its effect should be stronger among firms with higher idiosyncratic volatility. Table 3 shows the idiosyncratic volatility of both classes of stocks. The the difference in idiosyncratic risk between the two stock classes. We average the estimates cross-sectionally in each month and then across months. Islamic stocks report lower idiosyncratic volatility than conventional stocks in any of the three pricing models. The difference in average idiosyncratic risk between Islamic and conventional stocks equals 5.71%, 5.38%, and 6.67% using Fama and French (1993), Carhart (1997), and Pastor and Stambaugh (2003) multi-factor models which account for 18.7%, 19.4%, and 28.9% of the average idiosyncratic volatility of Islamic stock, respectively. The difference is statically significant at 5% level of significance in the first two models and at 1% level of significance in Pastor and Stambaugh (2003) liquidity model.

Next, we want to examine, in a multivariate framework, whether firm characteristics can explain the reported idiosyncratic volatility or is it because of the effect of Sharia stock classification. Following

Table 3: stock Idiosyncratic volatility

This table reports average coefficients and Idiosyncratic volatility from monthly stock-level time-series regressions of daily firm returns Using Fama-French (1993) three-factor , Carhart (1997) four-factor, and Pastor and Stamaugh (2003) liquidity models. We report average coefficients for Islamic, conventional, and all stocks in the market. We average the coefficients cross-sectionally in each month and then across months. In parentheses are the Fama–MacBeth t-statistics calculated using Newey-West corrected standard errors. The sample period is from 2002 to 2015.

	FF Three-Factor			**Carhart Four-Factor**			**PS Liquidity**		
	Islamic	**conventional**	**All**	**Islamic**	**Conventional**	**All**	**Islamic**	**Conventional**	**All**
Intercept	**-0.33*** (-1.49)	**-0.30*** (-1.37)	**-0.32*** (-1.55)	**-0.42*** (-1.75)	**-0.30*** (-0.77)	**-0.36*** (-1.48)	**-0.20*** (-0.55)	**-0.30*** (-0.77)	**-0.24*** (-0.68)
Mkt	**0.88** [a] (50.84)	**0.95** [a] (58.70)	**0.92** [a] (66.9)	**0.89** [a] (59.55)	**0.97** [a] (65.0)	**0.92** [a] (71.8)	**0.89** [a] (54.26)	**0.97** [a] (65.0)	**0.93** [a] (73.8)
SMB	**0.44** [a] (11.84)	**0.45** [a] (21.93)	**0.45** [a] (18.17)	**0.46** [a] (12.93)	**0.48** [a] (52.6)	**0.46** [a] (23.3)	**0.40** [a] (12.33)	**0.48** [a] (52.6)	**0.44** [a] (24.6)
HML	**0.11** [a] (4.81)	**-0.03** (-1.80)	**0.05** [b] (2.88)	**0.12** [a] (4.95)	**-0.02** (1.40)	**0.05** [b] (3.26)	**0.17** [a] (8.04)	**-0.02** (1.40)	**0.07**[a] (5.36)
UMD				**-0.04** (-1.50)	**-0.02** (1.40)	**-0.04** [c] (-2.24)			
Liquidity							**0.01** (0.37)	**0.03** (1.5)	**0.012**[a] (0.42)
R^2	**45.3%**	**46.4%**	**45.8%**	**50.6%**	**51.8%**	**51.2%**	**49.8%**	**52.0%**	**50.9%**
IV	**30.6%**	**36.3%**	**33.4%**	**27.7%**	**30.1%**	**30.3%**	**23.1%**	**29.8%**	**26.4%**
Difference in IV		**5.71%** [b] (2.57)			**5.38%** [b] (3.30)			**6.67%** [a] (3.30)	

* numbers are multiplied by 1000

(**a)** significant at 1% , (**b)** significant at 5% and (**c)** significant at 10%

Ferreira and Laux (2007), we conduct our regression tests using the logistic transformation of idiosyncratic volatility computed as:

$$\Psi_{i,t} = \ln\left(\frac{\sigma^2_{i\varepsilon,t}}{\sigma^2_{it}-\sigma^2_{i\varepsilon,t}}\right) \qquad (2d)$$

where σ_{it}^2 is total return volatility of stock i during the month t and $\sigma_{i\varepsilon,t}^2$ is the idiosyncratic volatility of stock i in month t. As with Ferreira and Laux (2007) we test firm idiosyncratic volatility by running the following cross-sectional regression every month:

$$\Psi_{i,t} = \alpha_t + \beta_{1t}\, Islamic + \beta_{2t}\, Log(Size) + \beta_{3t}\, BM + \beta_{4t}\, ROA + \beta_{4t} VROA + \beta_{5t} DD + \beta_{6t}\, Log(Age) + \beta_{7t} Invp + \beta_{8t}\, Analyst + \beta_{9t}\, Leverge + \beta_{10t}\, Log(Investors) + \varepsilon_{i,t} \quad (2e)$$

Where $\Psi_{i,t}$ is the logistic transformed relative idiosyncratic volatility computed form either model (2a),(2b), or (2c), $Islamic$ is a dummy variable that takes one if the firm is classified as Islamic and zero otherwise, $Size$ is firm market capitalization, BM is the firm book-to-market ratio, ROA is the firm return on assets ratio, $VROA$ is the firm quarterly ROA volatility during the last 12 quarters or the past three years, DD is a dividends payer dummy variable that takes one if the firm paid dividend during the year and zero otherwise, Age is number of months since the stock was available in our data, $Invp$ is the inverse of share price, $Analyst$ is the number of analyst covering the stock, Leverage is the firm debt to asset ratio, and $Investors$ is the total number of investors holding stock i at the end of the month t. We also control for additional differences across industries by including a dummy variable for industry.

Table 4 presents three different versions of the monthly cross-sectional regression equation (2e). We calculate the time series averages of estimates and adjust their standard errors for autocorrelation using the Newey and West (1987) approach with twelve lags. The consistent result is a significant negative relation between idiosyncratic volatility and a firm Sharia compliance. In column (1) of the three different multi-factor models, for example, the regression coefficient on the Islamic dummy variable is between -0.15 and -0.17 and it is statically significant at 1% level of significance. This suggests that independent of any changes in other firm characteristics, Islamic stocks, on average, have 15% to 17% lower idiosyncratic volatility compared to their conventional counterparts.

Table 0:4: Cross-sectional regressions of idiosyncratic volatility

The table reports Fama-MacBeth (1973) cross-sectional regression estimates, where the dependent variable is firm idiosyncratic volatility measured using monthly regression of firm daily stock returns using three different models. Independent variables are Islamic dummy variable that equals one if the firm is classified as Islamic and zero otherwise, "**Size**" is the natural log of firm market value, "**B/M**" Book-to-market ratio, "**ROA**" firm return on assets, "**VROA**" is firm quarterly ROA volatility over the past 3 years, "**DD**" is a dummy variable that equals one of the firm pay dividends and zero otherwise, "**Age**" is the number of month since the firm appears in our data, "**1/p**" is the inverse of share price, Number of analyst, "**Leverage**" is firm debt to asset ratio and we put missing values for firms in Banks & Financial Service and Insurance sectors, and "**Number of investors**" which is the total number of investors for each firm at the end of the month (from Jan 2010 to Dec 2015). We average coefficients cross-sectionally each month and then across months. Intercepts and coefficients on the industry dummies are not reported to save space. In parentheses are the Fama–MacBeth t-statistics calculated using Newey-West corrected standard errors.

	FF Three-Factor			**Carhart Four-Factor**			**PS Liquidity**		
	(1)	**(2)**	**(3)**	**(1)**	**(2)**	**(3)**	**(1)**	**(2)**	**(3)**
Islamic dummy	**-0.15** [a]	**-0.04**	**-0.06** [c]	**-0.15** [a]	**-0.05**	**-0.07** [a]	**-0.17** [a]	**-0.04**	**-0.07** [c]
	(4.4)	(1.1)	(2.2)	(5.0)	(1.5)	(3.5)	(3.5)	(1.0)	(2.4)
Size	**0.002**	**0.01**	**0.08** [a]	**-0.01**	**-0.01**	**0.06** [b]	**-0.05** [c]	**-0.03** [c]	**0.02**
	(0.1)	(0.5)	(3.5)	(-0.5)	(-0.3)	(3.3)	(-2.1)	(-2.0)	(1.3)
B/M	**0.15**	**-0.03**	**0.06**	**0.15** [c]	**-0.02**	**0.07**	**0.20** [c]	**0.05**	**0.12**
	(1.9)	(-0.3)	(0.7)	(2.1)	(-0.2)	(0.7)	(2.4)	(0.8)	(1.3)
ROA	**4.02** [a]	**4.09** [a]	**5.07** [a]	**4.11** [a]	**4.13** [a]	**5.25** [a]	**4.88** [a]	**5.02** [a]	**4.94** [a]
	(5.9)	(5.2)	(6.4)	(6.0)	(5.2)	(7.0)	(8.6)	(7.5)	(6.9)
VROA	**-7.22**	**46.15**	**-26.4**	**-10.42**	**42.54**	**-27.6**	**0.94**	**43.12**	**-28.0**
	(-0.3)	(1.4)	(-0.7)	(-0.4)	(1.3)	(-0.7)	(0.0)	(1.5)	(-0.8)
DD	**0.03**	**0.03**	**0.05**	**0.03**	**0.04**	**0.04**	**0.03**	**0.01**	**0.03**
	(1.3)	(1.1)	(1.9)	(1.7)	(1.6)	(1.8)	(1.3)	(0.7)	(1.3)
Log (Age)	**-0.28** [c]	**-0.34** [a]	**-0.35** [a]	**-0.28** [c]	**-0.32** [a]	**-0.32** [a]	**-0.33** [b]	**-0.30** [a]	**-0.28** [a]
	(-2.2)	(-3.4)	(-5.6)	(-2.3)	(-3.5)	(-5.2)	(-3.3)	(-3.6)	(-5.5)
1/p	**-6.16** [a]	**-5.85** [a]	**-4.46** [b]	**-5.92** [a]	**-5.73** [a]	**-4.37** [c]	**-6.08** [a]	**-6.56** [a]	**-5.52** [b]
	(-4.7)	(-4.0)	(-2.8)	(-4.0)	(-3.5)	(-2.5)	(-5.6)	(-4.3)	(-3.4)
# of analysts	**-0.01**	**-0.06** [c]	**-0.04** [a]	**0.00**	**-0.05**	**-0.04** [a]	**-0.05** [c]	**-0.16**	**-0.03** [a]
	(-0.2)	(-2.1)	(-5.9)	(-0.1)	(-1.7)	(-5.4)	(-2.3)	(-1.8)	(-3.7)
leverage		**0.41** [a]			**0.44** [a]			**0.52** [a]	
		(3.4)			(3.6)			(3.9)	
Log (# Investors)			**-0.07** [a]			**-0.06** [a]			**-0.06** [a]
			(-4.7)			(-4.1)			(-5.0)
Number of Regressions	126	126	72	126	126	72	108	108	72

(**a)** significant at 1% , (**b)** significant at 5% and (**c)** significant at 10%

The same conclusion can be drawn from column (3), which control for number of investors, the estimated coefficient is between -0.06 and -0.07 with a t-statistic that is significant at 5% level of significance for FF (1993) and PS (2003) multi-factor models and at 1% level of significance in Carhart (1997) model. This suggest that even after controlling for the number of investors, Islamic stocks' investors hold a more diversified portfolio than that of conventional stocks' investors. When we control for leverage in column (2), the coefficient on Islamic dummy variable still have the negative sign but it lose it statistical significance. This suggests that the negative relationship between Islamic classification and idiosyncratic volatility could be driven by the firm level of leverage, but this conclusion is ruled out by the fact that the negative and statically significant coefficient on leverage variable indicates that higher level of leverage decreases stock's idiosyncratic volatility.

These results clearly indicate that Islamic stocks are held by broader investor base than conventional stocks and this is consistent with our hypothesis that Islamic stocks are traded by all type of investors, Islamic and conventional, and that conventional stocks, as indicated by their high level of idiosyncratic risk, held by narrower base of investors, conventional investors, who do not care about Sharia stock classification. The difference in idiosyncratic risk also suggests that conventional stocks suffer from isolation and supports our hypothesis of market segmentation. Conventional stocks are traded by fewer investors, because they are restricted from being traded by Islamic investors, which leads to conventional stocks being segmented and isolated from Islamic stocks. Therefore, conventional stocks have to compensate their investors in the form of an additional risk premium for being undiversified.

1.3. Information environment and stocks Synchronicity

In this section we will examine whether Sharia stock classification creates information barrier between the two stock classes similar to the barrier between two different equity markets. Morck

et al. (2000) suggest that limitations on informed arbitrage may explain the differences in return synchronicity between international equity markets. We expect that the limitation on Islamic investors to trade non-Islamic stocks will create a barrier between the two classes of stocks that leads synchronicities of stocks returns with local and global economic factors to differ between the two classes. We also expect that Islamic investors to share many common experiences and similar perspectives with each other and also follow a similar way to gather and process information, therefore, they are more likely to arrive at similar investment decisions, which can lead them to converge in stock selections and buy/sell decisions. Eun et al. (2015) suggest that culture influences stock price synchronicity by affecting a country's information environment and correlations in investors' trading activities.

To test whether the two classes are informationally segmented, we follow Morck et al. (2000) and Pukthuanthong and Roll (2009) and use R^2 from regressing individual stock return on local or global macroeconomic factors as a measure of stock synchronicity and integration with other stock in the market. If Islamic and conventional stocks have R^2 or synchronicity that is not statically different, we say that they are informationally integrated and there is no limitation or barrier to trade them and if they have a statically different R^2, we say that they are informationally segmented. Also, high R^2 means more information about local or global factors is incorporated into stock prices compared to low R^2.

To test stock local synchronicity, we use monthly macroeconomic factors that are available in the International Monetary Fund database for Saudi Arabian economy. We follow the methodology of Pukthuanthong and Roll (2009) and extract the first eight principal components, which represent nearly 65% of total variation, from the monthly returns of 67 macroeconomic factors that are available and use them as the local factors to estimate the following model:

$$R_{i,t} = \alpha_i + \beta_{1i}\, PC_{1,t} + \beta_{2i}\, PC_{2,t} + \ldots + \beta_{8i}\, PC_{8,t} + \varepsilon_{i,t} \qquad (3a)$$

Where $R_{i,t}$ is the monthly return for stock i on month t, and $PC_{1,t}$- $PC_{8,t}$ are the first to eighth principal components on month t.

For stocks global synchronicity, we use S&P500 index monthly returns because it represents the movement of the largest companies of the world largest equity market and because the local currency of Saudi Arabia is pegged to the US dollar at a fixed exchange rate. Since almost 90% of the Saudi government revenues comes from oil exports, we use Brent oil monthly spot returns as global factor that determines future government expenditure and Saudi economic performance. To account for global markets sentiments and future expectations, we also use Morgan Stanley Capital International (MSCI) emerging markets index monthly returns. We then regress individual stock monthly returns on these global factors separately and collectively using the following regression model:

$$R_{i,t} = \alpha_i + \beta_{si}\ S\&P500_t + \beta_{Bi}\ Brent_t + \beta_{Mi}\ MSCI_t + \varepsilon_{i,t} \qquad (3b)$$

Where $R_{i,t}$ is the monthly return for stock i on month t, and $S\&P500_t$, $Brent_t$, $and\ MSCI_t$ are monthly returns of the corresponding factor on month t.

Table 5 shows the two classes synchronicity with local and global factors. For the stock to be included in the regression, we require that it have at least 24 months of returns. The estimates reported in panel A of table 5, are simple average of R^2s of each class of stocks and for all stocks in the market. By looking at average synchronicity measure in panel A, we can see clearly that Islamic stocks are more synchronized and informationally integrated with global and local economic factors. For example, Islamic stocks have an average R^2 from local factors regression of 18.29%, which is 41% higher than the R^2 of 12.95% for conventional stocks. The difference of local synchronicity between the two classes is 5.34% which is statically significant at 1% level of significance. In terms of global integration, the average R^2 for Islamic stocks is 14.17%, which is 26% higher than conventional stocks synchronicity of 11.21%. The difference in R^2 from global

factors between the two classes equals 2.96% and it is statically significant at 5% level of significance.

To investigate the source of synchronicity and information integration of individual stocks, we perform a multivariate analysis to determine whether this synchronicity is related to the effect of Sharia stock classification or firm characteristics. Specifically, we conduct a cross-sectional regression where we regress individual stock R^2 estimated from equations (4a) and (4b) on Islamic dummy variable and other control variables to determine whether stock classification still explains stock synchronicity. Because R2 measures are bounded between zero and one, we follow Morck et al. (2000) and apply a logistic transformation using the formula:

$$\theta_{i,t} = \ln\left(\frac{R_i^2}{1-R_i^2}\right) \qquad (3c)$$

We then run the cross-sectional regression using the following equation:

$$\theta_{i,t} = \alpha_t + \beta_{1t}\, Islamic + \beta_{2t}\, Log(Size) + \beta_{3t}\, BM + \beta_{4t}\, ROA + \beta_{4t} VROA + \beta_{5t} DD + \beta_{6t}\, Log(Age) + \beta_{7t} Analyst + \beta_{9t}\, Leverge + \beta_{10t}\, Log(Investors) + \varepsilon_{i,t} \qquad (3d)$$

Where $\theta_{i,t}$ is the logistic transformed R^2 computed using either equation (4a) or (4b), $Islamic$ is a dummy variable that takes one if the firm is classified as Islamic and zero otherwise, $Size$ is firm market capitalization, BM is the firm book-to-market ratio, ROA is the firm return on assets ratio, $VROA$ is the firm quarterly ROA volatility during the past three years, DD is a dividends payer dummy variable that takes one if the firm paid dividend during the year and zero otherwise, Age is number of months since the stock was available in our data, $Analyst$ is the number of analyst covering the stock, Leverage is the firm debt to asset ratio, and $Investors$ is the total number of investors holding stock i at the end of the month t. We also control for differences across industries by including a dummy variable for industry.

The results in panel B of table 5 show that there is a positive relationship between stock Islamic classification and the level of integration or synchronicity with global and local factors. The coefficients on Islamic dummy variables are all positive and statically significant.

Table 5: Stock price Synchronicity with local and global macroeconomic factors

Panel A of this table reports average R-squared from firm-level time-series regressions of monthly stock returns on global and local macroeconomic factors. The global factors are Brent crude oil monthly spot prices, US S&P500 index monthly closing prices, and MSCI Emerging markets index monthly closing prices. For local factors, we use the first eight principal components of 67 local Saudi macroeconomic factors that capture 65% of variation. Panel B reports Fama-MacBeth (1973) cross-sectional regression estimates, where the dependent variable is logistic transformed R^2 estimated from eq (3a) and (3b). We average coefficients cross-sectionally each month and then across months. Intercepts and coefficients on the industry dummies are not reported to save space. In parentheses are the Fama–MacBeth t-statistics calculated using Newey-West corrected standard errors.

	Panel A: Time series regression of stock returns on global and local factors				
	Brent Oil	US S&P500	MSCI Emerging Mkts	All Global	Local macro factors
Islamic stocks	**7.83%** [a]	**7.01%** [a]	**10.22%** [a]	**14.17%** [a]	**18.29%** [a]
	(12.19)	(9.82)	(11.87)	(14.41)	(13.93)
Conventional stocks	**5.87%** [a]	**5.41%** [a]	**8.18%** [a]	**11.21%** [a]	**12.95%** [a]
	(8.92)	(10.45)	(11.72)	(12.90)	(13.85)
Difference	**1.96%** [b]	**1.61%** [c]	**2.03%** [c]	**2.96%** [b]	**5.34%** [a]
	(2.11)	(1.86)	(1.85)	(2.26)	(3.40)
All Stocks	**6.75%** [a]	**6.13%** [a]	**9.10%** [a]	**12.53%** [a]	**15.32%** [a]
	(14.44)	(14.19)	(16.58)	(19.05)	(19.12)

	Panel B: Cross-sectional regression of R-squared							
	Global R-squared				Local R-squared			
	(1)	**(2)**	**(3)**	**(4)**	**(1)**	**(2)**	**(3)**	**(4)**
Islamic dummy	**0.59** [a]	**0.54** [a]	**0.67** [a]	**0.43** [b]	**0.55** [a]	**0.51** [a]	**0.62** [a]	**0.53** [a]
	(3.38)	(3.01)	(3.14)	(2.02)	(3.78)	(3.36)	(3.53)	(2.89)
Size	**0.16** [b]	**0.14** [c]	**0.22** [b]	**0.07**	**0.15** [b]	**0.05**	**0.08**	**0.01**
	(2.05)	(1.73)	(2.22)	(0.68)	(2.38)	(0.71)	(0.97)	(0.10)
B/M	**0.13**	**0.09**	**-0.06**	**-0.23**	**-0.42** [b]	**-0.40** [c]	**-0.68** [a]	**-0.83** [a]
	(0.45)	(0.31)	(-0.18)	(-0.63)	(-1.97)	(-1.85)	(-3.12)	(-3.22)
ROA	**-4.47**	**-5.24**	**-8.21**	**-3.44**	**-4.11**	**-5.62**	**-5.98**	**-2.16**
	(-0.98)	(-1.16)	(-1.25)	(-0.47)	(-0.96)	(-1.26)	(-1.04)	(-0.33)
VROA	**-82.3**	**-99.5**	**-189.9**	**-101.6**	**-33.5**	**-7.6**	**-44.2**	**56.8**
	(-0.34)	(-0.43)	(-0.58)	(-0.28)	(-0.17)	(-0.04)	(-0.16)	(0.19)
DD	**-0.37**	**-0.44**	**-0.39**	**-0.25**	**-0.22**	**-0.23**	**-0.30**	**-0.05**
	(-1.22)	(-1.42)	(-1.13)	(-0.79)	(-0.75)	(-0.80)	(-0.95)	(-0.14)
Log (Age)		**0.22**	**0.21**	**0.47** [b]		**-0.16**	**-0.12**	**0.16**
		(1.21)	(1.20)	(2.40)		(-1.03)	(-0.72)	(0.76)
Number of analysts		**0.03**	**0.01**	**0.00**		**0.10** [a]	**0.08** [b]	**0.05**
		(0.63)	(0.19)	(0.00)		(2.89)	(2.27)	(1.30)
Leverage			**-0.07**	**-0.54**			**0.48**	**-0.02**
			(-0.07)	(-0.52)			(0.65)	(-0.03)
Number of investors				**0.34** [a]				**0.30** [a]
				(3.80)				(3.21)
Number of observations	203	203	203	189	201	201	201	187

(a) significant at 1% , (**b)** significant at 5% and (**c)** significant at 10%

For example, in column (1) of global and local factors synchronicity measures, Islamic stocks have a global and local synchronicity that is higher by 80% and 73% than that of conventional stocks, respectively. The same conclusion can be drawn from column (3), where we add firm age, leverage level, and analyst coverage as additional control variables, Islamic stocks have global and local R^2 that is higher by 95% and 86% than corresponding R^2 for conventional stocks, respectively. Note that we add leverage as a control variable in columns (3) and (4), stocks operating in Banks & Financial Service and Insurance sectors are excluded from the regression because their leverage ratio has no useful meaning.

To summarize, the results of stock synchronicities suggest that Islamic stocks are more informationally integrated with global and local economic factors. The openness of Islamic stocks to both Islamic and conventional investors increases and facilitates the dissemination of information among equity market participants which results in high levels of stock synchronicities or R^2.

1.4. Stock visibility and investor familiarity

We show above that stocks synchronicities are significantly higher for Islamic stocks than conventional stocks. Do Islamic stocks trade more or less in response to firm-specific or market wide factors? To test this, we follow Loughran and Schultz (2005) and measure the difference in systematic and unsystematic turnover between Islamic and conventional stocks. Loughran and Schultz (2005) suggest that higher systematic turnover indicates higher stock visibility and investor familiarity; if the systematic component of turnover is larger for Islamic stocks, this would suggest that investors trade Islamic stocks in response to market wide or industry wide information which means that Islamic stocks are more visible, or are known to more investors, and hence are more heavily traded when information that is relevant to numerous firms is revealed.

For every trading day over 2002 to 2015 period, we estimate individual stock turnover with lag, lead, and contemporaneous market turnover. Market turnover is calculated by dividing the total number of shares traded on a specific day by the total number of shares outstanding for all listed stocks in that day. We run a regression for each stock every month of the form:

$$Turnover_{i,t} = \alpha_0 + \alpha_{1,i}\, Turnover_{m,t+1} + \alpha_{2,i}\, Turnover_{m,t} + \alpha_{3,i}\, Turnover_{m,t-1} + \varepsilon_{i,t}\,, \quad (4a)$$

where $Turnover_{i,t}$ is the turnover of stock i on day t, and $Turnover_{m,t}$ is the market turnover on day t. To obtain the systematic turnover for stock i on day t, we multiply the coefficients by the average contemporaneous, lagged, and lead market turnovers. The unsystematic turnover is, therefore, measured by the intercept coefficient. We average the estimates cross-sectionally in each month and then across months. We also adjust standard errors for serial autocorrelation using the Newey and West (1987) approach with twelve lags.

Table 6 reports average systematic and unsystematic turnovers for Islamic and conventional stocks. For conventional stocks, systematic turnover is only 3.04% of outstanding shares per day, while Islamic stocks have a systematic turnover that equals 4.0% of outstanding shares per day. The difference in systematic turnover between Islamic and conventional stocks of 0.96% is statically significant at 1% level. Unsystematic turnover on the other hand, is lower for Islamic stocks than for conventional stocks. The average unsystematic turnover for Islamic stocks is only 0.33% and it is statically insignificant compared to a statically significant unsystematic turnover of 0.98% for conventional stocks. The difference between the two classes is 0.65% and it is significant at 1% level.

The results in table 6 imply that the greater turnover of Islamic stocks comes completely from systematic turnover. That is, when investors trade stocks for market wide reasons, they trade Islamic stocks. This finding seems to confirm that familiarity is an important criterion in determining trading. If investors trade in response to information that concerns a particular stock,

they are inclined to trade that stock. On the other hand, if investors can trade a number of different stocks in response to information with market-wide ramifications, they trade the stocks that they are familiar with, and more investors are familiar with Islamic stocks.

Table 6: Systematic and unsystematic turnover

For each stock each month, the following time-series regression is run using daily turnover:

$$turnover_{i,t} = \alpha_0 + \alpha_1\, turnover_{m,t+1} + \alpha_2\, turnover_{m,t} + \alpha_3\, turnover_{m,t-1} + \varepsilon_{i,t}$$

Systematic turnover is a1 times market turnover the next day, plus α_2 times the contemporaneous market turnover, plus $\alpha_3$times the previous day's market turnover. Unsystematic turnover is α_0. For each month, average systematic turnover, average unsystematic turnover, average α_1, and average α_2 are calculated for Islamic and conventional stocks. For each month, average systematic turnover, average unsystematic turnover, average α_1, and average α_2 are calculated for Islamic and Conventional stocks. In parentheses are the Fama–MacBeth t-statistics calculated using Newey-West corrected standard errors.

	Islamic Stocks		Conventional stocks		All stocks		Difference	
	Mean	t-stat	Mean	t-stat	Mean	t-stat	Mean	t-stat
Systematic Turnover	**4.00%** [a]	(3.79)	**3.04%** [a]	(4.09)	**3.32%** [a]	(4.05)	**0.96%** [a]	(4.3)
Unsystematic Turnover	**0.33%**	(1.35)	**0.98%** [a]	(3.65)	**0.76%** [a]	(3.10)	**-0.65%** [a]	(-3.4)
Coef. of Mkt Turnover $_{t+1}$	**0.33** [a]	(2.62)	**0.10**	(0.95)	**0.18** [c]	(1.92)	**0.23**	(1.6)
Coef. of Mkt Turnover $_{t}$	**3.51** [a]	(6.59)	**3.13** [a]	(6.73)	**3.24** [a]	(6.88)	**0.39** [b]	(2.4)
Coef. of Mkt Turnover $_{t-1}$	**0.51** [a]	(5.03)	**0.19**	(1.7)	**0.28** [a]	(3.42)	**0.32** [b]	(2.0)
Sum Coef.s t-1 to t+1	**4.35** [a]	(6.76)	**3.42** [a]	(8.04)	**3.70** [a]	(7.91)	**0.93** [a]	(3.1)
Average R-squared	**0.252**		**0.247**		**0.249**		**0.005**	

(**a)** significant at 1% , (**b)** significant at 5% and (**c)** significant at 10%

To verify that the differences in systematic and unsystematic turnover are driven by classification rather than factors that are correlated with classification, we regress our estimates of systematic and unsystematic turnover for each stock each month on a dummy for Islamic classification and other firm characteristics. Specifically, we run the following cross-sectional regression:

$$\gamma_{i,t} = \alpha_t + \beta_{1t}\, Islamic + \beta_{2t}\, Log(Size) + \beta_{3t}\, BM + \beta_{4t}\, ROA + \beta_{4t} DD + \beta_{5t}\, Log(Age) + \beta_{6t} invp + \beta_{7t} \log(RV) + \beta_{8t} Analyst + \beta_{9t}\, Log(Investors) + \varepsilon_{i,t} \quad (4b)$$

Where $\gamma_{i,t}$ is either systematic turnover, unsystematic turnover, or the coefficient on contemporaneous market turnover, $Islamic$ is a dummy variable that takes one if the firm is classified as Islamic and zero otherwise, $Size$ is firm market capitalization, BM is the firm book-to-market ratio, ROA is the firm return on assets ratio, DD is a dividends payer dummy variable that takes one if the firm paid dividend during the year and zero otherwise, Age is number of months since the stock was available in our data, $Invp$ is the inverse of share price, $Analyst$ is the number of analyst covering the stock, and $Investors$ is the total number of investors holding stock i at the end of the month t. We also control for differences across industries by including a dummy variable for industries.

Average coefficients computed across the 168 months[5] are reported in Table 7. Fama–MacBeth t-statistics are calculated using the Newey and West (1987) approach with twelve lags. The model specification in column (1) shows that Islamic stocks have higher Systematic turnover, greater sensitivity to same-day market turnover, and lower unsystematic turnover. The coefficients on Islamic dummy are economically and statically significant. When we control for visibility variables like analyst coverage and number of investors in column (2) and (3), the difference between Islamic and conventional stocks in systematic and unsystematic turnover and sensitivity to same-day market turnover become economically and statically insignificant. This indicates that Sharia stock classification increases stock familiarity and visibility to potential investors and that its effect is only weakened by analyst coverage and increased number of investors.

[5] the number of regressions in table 7 depend on data availability, number of analyst is only available from 2005 in I/B/E/S database and Tadawul provide us with number of investors is only for periods starting from Jan 2010.

Table 7: Cross-sectional regressions of Systematic and unsystematic turnover

The table reports Fama-MacBeth (1973) cross-sectional regression estimates, where the dependent variable is firm systematic, unsystematic, and the coefficient of contemporaneous market turnover, measured using monthly regression of firm daily stock returns using the following model:

$$turnover_{i,t} = \alpha_0 + \alpha_1\, turnover_{m,t+1} + \alpha_2\, turnover_{m,t} + \alpha_3\, turnover_{m,t-1} + \varepsilon_{i,t}$$

Independent variables are Islamic dummy variable that equals one if the firm is classified as Islamic and zero otherwise, "**Size**" is the natural log of firm market value, "**B/M**" Book-to-market ratio, "**ROA**" firm return on assets, "**DD**" is a dummy variable that equals one of the firm pay dividends and zero otherwise, "**Age**" is the number of month since the firm appears in our data,"**1/p**" is the inverse of share price, "**RV**" is daily stock return volatility over the past month ,"**Number of analyst"**, and "**Number of investors**" which is the total number of investors for each firm at the end of the month (from Jan 2010 to Dec 2015). We average coefficients cross-sectionally each month and then across months. Intercepts and coefficients on the industry dummies are not reported to save space. In parentheses are the Fama–MacBeth t-statistics calculated using Newey-West corrected standard errors.

	Systematic turnover			Unsystematic turnover			Same day market turnover coef.		
	(1)	**(2)**	**(3)**	**(1)**	**(2)**	**(3)**	**(1)**	**(2)**	**(3)**
Islamic dummy	**0.60** [b]	**0.47**	**-0.05**	**-0.49** [c]	**-0.40**	**0.05**	**0.40** [c]	**0.24**	**-0.05**
	(2.65)	(1.68)	(0.39)	(2.60)	(1.65)	(0.22)	(2.05)	(1.10)	(0.18)
Size	**-1.18** [a]	**-1.56** [b]	**-0.66** [a]	**-0.35** [c]	**-0.58** [b]	**-0.60** [a]	**-1.17** [a]	**-1.66** [a]	**-1.31** [a]
	(-3.63)	(-3.18)	(-5.01)	(-2.57)	(-3.16)	(-4.42)	(-5.04)	(-5.89)	(-5.07)
B/M	**-2.26** [c]	**-2.90** [c]	**-0.94**	**-0.45**	**-0.92**	**-1.19** [c]	**-2.08** [b]	**-2.74** [a]	**-2.19** [c]
	(-2.19)	(-2.25)	(-1.76)	(-0.67)	(-1.11)	(-2.45)	(-3.19)	(-3.39)	(-2.26)
ROA	**-0.40**	**-2.53**	**0.69**	**-2.24**	**-2.94**	**-2.97** [b]	**-1.02**	**-1.03**	**0.27**
	(-0.15)	(-0.92)	(0.78)	(-1.31)	(-1.39)	(-2.99)	(-0.36)	(-0.39)	(0.16)
DD	**-0.69** [c]	**-0.21**	**-0.23**	**0.09**	**-0.14**	**-0.14**	**-0.50**	**-0.32**	**-0.59** [c]
	(-2.22)	(-1.13)	(-1.91)	(0.45)	(-0.68)	(-0.83)	(-1.59)	(-1.49)	(-2.27)
Log (Age)	**1.31** [b]	**0.38**	**0.37** [c]	**-0.25**	**-0.05**	**-0.19**	**2.22** [c]	**0.32**	**0.62**
	(2.61)	(1.03)	(2.14)	(-0.81)	(-0.13)	(-1.28)	(2.04)	(1.07)	(1.56)
1/p	**48.04**	**57.15**	**25.86** [c]	**-38.51**	**-49.84**	**-6.14**	**42.18** [c]	**48.09**	**46.93** [c]
	(1.40)	(1.25)	(2.31)	(-1.78)	(-1.68)	(-0.73)	(2.18)	(1.87)	(2.60)
Log (RV)	**0.69** [a]	**0.44** [c]	**0.59** [a]	**1.11** [a]	**1.43** [a]	**0.69** [a]	**1.04** [a]	**0.80** [b]	**1.07** [a]
	(3.65)	(2.36)	(3.47)	(3.63)	(3.76)	(5.51)	(4.67)	(3.22)	(3.57)
# Analysts		**1.10**	**0.08** [b]		**0.65**	**0.16** [a]		**0.84**	**0.21** [a]
		(1.12)	(3.10)		(1.89)	(3.70)		(1.45)	(4.33)
Log (# Investors)			**0.05**			**-0.17** [c]			**0.06**
			(0.70)			(-2.20)			(0.50)
Number of regressions	168	126	72	168	126	72	168	126	72

(a) significant at 1% , (b) significant at 5% and (c) significant at 10%

1.1. Stock liquidity

In the previous sections we showed that Islamic stocks are more visible, recognize by wider base of equity market participants, and have larger number investors. These results suggest that Islamic stocks attracts a disproportionate number of investors who make their investment decisions based on familiarity rather than on more fundamental information. An implication of this is that classification may affect stock market liquidity through its effect on the composition of traders. Thus it is plausible that a firm compliance with Sharia rules reduces adverse selection costs by increasing the proportion of such uninformed traders in the market for the firm's stock.

Grullon et al. (2004) argue that uninformed investors cluster in high-visibility stocks because those are the ones they are aware of and because these investors often mistake their knowledge of a firm for relevant information, therefore, discretionary liquidity traders will target high-visibility stocks because they can hide their trades among other uninformed investors. Following this reasoning, we expect Islamic stocks to have higher liquidity than their conventional counterparts.

In this section we investigate the prediction of the relation between Sharia stock classification, stock turnover, and relative price impact measured by Amihud's (2002) illiquidity measure ILLIQ, calculated as the daily ratio of absolute stock return to dollar trading volume. We also use the modified version of illiquidity measure proposed by Amihud et al. (2015) estimated as the ratio of the ILLIQ to the average ILLIQ of all stocks in the market. Rather than computing dollar trading volume from the multiplication of volume with stock closing price, we use the reported actual trading values reported in the data provided by Tadawul.

Using a multivariate framework that controls for other factors that may affect liquidity we run the following daily cross-sectional regression model and control for variables suggested by Grullon et al. (2004) as follows:

$$\tau_{i,t} = \alpha_t + \beta_{1t}\, Islamic + \beta_{2t}\, Log(Size) + \beta_{3t} ROA + \beta_{4t}\, Log(Age) + \beta_{5t} Log(RV) + \beta_{6t} Invp + \beta_{7t}\, Log(Turnover) + \varepsilon_{i,t} \quad (5)$$

Where $\tau_{i,t}$ is either stock turnover ratio, *ILLIQ*, or *ILLIQMA*. $Islamic$ is a dummy variable that takes one if the firm is classified as Islamic and zero otherwise, $Size$ is firm market capitalization, ROA is the firm return on assets ratio, Age is number of months since the stock was available in our data, RV is daily stock return volatility over the past month, $Invp$ is the inverse of share price, and $Turnover$ is stuck turnover in the past month. We also control for additional differences across industries by including a dummy variable for industry.

Table 8 presents the results from the multivariate analysis. We calculate the time-series average of estimates across daily cross-sectional regressions. To take into account serial correlation in the coefficient estimates, we compute Newey-West (1987) standard errors with twenty lags. Consistent with our prediction, Islamic stocks have a higher liquidity than conventional stocks. When using *ILLIQ* and *ILLIQMA* measure for example, the coefficient on Islamic dummy variable is consistently negative and statically significant in both model specifications which indicates that Islamic stocks have lower illiquidity, or higher liquidity, than their conventional counterparts. The same conclusion can be drawn with stock turnover ratio, stocks that have been classified as Sharia compliant have stock turnover ratio that is higher than the turnover ratio of non-complaint stocks.

To summarize, the results reported in this section suggest that Sharia stock classification increases Islamic stocks visibility and investor recognition, and breadth of ownership through it wide acceptance by both types of investors, Islamic and conventional. The wide acceptance and increased firm visibility, leads to the clustering of uninformed investors in these high-visibility firms who trade on their knowledge of a firm rather than relevant information. Thus, liquidity traders will find it optimal to trade Islamic stocks, which are highly visible, in order to hide their trade among uniformed investors. Our results confirm this prediction and show that Islamic stocks are more actively traded and more liquid than conventional stocks. The multivariate

analysis indicates that after controlling for other firm characteristics known to affect liquidity and trading activity, firm Sharia compliance has a positive effect on stock liquidity and trading activity.

Table 8: Stock liquidity And trading activity

In the regressions, the dependent variable is the daily stock turnover or Amihud's illiquidity for firm i on calendar day j. Turnover is defined as trading volume divided by shares outstanding. Explanatory variables are an Islamic dummy variable equal to one if the firm is classified as Islamic or zero otherwise, firm size computed as the natural logarithm of the market value, Book-to-market ratio, (ROA) firm return on assets, Number of analyst, Leverage which is total debt/total assets, (Age) firm age which is the number of month since the firm appears in our data, number of investors which is the total number of investors for each firm at the end of the month (from Jan 2010 to Dec 2015), (1/p) the inverse of the stock price, and a dummy variable for each industry. The cross-sectional regressions weight each day equally. The parameter values are the average of the cross-sectional regressions. In parentheses are the Fama–MacBeth autocorrelation-adjusted t-statistics. Intercepts and coefficients on the industry dummies are not reported to save space.

	Log (ILLIQ)		***ILLIQMA***		***Log(Turnover)***	
	(1)	**(2)**	**(1)**	**(2)**	**(1)**	**(2)**
Islamic dummy	**-0.24** [a] (14.5)	**-0.23** [a] (14.4)	**-0.33** [a] (10.8)	**-0.32** [a] (10.6)	**0.24** [a] (15.2)	**0.27** [a] (19.3)
Size	**-0.45** [a] (-36.5)	**-0.59** [a] (-46.9)	**-0.26** [a] (-21.5)	**-0.41** [a] (-26.7)	**-0.60** [a] (-46.6)	**-0.55** [a] (-36.3)
ROA	**1.95** [a] (13.5)	**1.22** [a] (8.7)	**1.47** [a] (8.1)	**0.67** [b] (2.9)	**-2.60** [a] (-16.1)	**-2.26** [a] (-14.4)
Log (Age)	**-0.09** (-1.7)	**0.05** (0.9)	**-0.34** [c] (-2.3)	**-0.19** (-1.3)	**0.04** (0.7)	**-0.001** (0.0)
Log (RV)	**-0.18** [a] (-8.2)	**-0.16** [a] (-7.6)	**-0.12** [a] (-3.9)	**-0.10** [a] (-3.3)	**0.36** [a] (13.8)	**0.36** [a] (13.8)
1/p		**-6.84** [a] (-10.0)		**-8.03** [a] (-7.3)		**5.19** [a] (6.8)
Log (Turnover)		**-0.15** [a] (-22.2)		**-0.14** [a] (-12.0)		
R-square	**0.38**	**0.42**	**0.27**	**0.30**	**0.71**	**0.71**
Number of observations	**3410**	**3410**	**3410**	**3410**	**3410**	**3410**

[a] significant at 1% , [b] significant at 5% and [c] significant at 10%

2. Robustness checks

We now summarize several other untabulated robustness checks that do not alter the main inferences of our study. To check if our results are driven by classification used, we use an alternative Sharia stock classification by Dr. Al-Osaimi and the results are similar to that already reported in our study and our conclusion remain the same. It is possible that even if we use other Sharia classification our results will still be driven by fundamental-related Sharia classification criteria such as firm's debt ratio. To address this issue, we pick stocks that are Islamic by default and whose compliance with Sharia roles are determined by their business operation and not by their leverage level. Typically, firms that operate in Banks & Financial Service or Insurance sectors decide whether or not to comply with Sharia roles early when they first establish their business and once they decide to comply, it is not possible to abandon their commitment to Sharia rules. Therefore, investors will perceive those firms as truly Islamic and there will be no doubt about their classification.

We examine the effect of firm compliance with Sharia roles on stock visibility and liquidity in firms operating in Banks & Financial Service or Insurance sectors. Table 9 presents the results of regressing stock visibility and liquidity measures on Islamic dummy variable and other control variables. The results are consistent with our prediction that Islamic stocks are more visible and liquid and owned by larger number of investors as indicated by the positive and statically significant coefficients on Islamic dummy variable for stock synchronicity and liquidity regressions. Islamic stocks are also have a higher investor recognition than their conventional counterparts as indicated by the negative and statically significant coefficient on Islamic dummy variable for Idiosyncratic volatility regression.

Table 9: Robustness check

This table repeat the regressions of previous tables but with firms that operate in Banks & Financial Service and Insurance sectors only. The regressions are cross-sectional regressions performed every month except for liquidity measures where the regressions are done every day. Dependent variables are, Log of Number of investors, logistic transformed idiosyncratic volatility (eq. 3c), logistic transformed measure of synchronicity R2 (eq. 2d), Systematic turnover (eq 4a), liquidity measures, Amihud's (2002) and stock turnover. We average coefficients cross-sectionally (for liquidity) each month (day) and then across months (days). Intercepts and coefficients on the industry dummies are not reported to save space. In parentheses are the Fama–MacBeth t-statistics calculated using Newey-West corrected standard errors.

	Number of investors	Idiosyncratic volatility	Synchronicity		Systematic turnover	Liquidity	
			Global	Local		*ILLIQ*	Turnover
Islamic dummy	**0.91** [a] (3.79)	**-0.54** [a] (4.80)	**0.42** (1.29)	**0.71** [b] (2.09)	**-0.06** (0.10)	**-1.36** [a] (10.6)	**1.55** [a] (15.4)
Size	**0.52** [a] (12.06)	**0.17** [a] (4.15)	**-0.27** (-1.46)	**-0.17** (-0.66)	**-0.48** (-1.32)	**-1.04** [a] (-15.6)	**-0.21** [a] (-3.4)
ROA	**2.48** [a] (7.70)	**-10.85** (-0.90)	**-2.23** (-0.17)	**-6.82** (-1.07)	**2.76** (0.55)	**7.79** (1.0)	**3.11** (0.6)
Log (Age)	**-0.64** [a] (-11.62)	**-0.04** (-0.10)	**0.28** (0.54)	**-0.38** (-1.10)	**0.50** (0.65)	**2.85** [a] (5.9)	**-2.75** [a] (-6.9)
DD	**-1.15** [c] (-2.34)	**-0.29** [c] (-2.07)	**-1.05** (-1.66)	**-0.44** (-0.58)	**0.61** (0.91)		
1/p	**22.48** [a] (16.60)	**-6.11** [c] (-2.37)			**40.83** (1.93)	**-28.44** [a] (-6.9)	**23.59** [a] (6.6)
B/M		**0.36** [c] (2.27)	**1.05** [c] (1.76)	**1.20** [b] (2.37)	**-2.00** (-1.34)		
# Analysts		**-0.09** [a] (-6.01)	**0.31** [b] (2.21)	**0.35** [c] (2.00)	**0.08** (0.84)		
Log (# Investors)		**0.02** (0.45)	**-0.04** (-0.33)	**-0.21** (-1.32)	**0.20** (0.77)		
Log (RV)	**-0.01** (-0.13)				**0.44** (1.36)	**-0.04** (-0.7)	**0.21** [a] (4.3)
VROA		**36.07** (0.56)	(40.98) (0.17)	**-99.5** (-0.66)			
Log (Turnover)	**0.16** [a] (6.77)					**-0.24** [a] (-11.9)	
Momentum	**0.43** (0.57)						
R-squared	0.69	0.46	0.23	0.42	0.32	0.61	0.81

[a] significant at 1% , [b] significant at 5% and [c] significant at 10%

3. Conclusion

The objective of this paper is to examine the potential impact of market barriers created by implicit, cultural, or philosophical differences among economic agents by studying how Islamic religious restrictions effect stocks visibility and investor recognition in Saudi Arabia. We examine the performance of Islamic

and conventional stocks in terms of liquidity and trading activity and determine whether the differences are attributed to investor recognition and to the implicit trading barrier created between the two classes of stock by Islamic classification. Due to the religious nature of the population, the degree to which individuals participate in the stock market, and the recent growth in the listed firms available for purchase in the stock market, the Saudi Arabian stock market provides an ideal sample for our analysis. Accordingly, we examine the daily and monthly stock data of all Saudi firms from 2002 to 2015 and calculate important measures pertaining to breadth of ownership, investor recognition, visibility, synchronicity, information integration, and stock liquidity. For example, we compute the dgree of market integration and synchronicity along the lines of Pukthuanthong and Roll (2009), the degree of stock recognition based on Merton's (1987) framework, the degree of stock visibility and investor familiarity like that described in Loughran and Schultz (2005).

Our results support the segmentation and impediment-to-trade hypothesis. Conventional stocks are isolated and segmented from Islamic stocks, which means that there exists an implicit barrier of trade between them. By applying a methodology similar to Pukthuanthong and Roll (2009) to measure stock synchronicity and information integration , we find that local and global macroeconomic factors can better explain Islamic stock returns than conventional stock returns. In some regressions, the percentage of macroeconomic factors explaining Islamic stock returns is twice as high as that for conventional stock returns. One important implication is that conventional securities cannot be traded by Islamic investors, therefore, investors who invest in

conventional securities must hold undiversified portfolios and, thus, require a return premium for bearing idiosyncratic risk. To test this implication, we follow Ang et al. (2006) and estimate firm idiosyncratic volatility as the standard deviation of abnormal stock returns, relative to multi-factor models. The results show that Islamic stocks have higher investor recognition, as indicated by their low idiosyncratic risk, than conventional stocks.

In addition, we also report evidence supporting the hypothesis that sharia certification generates an investor recognition effect similar to that found in the literature. Our results indicate that Islamic stocks exhibit higher liquidity and more trading activity than conventional stocks. We find that Islamic stocks are traded 27 percent more than conventional stocks in terms of stock turnover. In addition, according to Amihud's (2002) illiquidity measure, Islamic stocks are 24 percent more liquid than their conventional counterparts. In addition, we identify the type of information conveyed through the relatively higher frequency trades of Islamic stocks using a methodology similar to that of Loughran and Schultz (2005). The results imply that the higher turnover for Islamic stocks comes completely from systematic turnover. That is, when investors trade stocks for market-wide reasons, they trade Islamic stocks. This finding supports that familiarity is an important criterion in determining trading. If investors trade in response to information that concerns a particular stock, they must trade that stock. On the other hand, if investors can trade a number of different stocks in response to information with market-wide ramifications, they choose to trade the stocks that they are familiar with, and Saudi investors more familiar with Islamic stocks, due to their certification.

To our knowledge, this is the first paper to discuss the performance, liquidity, or trading activity differences between Islamic and conventional stocks in the context of market segmentation and investor recognition. Our results imply that sharia certification has the effect of segmenting the Saudi markets, as well as improving the liquidity and investor recognition of Islamic stocks for Saudi investors. Therefore, the results presented have important implications as to the efficiency of asset pricing not only in emerging markets, such as Saudi Arabia, but also in economies with significant Islamic financial markets. Furthermore, our results may provide

value to a new line of literature that examines other implicit market barriers, such as those due to other cultural or philosophical differences, and their impact on the efficiency of financial markets throughout the world.

References

Abbes, M.B. and Trichilli, Y., 2015. Islamic stock markets and potential diversification benefits. Borsa Istanbul Review, 15(2), pp.93-105.

Ahmad, Z. and Ibrahim, H., 2002. A study of performance of the KLSE Syariah index. Malaysian Management Journal, 6(1&2), pp.25-34.

Alam, N. and Rajjaque, M.S., 2010. Shariah-compliant equities: Empirical evaluation of performance in the European market during credit crunch. Journal of Financial Services Marketing, 15(3), pp.228-240.

Ashraf, D. and Mohammad, N., 2014. Matching perception with the reality—Performance of Islamic equity investments. Pacific-Basin Finance Journal, 28, pp.175-189.

Amihud, Y., 2002. Illiquidity and stock returns: cross-section and time-series effects. Journal of financial markets, 5(1), pp.31-56.

Amihud, Y., Hameed, A., Kang, W. and Zhang, H., 2015. The illiquidity premium: International evidence. Journal of Financial Economics, 117(2), pp.350-368.

Ang, A., Hodrick, R.J., Xing, Y. and Zhang, X., 2006. The cross‐section of volatility and expected returns. The Journal of Finance, 61(1), pp.259-299.

Bailey, W., 1994. Risk and return on China's new stock markets: Some preliminary evidence. Pacific-Basin Finance Journal, 2(2), pp.243-260.

Bailey, W., Chung, Y. and Kang, J., 1999. Foreign Ownership Restrictions and Equity Price Premiums: What Drives the Demand for Cross-Border Investments?. The Journal of Financial and Quantitative Analysis, 34(4), p. 489.

Balcılar, M., Demirer, R. and Hammoudeh, S., 2015. Global risk exposures and industry diversification with Shariah-compliant equity sectors. Pacific-Basin Finance Journal, 35, pp.499-520.

Bhatt, V. and Sultan, J., 2012. Leverage risk, financial crisis, and stock returns: A comparison among Islamic, conventional, and socially responsible stocks. Islamic Economic Studies, 20(1), pp.87-143.

Bushee, B.J. and Miller, G.S., 2012. Investor relations, firm visibility, and investor following. The Accounting Review, 87(3), pp.867-897.

Canepa, A. and Ibnrubbian, A., 2014. Does faith move stock markets? Evidence from Saudi Arabia. The Quarterly Review of Economics and Finance, 54(4), pp.538-550.

Carhart, M.M., 1997. On persistence in mutual fund performance. The Journal of Finance, 52(1), pp.57-82.

Charles, A., Darné, O. and Pop, A., 2015. Risk and ethical investment: Empirical evidence from Dow Jones Islamic indexes. Research in International Business and Finance, 35, pp.33-56.

Chen, H., Noronha, G. and Singal, V., 2004. The price response to S&P 500 index additions and deletions: Evidence of asymmetry and a new explanation. The Journal of Finance, 59(4), pp.1901-1930.

Dewandaru, G., Bacha, O.I., Masih, A.M.M. and Masih, R., 2015. Risk-return characteristics of Islamic equity indices: Multi-timescales analysis. Journal of Multinational Financial Management, 29, pp.115-138.

Dewandaru, G., Rizvi, S.A.R., Masih, R., Masih, M. and Alhabshi, S.O., 2014. Stock market co-movements: Islamic versus conventional equity indices with multi-timescales analysis. Economic Systems, 38(4), pp.553-571.

Dharani, M. and Natarajan, P., 2011. Equanimity of risk and return relationship between Shariah index and general index in India.

Eun, C.S., Wang, L. and Xiao, S.C., 2015. Culture and R 2. Journal of Financial Economics, 115(2), pp.283-303.

Errunza, V. and Losq, E., 1985. International asset pricing under mild segmentation: Theory and test. The Journal of Finance, 40(1), pp.105-124.

Fama, E.F. and French, K.R., 1993. Common risk factors in the returns on stocks and bonds. Journal of financial economics, 33(1), pp.3-56.

Fang, L. and Peress, J., 2009. Media coverage and the cross‐section of stock returns. The Journal of Finance, 64(5), pp.2023-2052.

Ferreira, M.A. and Laux, P.A., 2007. Corporate governance, idiosyncratic risk, and information flow. The Journal of Finance, 62(2), pp.951-989.

Foerster, S.R. and Karolyi, G.A., 1999. The effects of market segmentation and investor recognition on asset prices: Evidence from foreign stocks listing in the United States. The Journal of Finance, 54(3), pp.981-1013.

Geczy, C., Stambaugh, R.F. and Levin, D., 2005. Investing in socially responsible mutual funds.

Girard, E.C. and Hassan, M.K., 2008. Is there a cost to faith-based investing: Evidence from FTSE Islamic indices. The Journal of Investing, 17(4), pp.112-121.

Grullon, G., Kanatas, G. and Weston, J.P., 2004. Advertising, breadth of ownership, and liquidity. Review of Financial Studies, 17(2), pp.439-461.

Hammoudeh, S., Mensi, W., Reboredo, J.C. and Nguyen, D.K., 2014. Dynamic dependence of the global Islamic equity index with global conventional equity market indices and risk factors. Pacific-Basin Finance Journal, 30, pp.189-206.

Heinkel, R., Kraus, A. and Zechner, J., 2001. The effect of green investment on corporate behavior. Journal of financial and quantitative analysis, 36(04), pp.431-449.

Hoepner, A.G., Rammal, H.G. and Rezec, M., 2011. Islamic mutual funds' financial performance and international investment style: Evidence from 20 countries. The European Journal of Finance, 17(9-10), pp.829-850.

Hong, H. and Kacperczyk, M., 2009. The price of sin: The effects of social norms on markets. Journal of Financial Economics, 93(1), pp.15-36.

Hong, H. and Kostovetsky, L., 2012. Red and blue investing: Values and finance. Journal of Financial Economics, 103(1), pp.1-19.

Irvine, P.J., 2003. The incremental impact of analyst initiation of coverage. Journal of Corporate Finance, 9(4), pp.431-451.

Kadlec, G.B. and McConnell, J.J., 1994. The effect of market segmentation and illiquidity on asset prices: Evidence from exchange listings. The Journal of Finance, 49(2), pp.611-636.

Kumar, A., Page, J.K. and Spalt, O.G., 2011. Religious beliefs, gambling attitudes, and financial market outcomes. Journal of Financial Economics, 102(3), pp.671-708.

Lee, H.W., 2009. The Price Premium of China A‐Shares over Hong Kong H‐Shares: A Further Visit of the Liquidity Hypothesis. Asia‐Pacific Journal of Financial Studies, 38(5), pp.657-694.

Loughran, T. and Schultz, P., 2005. Liquidity: Urban versus rural firms. Journal of Financial Economics, 78(2), pp.341-374.

Majdoub, J. and Mansour, W., 2014. Islamic equity market integration and volatility spillover between emerging and US stock markets. The North American Journal of Economics and Finance, 29, pp.452-470.

Mensi, W., Hammoudeh, S., Reboredo, J.C. and Nguyen, D.K., 2015. Are Sharia stocks, gold and US Treasury hedges and/or safe havens for the oil-based GCC markets? Emerging Markets Review, 24, pp.101-121.

Merdad, H.J., Hassan, M.K. and Hippler, W.J., 2015. The Islamic risk factor in expected stock returns: an empirical study in Saudi Arabia. Pacific-Basin Finance Journal, 34, pp.293-314.

Merton, R.C., 1987. A simple model of capital market equilibrium with incomplete information. The journal of finance, 42(3), pp.483-510.

Morck, R., Yeung, B. and Yu, W., 2000. The information content of stock markets: why do emerging markets have synchronous stock price movements? Journal of financial economics, 58(1), pp.215-260.

Naifar, N., 2016. Do global risk factors and macroeconomic conditions affect global Islamic index dynamics? A quantile regression approach. The Quarterly Review of Economics and Finance, 61, pp.29-39.

Saiti, B., Bacha, O.I. and Masih, M., 2014. The diversification benefits from Islamic investment during the financial turmoil: The case for the US-based equity investors. Borsa Istanbul Review, 14(4), pp.196-211.

Shamsuddin, A., 2014. Are Dow Jones Islamic equity indices exposed to interest rate risk? Economic Modelling, 39, pp.273-281.

Shleifer, A., 1986. Do demand curves for stocks slope down? The Journal of Finance, 41(3), pp.579-590.

Pástor, Ľ. and Stambaugh, R.F., 2003. Liquidity risk and expected stock returns. Journal of Political economy, 111(3), pp.642-685.

Pukthuanthong, K. and Roll, R., 2009. Global market integration: An alternative measure and its application. Journal of Financial Economics, 94(2), pp.214-232.

Wahyudi, I. and Sani, G.A., 2014. Interdependence between Islamic capital market and money market: Evidence from Indonesia. Borsa Istanbul Review, 14(1), pp.32-47.

Walkshäusl, C. and Lobe, S., 2012. Islamic investing. Review of Financial Economics, 21(2), pp.53-62.

Yilmaz, M.K., Sensoy, A., Ozturk, K. and Hacihasanoglu, E., 2015. Cross-sectoral interactions in Islamic equity markets. Pacific-Basin Finance Journal, 32, pp.1-20.

CHAPTER 2

Commonality in Preferences and Stock Comovements

1. Introduction and Motivation

In a perfect and frictionless financial market, asset prices change to reflect new information about future cash flows and discount rates. To the extent that there are common factors affecting either cash flows or discount rates, asset prices will move together to reflect innovations in such common factors. However, there is growing evidence that prices move together for reasons that are seemingly unrelated to fundamentals. It is well documented in the literature that stocks comove in many dimensions. Ahn et al. (2009) and Hou (2007) show that stocks in the same industry exhibit a strong commonality in their returns as those stocks share economic fundamentals or they are affected by common industry-level shocks. There are also groups of stocks, other than those within the same industry that shows strong return comovements, such as small stocks or value stocks (e.g., Fama and French (1993)) and it is not clear whether their fundamentals also commove.

Two broad competing theories explain such commonality in stock returns. Traditional perspective claims that comovement in stock returns is generated by comovement in fundamental values. A more recent perspective suggests that it is the non-fundamental factors, such as investor sentiment and market frictions, that drive return comovement (Barberis et al. (2005)). They argue that investors are prone to 'category' or 'habitat' trading, where they lump certain individual stocks together and trade them as a group or simply trade only those stocks. Such behavior could generate non-fundamental comovement at each category or habitat level through correlated trading. Motivated by this habitat-based framework of return comovement, Kumar, Page, and Spalt (2016) show that investors' preferences toward lottery-like stocks generate excess return comovement through correlated trading of gambling-motivated investors.

The motivation of our paper is to examine whether there exists any return commonality among the same-class stocks and whether this commonality or comovement in trading is driven by non-fundamental factors. Based on Barberis et al. (2005) view on non-fundamental factors that generate stock comovement, we predict that there will be a common factor in the return of securities that are held and traded by Islamic investors, especially individual investors. In habitat view proposed by Barberis et al. (2005) they state that since many investors choose to trade only a subset of all available securities, whenever these investors' risk aversion, liquidity needs, or sentiment change, they will change their exposure to the stocks in their habitat, thereby inducing a common factor in the returns of these stocks. Another view that is also proposed by Barberis et al. (2005) is the information diffusion view, which argues that, due to some market friction, information environments will not be the same for all stocks. Information will be incorporated more quickly into the prices of some stocks more than the others. For example, some stocks may be less costly to trade, or may be held by investors with a better access to breaking news and the resources required to exploit it. In this view, there will be a common factor in the returns of stocks that incorporate information at similar rates. When positive news about aggregate earnings is released, some stocks incorporate it today and move up together immediately, while other stocks will take time to incorporate such news and they will only move after some delay.

Many studies have tried to develop tools to understand how information is incorporated into asset prices. Empirically, social networks, culture, or more generally information networks, have been shown to be important in explaining investors' trading decisions and portfolio performance and thus could lead to correlated trading among a subset of investors (e.g. Feng and Seasholes (2004), Hong et al. (2004), Guiso et al. (2004), Ivković and Weisbenner (2007), Brown et al. (2008), Cohen et al.(2008), Colla and Mele (2010), and Ozsoylev and Walden (2011), Han and Yang (2013), and Eun et al. (2015)). To measure social connectedness, some studies rely on the person's religious participation as a measure of sociability and find that individuals who visit with neighbors or attend church have higher levels of stock market participation. (Hong, Kubik, and Stein (2004), Gruber (2005), and Guiso et al. (2004)). The literature of sociology suggests that a substantial amount of information that people obtain is through interactions with neighbors

and casual acquaintances. Motivated by this view, we conjecture that Islamic investors are more socially connected since they meet at mosques five times a day to perform their religious prayers and therefore their investment decisions will possibly lead to correlated trading activities.

We examine the sample of daily Saudi Arabian-listed stock returns from 2002 to 2015. Our study will focus on the stock market of Saudi Arabia for several important reasons. First, the majority of traders in the Saudi stock market are individual traders, which gives us the opportunity to test the effect of individual recognition on trading behavior. Second, Saudi Arabia has a majority Muslim population, and it is known for its strong adherence to Sharia law, which gives us the opportunity to test the effect of religious beliefs on investor investment decisions and portfolio construction. Third, in Saudi Arabia, clerics and Islamic finance scholars voluntarily screen stocks and financial instruments for their Sharia compliance and attempt to disseminate this information to the public through different media channels. This enables us to study the effect of such information on individual trading activity and determine whether this type of stock classification acts to increase the recognition of Sharia compliant stocks. Finally, Saudi banks, especially Islamic banks, encourage individual investment in the stock market through their Murabaha personal loan products, which are Islamic loans whereby a bank sells stock on credit to its customers.

In this paper, we posit that active correlated trading among Islamic investors induces a common factor among the returns and liquidity of stocks that those investors find compliant with their religious believes. Although previous studies find evidence of religion-motivated investment decisions (Kumar et al. (2011), Shu et al. (2012), Kumar et al. (2016) and Kumar (2009)) this study is the first to examine the potential impact of these decisions on stock return and liquidity comovement. Our main conjecture is motivated by Barberis et al. (2005) habitat-based framework of return comovement and the observation that Islamic stocks are segmented from the rest of the market.

In Islamic finance, Islamic scholars provide important information to potential investors, screen stocks in order to classify them as Sharia compliant (Islamic), or non-Sharia compliant (conventional) depending on whether or not the firm engages in Islam prohibited activities. If the firm does not engage in any of the prohibited activities in Islam, it will be classified as Sharia compliant or Islamic firm, otherwise it will be classified as non-Sharia or conventional firm. Depending on each investor's adherence level to Islamic roles, Islamic investors with high levels of adherence to Islamic rules will refrain from trading stocks that are not compliant with Sharia law (conventional stocks) and will only trade Islamic, or Sharia compliant stocks. On the other hand, conventional investors, who care less about Islamic religious restrictions, will trade stocks regardless of whether they are Sharia compliant (Islamic), or not. Given the observed difference in preferences between equity market participants, we conjecture that Islamic stocks, favored by Islamic investors, exhibits excess return and liquidity comovements since Islamic investors' trading activities are often correlated. This might be due to their stronger behavioral biases and/or their demographic attributes are similar.

Consistent with this prediction, we find that Islamic stocks comove strongly with one another, and provide evidence that this return and liquidity comovements are generated by the correlated trading of Islamic investors. These comovements are still persistent even after controlling for industry and other stocks comovements as well as other known risk factors such as size, value, momentum, and liquidity factors. Another striking result is that these excess return and liquidity commonalities cannot be explained by comovements in earnings or other firm fundamental-related factors. Our results explain the dynamics of the effect of Sharia stock classification on stock return and liquidity comovements. Using difference-in-difference approach, our results show that Sharia stock classification increases the commonalities between Islamic stocks especially in the first two years after classification reports are released to the public. Our results remain robust to changing portfolio weighting, regressions frequency, and classification methodology, we find that classifying stock as an Islamic stock increases its price comovement with other Islamic stocks and also increase its commonality in liquidity Islamic stocks.

The customers have the discretion to choose among a portfolio of stocks, but the stocks must be Sharia-compliant. Consequently, potential borrowers that may initially have no interest in investing in the stock market are incentivized to gather information pertaining to Sharia compliant stocks. As a consequence of these trends in the Saudi market, individual investors have become very active in trading Saudi stocks, and, as documented by the Saudi Stock Exchange (Tadawul)[6], 90 percent of Saudi stocks are traded by individual investors. Taking these factor into consideration along with the fact that in Saudi stock market short selling is not allowed, this leads us to think that the market will be more affected by individual behavior and sentiments. As suggested by Baker and Stein (2004), in a world with short-sales constraints, market liquidity can be a sentiment indicator. An unusually liquid market is one in which pricing is being dominated by irrational investors, who tend to underreact to the information embodied in either order flow or equity issues. Thus high liquidity is a sign that the sentiment of these irrational investors is positive, and that expected returns are therefore abnormally low.

Another important implication of Saudi stock market is that because trading is done mainly by individuals, their behavior will determine the stock market performance. Prior studies show that stock price anomalies are associated with individual or retail investors. Kumar and Lee (2006) show that individual investors trade in concert and that systematic retail trading results in return comovements for stocks with a high retail concentration. Their paper leaves open the question of the origin of the systematic component of retail trades. Barber and Odean (2008) suggest that one source of the systematic component of retail trades could be mass media coverage. Grinblatt and Keloharju (2001) suggest that small investors are more subject to cultural and language biases as well as the disposition effect. Barber, Odean, and Zhu (2009) document that the trading of individuals is highly correlated and surprisingly persistent and that this high trading correlation is induced by behavioral biases. They argue that the preferences for investing

[6] For further information see periodic market reports published by Saudi Stock Exchange (Tadawul) available at their website www.tadawul.com.sa

in some stocks while selling others must be shared by many individual investors if these preferences are to affect prices. They find that the most reasonable drivers of the coordinated trading are the combination of the disposition effect, the representativeness heuristic, and limited attention. Consistent with this view, Kumar, Page, and Spalt (2013) provide a supporting evidence that correlated retail trading generates comovements in stock returns. The comovement patterns they document fit well with the habitat-based view of return comovements developed in Barberis et al. (2005).

While prior studies have shown that non- fundamental categorization exists among the same-index stocks (Vijh(1994) and Barberis et al.(2005)), same-style mutual funds (Cooper et al.(2005)), stocks with corporate headquarters in the same geographic area (Pirinsky and Wang (2006), and same-country stocks (Froot and Dabora (1999)), no study examines stock comovements in the context of trading and/or information category. Our paper contributes to the growing behavioral finance literature that examines whether non-fundamental factors such as nominal prices, firm location and investor preference and sentiment affect asset prices, including their comovements and liquidity (Barberis and Shleifer (2003), Barberis et al. (2005), Baker and Wurgler (2006) Kumar and Lee (2006) Green and Hwang (2009), Kumar et al. (2013), Broman (2016), Kumar et al. (2016)).

Our paper is also related to the growing literature on the effect of investor preferences and social norms on portfolio choice and asset prices. Kumar et al. (2016) show that investors' preferences toward lottery-like stocks generate excess return comovement through correlated trading of gambling-motivated investors, also Hong and Kostovetsky (2012) show how political values of fund managers influence their portfolio choices. Heinkel, Kraus, and Zechner (2001) examine the price implications of ethical screening on polluting companies. Similarly, Hong and Kacperczyk (2009) show that negligence of sin stocks, stocks of firms involved in producing alcohol, tobacco, and gaming, by norm-constrained institutions have an impact on the price performance of these stocks

Our findings also add to an emerging Islamic finance literature that analyzes the difference between Islamic and conventional stocks. Prior research has shown that investors with a stronger adherence to Sharia rules exhibit a strong preference for Sharia compliant stocks (Canepa and Ibnrubbian (2014), Dewandaru et al. (2015)) and trade more frequently (Alhomaidi et al. (2016)). Furthermore, many other studies try to examine comovement in Islamic and conventional stocks and indices (Ajmi et al. (2014), Hammoudeh et al. (2014), El Alaoui et al. (2015), Rizvi et al. (2015)) but their objective was to understand the behavior of contagion and causality between/within conventional and Islamic markets.

The remainder of the paper is organized as follows: We summarize the data and the Sharia stock classification methodology in Section II. Section III presents the methodology used and our main empirical results. Section IV provides additional robustness checks. We conclude in Section VI with a brief discussion.

2. Data and Stock Classifications

To test the comovement in stock prices among Islamic and conventional stocks we use stock market data for Saudi Arabian stock market. Stock prices and firm accounting data were collected using Global COMPUSTAT from Wharton Research Data Services. The sample period for this study contains daily data that spans 2002 to 2015 (subject to the data availability in WRDS). We also have analyst coverage data from I/B/E/S [7]and number of investors for each firm on a monthly basis from Saudi Tadawul[8] agency for the period from Jan 2010 to Dec 2015. Our sample includes all listed stocks in the Saudi equity market. We calculate daily stock turnover ratio as the ratio of daily traded stocks over total number of shares outstanding for each firm. Amihud's illiquidity measure is calculated as the ratio of absolute daily stock return over Riyal

[7] The data for analyst coverage starts from 2005 and Analyst coverage is defined as the number of analysts reporting current fiscal year annual or quarter earnings estimates each month.

[8] Tadawul has also provided us with data on daily stock returns with "actual Riyal traded volume" which we use to calculate average prices and Amihud's (2002) illiquidity measure.

traded volume for each stock. We also calculate control variables for all stocks in our sample except stocks in Banks & Financial Service or Insurance sectors where we assign a missing values to their (Leverage) or debt to assets ratio variable.

To classify the firms into Islamic (Sharia compliant) or conventional (non-Sharia compliant), we use the most common and market available classifications. In Saudi Arabia, there exists more than one classification. And these classifications differ in the screening process and criteria for selecting Islamic firms. These classifications share some criteria, like the prohibited activities, which include (1) activities that involve in any form of usury or interest rates (riba), for example, borrowing or investing in interest bearing or fixed-income instruments. (2) Activities that involve excessive risk, uncertainty, ambiguity, or deception (gharar). (3) Activities that are related by any means to gambling, lottery, or game of chance (maysir). (4) Sharia-compliant firms according to the criteria mentioned earlier and we update our sample to match these Activities that are related to non-halal businesses, such as those that deal with pork, adult entertainment, tobacco, non-medical alcohol, and all other unethical businesses.

For many firms, it is quite difficult not to engage in some of these activities especially in activities that involve in any form of interest rates. As a consequence, some Sharia scholars add certain exceptions to the filtering process and the adherence to Sharia law. For example, if a firm is engaged in an impermissible activity, the ratio of income generated by that impermissible activity to the total income must be less than a certain percentage in order to classify the firm as an Islamic firm, otherwise it will be considered as a non-Sharia compliant or conventional firm. The classifications will differ in what percentage of income generated by impermissible activities that the firm cannot exceed in order to be classified as an Islamic firm.

We will rely on Dr.Al-Fozan's stock classification reports since it is commonly used by investors, covers stocks listed in all sectors of equity market, and it is one of the strictest classification, which insure that firms that are classified as Sharia-compliant by any other

classification must be Sharia compliant according to this classification[9]. Figure 1 shows the distribution of Islamic and conventional stocks across market sectors. It is important to note that Islamic and conventional stocks are not equally distributed across market sectors. Conventional stocks dominate both petrochemical industries and insurance sectors, whereas Islamic stocks dominate real estate development and transport sectors. This distribution heterogeneity could cause endogeneity problem in our results; the high comovement between Islamic stocks or conventional stocks is attributed to the fact that these stocks being in certain sectors and not to the fact that they are classified as Islamic or conventional. To address this issue, we control for the sector by adding an index of sector returns where the stock belongs whenever we examine the difference in comovement between the two groups of stocks.

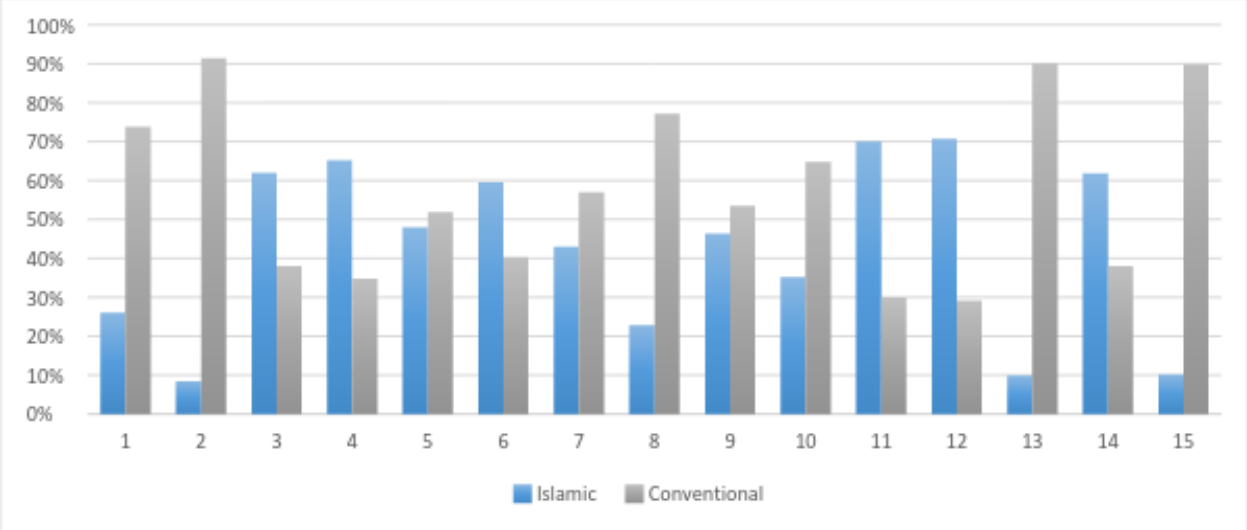

Figure 2 : ***Islamic and Conventional stocks distributions across market sectors***

The industries are as follows: 1: Banks & Financial Services, 2:Petrochemical Industries 3:Cement, 4:Retail, 5:Energy, & Utilities, 6:Agriculture & Food Industries, 7:Telecommunication & Information Technology, 8:Multi-Investment, 9:Industrial Investment, 10:Building & Construction, 11:Real Estate Development, 12:Transport, 13:Media and Publishing, 14:Hotel & Tourism, and 15:Insurance.

[9] Canepa and Ibnrubbian (2014) and Merdad et al. (2015) use an alternative classification of Dr.Al-Osaimi which has the same level of strictness and popularity as Dr.Al-Fozan's but it does not cover all sectors of equity market. According to Dr. Al-Osaimi, the reason for not classifying stocks in some sectors is because these sectors usually have their own Sharia board that take care of classifying stocks. We repeated our tests using Dr.Al-Osaimi's classification and that didn't affect our main conclusion.

The data on stock classification is obtained from published Sharia stock classification reports issued by Sharia scholars. The first classification report published by Dr. Al-Fozan was released on December 2007 and classifies 28 of the total 117 firms traded in Saudi equity market as Islamic or Sharia-compliant firms. Since our data begins before the first classification report was published we assign firms that were classified as Sharia-compliant as Islamic from the beginning of our data until the date of publication of the second report. The classification reports are revised periodically to add or remove firms from Islamic or reports. Sharia stock classification reports are publically available on the internet[10] and the total number of published reports until the end of 2015 was nine reports and the total number of stocks that have been classified as Sharia-compliant in the last report was 89 out of 177 firms traded in the Saudi equity market.

The literature suggests that individual investors' preferences for investing in stocks depend on firm characteristics such as firm size and book-to-market ratio. Table 10 shows the data summary statistics for each class of stocks. Although the average size of conventional firm is almost double that of Islamic firm, Islamic firms have a larger median size than conventional firms. If we look at book-to-market ratio, we see that there is almost no difference between the two classes in terms of mean and median book-to-market ratio. These suggest that individual investor preferences toward any class is not driven by the firm size or book-to-market ratio. In terms of profitability, Islamic stocks have higher mean and median return on assets than that of conventional stocks. Islamic firms use lower debt than conventional stocks and this is expected because one of the main Sharia classification criteria depends on firm leverage level. Although the number of firms that become Islamic is increasing in our sample through time, the average number of Islamic firms is slightly lower than that of conventional firms and they also tend to be older than conventional stocks. In terms of

[10] We collect the reports from the main source of Dr. Al-Fozan's stock classification reports http://www.islammessage.com

Table 10 : Summary statisitcs

This table shows summary statistics for Saudi stocks during the period from 2008 to 2015 separated based on Al-Fozan's classification into Islamic and conventional stocks. "**Size**" is the market capitalization calculated as the stock closing price at the end of the year times the number of shares outstanding, "**BM**" firm quarterly Book-to-market ratio," **Leverage**" firm quarterly debt to assets ratio, "**ROA**" firm quarterly return on assets, "**Firm Age**" is the number of months since the stock is available in our data, "**Turnover**" stock daily trading volume over total shares outstanding, "**ILLIQ'** stock Amihud's (2002) illiquidity (multiplied by 10^8), stock "**Closing price**", stock "**Daily returns**", stock daily "Return volatility" during 3 months, "**Number of analyst**", " **Number of investors**" reported at the end of each month, and " **Number of firms**" in each class.

Variable	Islamic firms					Conventional firms				
	Mean	Median	Std. Dev.	Min	Max	Mean	Median	Std. Dev.	Min	Max
Size	6,062	1,887	14,789	212	115,230	12,200	1,490	35,932	136	365,094
BM	0.57	0.50	0.34	0.08	2.60	0.58	0.51	0.33	0.08	3.55
Leverage	16.1%	9.1%	17.0%	0.0%	58.4%	27.5%	25.9%	20.5%	0.0%	65.8%
ROA	6.0%	6.1%	10.4%	-77.5%	38.5%	2.3%	2.1%	8.4%	-131.0%	47.1%
Firm Age	83.36	81.00	48.61	1.00	162.50	76.64	70.50	43.79	1.00	162.50
Turnover	3.4%	0.8%	8.0%	0.0%	39.8%	3.9%	1.0%	9.2%	0.0%	44.2%
ILLIQ	2.94	0.05	346.00	0.00	6.13	25.10	0.05	2600.00	0.00	13.00
Closing price	38.26	29.64	27.67	5.35	142.00	32.36	26.61	20.51	3.75	134.25
Daily returns	0.04%	0.03%	2.55%	-9.34%	9.60%	0.06%	0.04%	2.99%	-9.76%	9.86%
Return volatility	0.065%	0.080%	0.042%	0.003%	0.423%	0.090%	0.102%	0.056%	0.005%	0.510%
Number of analysts	1.42	0.00	2.80	0.00	19.00	1.27	0.00	2.83	0.00	15.00
Number of investors	62,760	22,788	106,649	1,849	699,437	56,251	20,530	93,853	2,054	608,361
Number of Firms	70	64	13	28	89	83	83	4	77	89

stock performance, Islamic firms are lower than conventional firms in average daily stock turnover, return, and return volatility but higher than conventional firms in average daily stock closing price and liquidity, as indicated by their low mean of Amihud's (2002) illiquidity measure. Islamic firms have wider base of investors than conventional firms and are covered by higher number of analysts.

3. Methodology and Results

3.1. Simple model

We begin our analysis by examining the degree of comovement of a stock with other stocks from the same class. Following existing literature, we evaluate the degree of the return comovement using the slope coefficients (βs) from a regression of stock returns on the returns of other stocks in the same Class. We use equally weighted average return to avoid large firm bias in constructing the Class portfolio. Equal weighting allows us to address the question of how a particular stock comoves with other stocks within the same class. Value weighting could create a bias especially for Islamic portfolios that have a relatively few stocks where large stocks might be dominating the aggregate market capitalization. As a robustness check we will also perform our tests by using a value-weighted Islamic portfolio returns and see whether the results are quantitatively different or similar. We follow Pirinsky and Wang (2006) and estimate the following stock-level time-series regression:

$$R_{i,t} = \alpha_i + \beta_{i,c} R_{cl,t} + \varepsilon_{i,t} \quad (6)$$

where, $R_{i,t}$ is the daily return of an individual stock, and $R_{cl,t}$ is the daily return of the individual stock's same *Class* portfolio, at date t (by the same *Class*, we mean if the individual stock, is an Islamic stock than $R_{cl,t}$ is the daily return on equally weighted portfolio of Islamic stocks only, if $R_{i,t}$ is a conventional stock, then $R_{cl,t}$stands for the daily return on equally weighted portfolio of

conventional stocks only). All returns are in excess of daily T-bill rates. To avoid spurious correlations, when calculating the return on the *Class* portfolio, $R_{cl,t}$, we exclude the return of the corresponding stock each time we calculate the *Class* portfolio return. We also add the return on the overall market portfolio to the regression in order to control for the market:

$$R_{i,t} = \alpha_i + \beta_{i,c} R_{c,t} + \beta_{i,mkt} R_{MKT,t} + \varepsilon_{i,t} \quad (7)$$

The market portfolio return $R_{MKT,t}$ is included in the regression to control for overall market-wide comovement. Because Islamic stocks tend to be more clustered in some industries than others, we must control for industry effects, we modify our equation by introducing an equally weighted industry index of the stock's corresponding industry group, that is,

$$R_{i,t} = \alpha_i + \beta_{i,c} R_{c,t} + \beta_{i,mkt} R_{MKT,t} + \beta_{i,ind} R_{ind,t} + \varepsilon_{i,t} \quad (8)$$

where $R_{ind,t}$ is the return of the stock's corresponding industry at date t. We choose to work with an equally weighted industry index in order to be consistent with the way the local index is constructed and to avoid large firm bias.

It is important to notice that the correlation between the industry and the market returns is sometimes very high and that the correlations captured by the beta of *Class* stocks portfolio is due to the correlation between the Islamic stocks portfolio and the market portfolio, so that we followed Bekaert et al. (2009) and calculate the industry and *Class* stocks portfolio returns in two stages. First, we construct equally weighted portfolios for *Class* stocks as well as for stocks in each industry. Then, the daily returns of these portfolios are orthogonalized with respect to the excess return of the market index, using an ordinary least square regression on $R_{MKT,t}$. The error term of the regression is the new portfolio returns for the corresponding class and industry.

3.2. Multi-factor model

Since we believe that stock return comovements are mainly driven by categorization or habitat view of investors, we divide our sample into two subsamples using the date of the first publically available Sharia-compliant stock classification. Table 11 shows the stock returns comovements for both stock groups, Islamic and conventional, and for a two subsamples, before and after the release of the first stock classification report as well as for the whole sample period. The reported parameters are time series averages of coefficients for each group generated using firm-year regressions of daily stock returns. Stocks are required to have at least 100 of daily observations to be included in the regression for that year. Panel A, shows that using equation (7), conventional stocks comovement with its own class is higher than that of the Islamic stocks in the two sub periods as well as for the whole sample. The difference in same class comovement between Islamic and conventional stocks is statically significant only after the publication date of first classification report but the difference in comovement before and after the publication date is statically insignificant.

In panel B, we use equation (8) which adds the equally weighted return index of sector or industry returns. Before 2008, the year of the publication of first stock classification report, the coefficient of same class stock return for Islamic stocks is 0.30 which is slightly lower than that of conventional stocks of 0.31. The difference in same class comovement between the two groups was only statically significant in the second sub sample where classification reports are published. For the period starting from 2008 and after, the period where stock classification reports are published, same class stock return comovement increased substantially for Islamic stocks to 0.51 but decreased for conventional stocks to 0.17 and the difference in comovement between the two subsamples for the same class comovement is also statically significant which indicates that investors are affected by these reports and that stock categorization effect took place after the stock classification reports. It is also important to note that Islamic and conventional stocks have almost the same stock return comovements with the industry portfolio before 2008 and that after 2007, Islamic stocks become less dependent on their own industry and shift part of their industry comovement toward same class portfolio. In conclusion, this table indicates that Islamic stocks

Table 11: Stock returns comovement with same class

This table reports average coefficients from annual stock-level time-series regressions of daily stock returns on an equal- weighted returns of same class, market, and industry portfolios. Stocks are classified into Islamic and conventional according to Dr. Al-Fozan's classification. We report average coefficients for Islamic and Conventional stocks for the entire sample, for the period from 2002 to 2007, and for the period from 2008 to 2015. We average the coefficients cross-sectionally in each year and then across years. Newey-West adjusted t-statistics are reported below the coefficients.

Panel A: Stock returns comovement with same class and market portfolios

	ALL			Before 2008			2008 and after			Difference (Before/After)	
	Islamic	Conventional	Difference	Islamic	Conventional	Difference	Islamic	Conventional	Difference	Islamic	Conventional
Same Class	**0.82** [a]	**0.87** [a]	**-0.05**	**0.80** [a]	**0.83** [a]	**-0.03**	**0.83** [a]	**0.90** [a]	**-0.07** [b]	**-0.02**	**-0.07**
	(23.4)	(18.0)	(0.3)	(9.8)	(7.3)	-(0.2)	(54.1)	(97.7)	-(3.9)	-(0.4)	-(0.8)
Market	**0.99** [a]	**1.04** [a]	**-0.05** [b]	**0.99** [a]	**1.01** [a]	**-0.02**	**0.99** [a]	**1.06** [a]	**-0.07** [a]	**0.00**	**-0.05** [b]
	(104.6)	(91.1)	(0.0)	(76.3)	(84.7)	-(0.9)	(69.3)	(133.8)	-(4.9)	(0.1)	-(3.6)
R-squared	**0.40**	**0.41**		**0.40**	**0.39**		**0.41**	**0.43**			

Panel B: Stock returns comovement with same class, market, and industry portfolios

	ALL			Before 2008			2008 and after			Difference	
	Islamic	Conventional	Difference	Islamic	Conventional	Difference	Islamic	Conventional	Difference	Islamic	Conventional
Same Class	**0.42** [a]	**0.23** [a]	**0.19** [a]	**0.30** [b]	**0.31** [a]	**-0.01**	**0.51** [a]	**0.17** [a]	**0.34** [a]	**0.21** [a]	**-0.14** [b]
	(9.1)	(7.3)	(4.2)	(5.6)	(15.1)	-(0.2)	(21.8)	(7.1)	(11.1)	-(4.2)	(3.8)
Market	**0.98** [a]	**1.04** [a]	**-0.05** [a]	**0.98** [a]	**1.01** [a]	**-0.04**	**0.99** [a]	**1.06** [a]	**-0.07** [a]	**0.01**	**0.04** [b]
	(97.7)	(107.5)	-(4.4)	(48.7)	(166.7)	-(1.7)	(104)	(117.7)	-(5.9)	-(0.6)	-(3.5)
Industry	**0.46** [a]	**0.61** [a]	**-0.14** [b]	**0.56** [a]	**0.58** [a]	**-0.03**	**0.39** [a]	**0.62** [a]	**-0.23** [a]	**-0.17** [b]	**0.04**
	(10.7)	(25.3)	-(3.5)	(8.7)	(10.5)	-(0.3)	(20.0)	(55.3)	-(10.8)	(3.0)	-(0.9)
R-squared	**0.45**	**0.45**		**0.46**	**0.44**		**0.44**	**0.46**			

(**a)** significant at 1% , (**b)** significant at 5% and (**c)** significant at 10%

return comovements with their same class stocks have increased after the public awareness of the published Sharia stock classification and that investors implement these classifications and categorize stocks into Islamic and conventional stocks when they construct their personal portfolios.

Recently, Chen et al. (2016) challenge the existence of excess comovement and suggest that the reported excess comovements are due to the fact that coefficients are sensitive to other unrelated factors and that one should use matched control samples to control for such factors. As an example, Islamic stocks could have high momentum, return volatility, or idiosyncratic volatility which will generate an increase in the coefficient of the stock on the Islamic portfolio return. To address this issue, we run the same regressions on equation (8) but this time we add equally weighted returns of both classes instead of one same class portfolio. This method should address the issue that stocks are more sensitive to other unrelated factor that is only found in one of the two classes of stocks. If Islamic investors trade only Islamic stocks and have correlated trading with other investors who share the same believes, we should expect that by adding both classes return portfolios, Islamic stocks have a higher factor loading on Islamic portfolio returns than that of Islamic stocks on conventional portfolio returns and this factor loading should also be higher than Islamic portfolio returns factor loading of conventional stocks.

Table 12 presents the results of regressing individual stock returns on the two classes of portfolios. In Panel A, where we use only market portfolio with the two classes of portfolios, Islamic stocks returns comove almost the same with both class portfolios before the classification date, however, after the classification reports are published, their comovement with their own group of stocks has increased from 0.49 to 0.69 and their return comovement with conventional stocks decreased from 0.24 before 2008 to 0.17 after the publication of the first classification report. Both groups have a higher return comovement with their own class's than with counterpart class's stock returns which means that these stock return comovements are the results of stock categorization or habitat view perceived by market investors and not driven by other unrelated factors. Also, own class return comovements for both groups are more pronounce after the

publication of the classification reports than before and the differences in comovement between both groups are more statically significant.

When we add industry return index, Islamic comovements with its own class are higher in all subsample as reported in Panel B of table 12. For the period before classification reports become public, the beta coefficient for Islamic stocks is 0.24 and 0.22 on portfolio of other Islamic stocks and portfolio of conventional stocks respectively and for conventional stocks their comovement with other conventional and Islamic stocks portfolios are 0.23 and 0.15 respectively. After publication of classification reports, comovements of Islamic stocks with other stocks of same class increases substantially to 0.47 where as their comovement with other stocks from different class decreases to 0.07. Conventional stocks on the other hand, experience a decrease in their comovement with other stocks from the same class of 15 percent, from 0.22 to 0.07, but their comovement with Islamic stocks increases to 0.21 which is still lower than the comovement of Islamic stocks with their own class of 0.47. It is important to note that comovement of stocks with other stocks from the same class is 0.47 for Islamic stocks, which is over seven times larger than that of conventional stocks of 0.07. The difference between Islamic and conventional stocks comovements with Islamic portfolio is statically significant only after the date of stock classification reports.

The conclusion from the above results is that Islamic stocks comove with the other Islamic stocks more than they comove with conventional stocks and this comovement is higher that the comovement of conventional stocks with their own class and also higher than the comovement of conventional stocks with Islamic stocks. Another important conclusion is that the comovement of Islamic stocks with their own class is only pronounced after in the sub sample where stock classification reports were published and publically available. Since we are interested in the effect of stock classification effect on stock return comovements in Islamic stocks we are going to use the sub sample period that starts after the date of the publication of the first stock classification report effect on stock return comovements in Islamic stocks we are going to use the sub sample

Table 12: Stock returns comovement with Islamic and conventional portfolios

This table reports average coefficients from annual stock-level time-series regressions of daily stock returns on an equal- weighted returns of each class, Islamic and conventional, market, and industry portfolios. Stocks are classified into Islamic and conventional according to Dr. Al-Fozan's classification. We report average coefficients for Islamic and Conventional stocks for the entire sample, for the period from 2002 to 2007, and for the period from 2008 to 2015. We average the coefficients cross-sectionally in each year and then across years. Newey-West adjusted t-statistics are reported below the coefficients.

	ALL			**Before 2008**			**2008 and after**			**Difference**	
	Islamic	**Conventional**	**Difference**	**Islamic**	**Conventional**	**Difference**	**Islamic**	**Conventional**	**Difference**	**Islamic**	**Conventional**
Islamic	**0.61** [a]	**0.20** [a]	**0.41** [a]	**0.49** [a]	**0.24** [a]	**0.26**	**0.69** [a]	**0.17** [b]	**0.52** [a]	**0.20** [a]	**-0.07**
	(14.3)	(8.9)	(10.7)	(12.2)	(22.5)	(5.6)	(36.8)	(5.3)	-(22.8)	-(4.7)	(2.1)
Conventional	**0.32** [c]	**0.72** [a]	**-0.40** [a]	**0.50** [a]	**0.60** [a]	**-0.10** [a]	**0.18** [a]	**0.81** [a]	**-0.62** [a]	**-0.32** [a]	**0.21** [c]
	(4.8)	(13.2)	-(6.0)	(8.9)	(7.1)	-(1.0)	(13.2)	(27.4)	-(22.8)	(6.6)	-(2.9)
Market	**1.00** [a]	**1.04** [a]	**-0.05** [b]	**1.01** [a]	**1.01** [a]	**0.00**	**0.98** [a]	**1.07** [a]	**-0.08** [a]	**-0.03**	**0.05** [a]
	(90.7)	(93.7)	-(3.6)	(56.7)	(149.8)	-(0.1)	(79.9)	(188.1)	-(7.1)	(1.3)	-(6.0)
R^2	**0.42**	**0.42**		**0.42**	**0.40**		**0.42**	**0.44**			

	ALL			**Before 2008**			**2008 and after**			**Difference**	
	Islamic	**Conventional**	**Difference**	**Islamic**	**Conventional**	**Difference**	**Islamic**	**Conventional**	**Difference**	**Islamic**	**Conventional**
Islamic	**0.37** [a]	**0.19** [a]	**0.18** [a]	**0.24** [b]	**0.15** [b]	**0.09**	**0.47** [a]	**0.21** [a]	**0.25** [a]	**0.22** [a]	**0.06** [c]
	(7.4)	(10.1)	(4.4)	(4.5)	(5.2)	(1.7)	(17.7)	(21.1)	(8.8)	(4.5)	(2.4)
Conventional	**0.13** [b]	**0.14** [b]	**-0.01**	**0.22** [a]	**0.23** [a]	**-0.01**	**0.07**	**0.07** [c]	**-0.01**	**-0.16** [b]	**-0.16** [b]
	(3.6)	(4.1)	-(0.2)	(7.7)	(8.8)	-(0.2)	(2.3)	(3.0)	-(0.3)	-(3.3)	-(4.1)
Market	**0.99** [a]	**1.05** [a]	**-0.06** [a]	**0.99** [a]	**1.02** [a]	**-0.03**	**0.99** [a]	**1.07** [a]	**-0.08** [a]	**0.00**	**0.04** [a]
	(100)	(113.2)	-(4.7)	(46.2)	(252.1)	-(1.3)	(119)	(205.7)	-(8.9)	-(0.2)	(5.1)
Industry	**0.42** [a]	**0.56** [a]	**-0.14** [a]	**0.47** [a]	**0.54** [a]	**-0.07**	**0.38** [a]	**0.58** [a]	**-0.20** [a]	**-0.08**	**0.04**
	(13.2)	(21.5)	-(3.7)	(8.0)	(8.7)	-(0.9)	(14.7)	(65.0)	-(8.1)	-(1.5)	(0.9)
R^2	**0.45**	**0.46**		**0.46**	**0.44**		**0.44**	**0.47**			

(**a)** significant at 1% , (**b)** significant at 5% and (**c)** significant at 10%

period that starts after the date of the publication of the first stock classification report which is form 2008 and over in the remaining analysis.

Stock return comovements may also be related to the firm characteristics of the stocks involved, that is whether they are small versus large, or value versus growth stocks. To see whether comovements are related to their firm characteristics or the way individual investors categorize them, we use the three different multiple factor models proposed by Fama and French (1993), Carhart (1997), and Pastor and Stambaugh (2003) to capture any style exposures in our sample. The Pastor-Stambaugh liquidity factor controls for stocks' exposure to the aggregate (market-wide) liquidity risk. If comovements are induced by correlated retail trading among Islamic individual investors, then the average βc should be higher for Islamic stocks than that of the conventional stocks. For example, Fama-French model, has three factors, a market factor, a size factor (SMB) and a value factor (HML), therefore the regression model will be:

$$R_{i,t} = \alpha_i + \beta_{i,c}\, R_{c,t} + \beta_{i,mkt}\, R_{MKT,t} + \beta_{i,ind}\, R_{ind,t} + \beta_{i,SMB}\, SMB_t + \beta_{i,HML} HML_t + \varepsilon_{i,t} \qquad (9)$$

We estimate the beta using firm-year regressions of daily stock returns. The data for these factors are not available for Saudi Arabia, therefore, we followed Fama and French (2012) and construct size, value, and momentum factors. Specifically, we sort stocks on size (market capitalization) and momentum and on size and the ratio of book equity to market equity (B/M). Size sorting is done at the end of June of each year whereas value and momentum sorting are done monthly. Big stocks are those in the top 70% of market cap, and small stocks are those in the bottom 30%. the intersection of the independent 2 by 3 sorts on size and B/M and size and momentum produces six portfolios for value and momentum factors.

We compute daily value-weight returns for each portfolio. The size factor, SMB, is the equal-weight average of the returns on the three small stock portfolios from the 2 by 3 size-B/M sorts minus the average of the returns on the three big stock portfolios. The value and momentum factors, HML and UMD, are the equal-weight average of the returns of small and big value minus

growth and winners minus losers respectively. To construct the, Liquidity factor, we follow Pastor and Stambaugh (2003) and sort stocks based on their sensitivity to market liquidity. High liquidity stocks are those in the top 70% of liquidity beta, and small stocks are those in the bottom 30%. The liquidity factor is the equal-weight average of the daily returns of high minus low liquidity beta stocks.

Table 13 shows the results of regressing individual stock return on the above factors along with same class, market, and industry portfolio returns. Even after controlling for other risk factors, Islamic stocks still have positive and significant stock return comovement with other stocks form its own class. Their same class stock return comovements are statically significant at 1% level of significant in all the three different factor-models. On the other hand, conventional stocks have negative but statically insignificant same class beta coefficients except for Pastor and Stambaugh (2003) liquidity model, where the beta is negative and statically significant at 10% level of significance. The difference in same class comovements between the two groups are economically and statically significant at 1% level of significance in all the three different models. These results indicate that even after the introduction of other risk factors that affect stock returns, Islamic stocks still show high return comovements with other stocks from it same class, whereas in conventional stocks case, stock returns comovements with same class disappear and become negative and insignificant.

It is also helpful to see what effects have these risk factors on the comovement of stock returns with other stocks from other class. Table 14 shows the results of introducing both class portfolio returns to the above multi-factor models along with industry portfolio. Islamic stocks comovements with other stocks from same class remain the same even after the addition of conventional stocks portfolio returns, whereas the comovements of conventional stocks with other same class stocks decreases and become closer to zero and statically insignificant. The average beta coefficients of Islamic stock portfolio return for Islamic stocks is 0.30 or above in all

Table 13: Stock return comovments using FF three-factor, Carhart four-factor, and PS liquidity models

This table reports average coefficients from annual stock-level time-series regressions of daily stock returns on an equal- weighted returns of same class or both classes and industry portfolios using Fama-French three-factor, Carhart four-facto, and Pastor and Stambagh liqidity madels.. Stocks are classified into Islamic and conventional according to Dr. Al-Fozan's classification. We report average coefficients for Islamic and Conventional stocks for the period from 2008 to 2015. We average the coefficients cross-sectionally in each year and then across years. Newey-West adjusted t-statistics are reported below the coefficients.

	FF Three-Factor			**Carhart Four-Factor**			**PS Liquidity**		
	Islamic	**Conventional**	**Difference**	**Islamic**	**Conventional**	**Difference**	**Islamic**	**Conventional**	**Difference**
Same Class	**0.30** [a] (6.0)	**-0.11** -(2.3)	**0.41** [a] (6.3)	**0.30** [a] (6.5)	**-0.12** -(2.3)	**0.42** [a] (6.5)	**0.29** [a] (6.1)	**-0.19** [c] -(2.8)	**0.47** [a] (6.2)
Market	**0.97** [a] (175.1)	**1.02** [a] (157.4)	**-0.05** [a] -(5.9)	**0.97** [a] (131.3)	**1.02** [a] (162.5)	**-0.05** [a] -(5.3)	**0.97** [a] (164.4)	**1.01** [a] (72.1)	**-0.04** [c] -(2.8)
Industry	**0.36** [a] (19.9)	**0.52** [a] (24.5)	**-0.16** [a] -(6.2)	**0.35** [a] (17.9)	**0.51** [a] (26.1)	**-0.16** [a] -(5.9)	**0.35** [a] (17.9)	**0.52** [a] (25.4)	**-0.17** [a] -(6.1)
SMB	**0.16** [a] (7.4)	**0.27** [a] (9.5)	**-0.11** [b] -(3.5)	**0.17** [a] (7.5)	**0.28** [a] (10.5)	**-0.11** [b] -(3.6)	**0.16** [a] (7.6)	**0.30** [a] (7.5)	**-0.14** [b] -(3.4)
HML	**0.08** [b] (4.8)	**0.00** (0.4)	**0.07** [b] (4.1)	**0.07** [b] (3.8)	**0.00** (0.0)	**0.07** [b] (3.6)	**0.08** [b] (4.8)	**0.01** (0.7)	**0.07** [b] (3.7)
UMD				**-0.01** -(0.7)	**-0.02** -(1.5)	**0.02** -(0.8)			
Liquidity							**0.01** (0.6)	**0.05** (1.4)	**-0.04** (1.3)
R-squared	**0.453**	**0.484**		**0.457**	**0.489**		**0.459**	**0.492**	

(**a)** significant at 1% , (**b)** significant at 5% and (**c)** significant at 10%

Table 14: Stock return comovements using FF three-factor, Carhart four-factor, and PS liquidity models

This table reports average coefficients from annual stock-level time-series regressions of daily stock returns on an equal- weighted returns of same class or both classes and industry portfolios using Fama-French three-factor, Carhart four-facto, and Pastor and Stambagh liqidity madels.. Stocks are classified into Islamic and conventional according to Dr. Al-Fozan's classification. We report average coefficients for Islamic and Conventional stocks for the period from 2008 to 2015. We average the coefficients cross-sectionally in each year and then across years. Newey-West adjusted t-statistics are reported below the coefficients.

	FF Three-Factor			**Carhart Four-Factor**			**PS Liquidity**		
	Islamic	**Conventional**	**Difference**	**Islamic**	**Conventional**	**Difference**	**Islamic**	**Conventional**	**Difference**
Islamic	**0.32** [a]	**-0.02**	**0.34** [a]	**0.32** [a]	**-0.04**	**0.35** [a]	**0.30** [b]	**-0.06**	**0.36** [a]
	(5.7)	-(0.8)	(6.4)	(6.1)	-(1.4)	(7.0)	(5.0)	-(1.9)	(6.1)
Conventional	**-0.13** [c]	**-0.06**	**-0.07**	**-0.12** [c]	**-0.07**	**-0.05**	**-0.17** [b]	**-0.14**	**-0.03**
	-(2.9)	-(1.2)	-(1.0)	-(3.2)	-(1.3)	-(0.8)	-(3.8)	-(1.8)	-(0.3)
Market	**0.96** [a]	**1.02** [a]	**-0.05** [a]	**0.96** [a]	**1.01** [a]	**-0.05** [a]	**0.96** [a]	**1.01** [a]	**-0.04** [c]
	(151.5)	(143.0)	-(5.3)	(135.5)	(151.8)	-(5.1)	(135.0)	(67.9)	-(2.7)
Industry	**0.36** [a]	**0.45** [a]	**-0.09** [b]	**0.35** [a]	**0.43** [a]	**-0.08** [b]	**0.35** [a]	**0.45** [a]	**-0.09** [b]
	(16.5)	(40.7)	-(4.1)	(16.8)	(34.2)	-(3.4)	(14.6)	(42.0)	-(3.9)
SMB	**0.20** [a]	**0.30** [a]	**-0.10**	**0.21** [a]	**0.32** [a]	**-0.11** [c]	**0.23** [a]	**0.35** [a]	**-0.12**
	(5.9)	(8.4)	-(2.1)	(6.1)	(9.1)	-(2.4)	(6.0)	(6.9)	-(2.1)
HML	**0.08** [b]	**0.00**	**0.07** [b]	**0.07** [b]	**0.00**	**0.07** [b]	**0.08** [b]	**0.01**	**0.07** [b]
	(4.5)	(0.3)	(4.0)	(3.7)	(0.1)	(3.5)	(4.2)	(0.9)	(3.1)
UMD				**-0.01**	**-0.02**	**0.02**			
				-(1.0)	-(1.6)	-(0.8)			
Liquidity							**0.02**	**0.05**	**-0.03**
							(1.2)	(1.5)	(0.9)
R-squared	**0.459**	**0.491**		**0.463**	**0.496**		**0.465**	**0.499**	

(**a)** significant at 1% , (**b)** significant at 5% and (**c)** significant at 10%

factor-models and they are statically significant at 1% level of significant in Carhar (1997) four-factor model and at 5% level of significant at 5% level of significance in the other models.The difference in class comovements between the two groups is only statically significant in Islamic stock portfolio and they are significant at 1% level of significance.

To conclude, the above results show that after controlling for known risk factors such as size, value, momentum, and liquidity factors, Islamic stocks comovements with other stocks from same class still economically and statically significant, whereas in conventional stocks, risk factors absorb substantial part of their return comovements with same class stocks and make them insignificant and close to zero. This means that return comovement of Islamic stocks with other stocks from it same class is not a result of Islamic stocks having some firm characteristics that are not found in other conventional stocks and that the only possible driver of their same class return comovement is that they are share the same stock classification. Stock classification influences investors' perceptions about stocks and facilitates categorization and habitat views that leads investors to differentiate between the two classes of stocks in the market.

3.3. Liquidity commonality

Next, we want to see whether commonality in preferences drives commonality in liquidity. Commonality in liquidity is defined as the co-movements in the time-series liquidity measures of the firm with other same class stocks. Specifically, we want to test whether trading behavior of Islamic investors leads to commonality in liquidity. Chordia et al. (2000), Kamara et al. (2008), Karolyi et al. (2012), and Koch et al. (2016) among others, provide a demand side explanation to the potential drivers of commonality in stock liquidity. They argue that correlated trading activity by institutional or individual investors put common selling and buying pressure across individual stocks, leading to common liquidity variations. According to Alhomaidi et al. (2016), Sharia stock classification creates a barrier between Islamic and conventional stocks in Saudi equity market. Islamic investors who care about following the Sharia rules will trade stocks

that are classified as Islamic and comply with Sharia standards, whereas other investors, or conventional investors, will trade stocks regardless of which class they belong to. This raises the question of whether this commonality in preferences among Islamic investors will generate commonality in the liquidity of stocks they trade. Specifically, we want to test whether liquidity shock or liquidity demand faced by Islamic investor will generate commonality in liquidity in Islamic stocks.

To test for commonality in liquidity within each class of stocks, we follow the empirical literature on liquidity commonality (e.g., Chordia et al., 2000, Coughenour and Saad, 2004: Kamara et al., 2008). We use stock liquidity measured by Amihud's (2002) Illiquidity as well as stock turnover ratio. In calculating Amihud's (2002), we use actual riyal value of transaction instead of multiplying daily stock close price by volume, since this variable is already available in our data. As with stock return comovement, we follow the literature and exclude individual stock liquidity from the computations of the industry and class liquidity. We regress individual stock liquidity on equally weighted Islamic, Industry, and market liquidity as follow:

$$\Delta L_{i.t} = \alpha_i + \beta_{i,c}\,\Delta CL_t + \beta_{i,MKT}\Delta MKTL_t + \gamma' X + \varepsilon_{i,t} \qquad (10)$$

where ΔL_i is the change in daily individual stock liquidity at year t, whereas β_c and β_{MKT} measure the sensitivity of changes in firm i's liquidity to changes in aggregate class and market liquidity respectively. X represent represents control variables such as the current, lag, and lead of market returns and other variable suggested by the literature.

Table 15 shows the results of testing commonality in stock liquidity in Islamic and conventional stocks with other stocks from same class. Model 1, uses the regression in equation (10) above and model 2, adds aggregate industry liquidity changes to the regression model. The beta coefficients sign and magnitude are as expected in both models and using both liquidity measures. Stock liquidity is more sensitive to aggregate market and industry liquidity than to same class aggregate liquidity in both groups of stocks. If we look at Amihud's (2002) illiquidity

measure, we see that in model 1, Islamic stocks have a higher commonality in liquidity with other stocks from same class than that of conventional stocks. The beta coefficient on same class aggregate liquidity is 0.21, that is economically and statically significant at 1% level of significance, whereas conventional stocks' commonality in liquidity with same class of -0.03 that is statically insignificant and substantially lower than that of Islamic stocks. The difference in same class commonality in liquidity between the two class is statically significant at 1% level of significance and equals 0.23. When we add aggregate industry liquidity in model 2, commonality in liquidity with same class become statically significant for both class but Islamic stocks still have positive and larger number than that of conventional stocks. The difference in same class liquidity commonality between Islamic and conventional stocks increases to 0.29 and it is statically significant at 1% level of significance. The addition of aggregate industry liquidity changes shows that conventional stocks liquidity is more sensitive to industry liquidity changes than Islamic stocks.

Next, using stock turnover as a measure of stock liquidity, we see that, in model 1, Islamic stocks are more sensitive to aggregate changes in liquidity of other same class stocks than conventional stocks. The commonality in liquidity with same class for Islamic stocks is 0.18 compared to 0.15 for conventional stocks. Both classes have a beta coefficient on same class aggregate liquidity that is statically significant ant 1% level of significance but the difference between them is statically insignificant. If we control for aggregate industry changes in liquidity, conventional stocks' liquidity commonality disappears and become zero whereas Islamic stocks' commonality still positive but statically significant at 5 rather than 1% level of significance. The difference in same class beta coefficient between Islamic and conventional stocks is 0.14 and it is statically significant at 5% level of significance. As we see in when we use Amihud's illiquidity measure, conventional stocks' sensitivity with aggregate industry liquidity is higher than the sensitivity of Islamic stocks when using stock turnover as liquidity measure.

Table 15: Commonality in liquidity within classes

This table reports average coefficients from annual stock-level time-series regressions of daily stock turnover and illiquidity on an equal-weighted liquidity of same class, market, and industry portfolios and other control variables. Stocks are classified into Islamic and conventional according to Dr. Al-Fozan's classification. We report average coefficients for Islamic and Conventional stocks for the period from 2008 to 2015. We average the coefficients cross-sectionally in each year and then across years. Newey-West adjusted t-statistics are reported below the coefficients

	Amihud's Illiquidity						**Turnover**					
	(1)			**(2)**			**(1)**			**(2)**		
	Islamic	**Conventional**	**Difference**	**Islamic**	**Conventional**	**Difference**	**Islamic**	**Conventional**	**Difference**	**Islamic**	**Conventional**	**Difference**
Same Class	**0.40** [a]	**-0.26**	**0.66** [b]	**0.33** [a]	**-0.31**	**0.63** [a]	**0.18** [a]	**0.15**	**0.03**	**0.14** [b]	**0.00**	**0.14** [c]
	(6.7)	-(1.1)	(3.0)	(6.7)	-(2.1)	(4.5)	(6.2)	(2.3)	(0.4)	(4.5)	-(0.1)	(2.9)
Market	**0.63** [a]	**0.69** [a]	**-0.06**	**0.63** [a]	**0.69** [a]	**-0.06**	**0.54** [a]	**0.55** [a]	**0.00**	**0.58** [a]	**0.59** [a]	**-0.01**
	(11)	(9.6)	-(0.7)	(12)	(10.9)	-(0.8)	(10)	(10.5)	-(0.1)	(11.7)	(13.4)	-(0.2)
Industry				**0.23** [a]	**0.44** [a]	**-0.21** [a]				**0.26** [a]	**0.36** [a]	**-0.10** [a]
				(21)	(14.0)	-(7.7)				(19.6)	(28.4)	-(5.6)
Market return $_{t-1}$	**-0.69**	**0.14**	**-0.83**	**-0.70**	**-0.09**	**-0.61**	**-1.1** [c]	**-1.6** [b]	**0.47**	**-1.1**	**-1.41** [c]	**0.36**
	(1.7)	(0.1)	-(0.8)	-(1.8)	-(0.1)	-(0.6)	-(2.4)	-(3.9)	(0.7)	-(2.4)	-(3.3)	(0.6)
Market return $_{t}$	**-1.68**	**-2.25** [c]	**0.56**	**-1.18**	**-1.32**	**0.13**	**3.68** [b]	**3.40** [b]	**0.28**	**3.33** [b]	**3.13** [c]	**0.20**
	-(2.1)	-(2.8)	(0.5)	-(1.7)	-(2.0)	(0.2)	(4.4)	(3.6)	(0.2)	(4.2)	(3.4)	(0.2)
Market return $_{t+1}$	**0.19**	**0.32**	**-0.13**	**0.18**	**0.42**	**-0.24**	**0.25**	**0.25**	**0.00**	**0.32**	**0.17**	**0.15**
	(0.4)	(0.5)	-(0.2)	(0.5)	(1.0)	-(0.5)	(0.8)	(0.8)	(0.0)	(1.2)	(0.5)	(0.4)
Difference in squared returns	**192** [a]	**169** [a]	**24**	**187** [a]	**157** [a]	**31**	**179** [b]	**141** [b]	**39**	**169** [b]	**133** [b]	**37**
	(7.0)	(6.2)	-(0.6)	(6.7)	(5.6)	-(0.8)	(5.2)	(5.1)	-(0.9)	(5.1)	(5.1)	-(0.9)
R-squared	**0.120**	**0.122**		**0.135**	**0.154**		**0.124**	**0.126**		**0.158**	**0.160**	

(**a)** significant at 1% , (**b)** significant at 5% and (**c)** significant at 10%

To conclude, the results above indicate that Islamic stocks are more sensitive than conventional stocks to changes in aggregate liquidity of stocks that share the same class even after we control for changes in aggregate industry and market liquidity and other variables that are known to affect stock liquidity. This supports the hypothesis that the pressure of buying and selling generated by correlated trading of Islamic investors induces high sensitivity in Islamic stocks to aggregate changes in liquidity of other Islamic stocks.

3.4. Cross-sectional regressions

One might argue that these liquidity commonalities or return comovements are driven by fundamental factors such as earnings comovements or because Islamic stocks are more covered by analyst. To address this issue, we do a two-step Fama-MacBeth (1973) regression where in the first step, we obtain stock liquidity commonalities, return and earnings comovements. In the second step we do a cross-sectional regression where we regress liquidity commonalities and return comovements on earning comovements and number of analysts along with other firm characteristics such as leverage, age, and number of investors. We follow Morck et al. (2000) to calculate earning comovements. For each quarter, we estimate the following regression using a five-year rolling window:

$$ROA_{i.t} = \alpha_{i,t} + \beta_{EC,t} ROA_C + \varepsilon_{i,t} \quad (11)$$

where ROA_C is the value-weighted average of the ROAs for all firms in the same class as firm i's excluding firm i's ROA. We require that the firm has at least 3 years of quarterly data in order to be included in the regression. Table 16 shows Fama-MacBeth (1973) quarterly cross-sectional regressions where dependent variable is return comovements or liquidity commonalities and the independent variables are Islamic dummy that equals one if the stock is classified as Islamic and zero otherwise, firm earning comovements, size or market capitalization, book-to-market ratio, stock quarterly return, stock return volatility during past three months, the inverse of

Table 16: Cross-sectional regressions of comovements

The table reports Fama-MacBeth (1973) cross-sectional regression estimates, where the dependent variable is either stock return, Amihud's illiquidity, or turnover comovement measures calculated quarterly using daily observations."**Ecov**" firm earning quarterly comovment with other firms in same class for the past 20 quarters. Newey-West adjusted t-statistics are reported below the coefficients.

	Returns			Amihud's illiquidity			Turnover		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Islamic	**0.218** [a]	**0.176** [a]	**0.245** [a]	**0.744** [a]	**0.772** [a]	**0.444** [a]	**0.296** [a]	**0.33** [b]	**0.216** [c]
	(5.9)	(4.5)	(11.2)	(3.9)	(3.8)	(4.6)	(3.7)	(3.5)	(2.3)
Ecov	**-0.02** [b]	**-0.004**	**-0.02**	**-0.03**	**-0.03** [c]	**0.003**	**0.04** [b]	**0.03**	**0.04** [c]
	(-2.1)	(-0.4)	(-1.6)	(1.0)	(-2.3)	(0.1)	(3.2)	(1.8)	(2.1)
Size	**-0.13** [a]	**-0.16** [a]	**-0.13** [a]	**-0.03**	**-0.04**	**0.003**	**-0.01**	**-0.004**	**-0.05**
	(-8.6)	(19.1)	(-8.3)	(-0.7)	(-1.0)	(0.1)	(-0.3)	(-0.1)	(-1.4)
BM	**-0.28** [a]	**-0.29** [b]	**-0.23** [c]	**-0.07**	**0.08**	**0.08**	**0.06**	**0.05**	**-0.07**
	(-3.7)	(-3.2)	(-2.6)	(-0.7)	(0.8)	(1.1)	(0.6)	(0.7)	(-0.8)
Return	**-0.57** [a]	**-0.74** [a]	**-0.51** [b]	**0.28**	**0.14**	**-0.1**	**0.11**	**0.09**	**-0.10**
	(-4.3)	(-4.6)	(-2.9)	(1.0)	(0.5)	(-0.4)	(0.7)	(0.5)	(-0.7)
Return volatility	**0.53**	**4.32** [a]	**0.26**	**0.35**	**1.1**	**0.8**	**2.7** [b]	**2.21** [b]	**1.55**
	(0.6)	(3.9)	(0.2)	(0.2)	(0.5)	(0.4)	(3.0)	(3.2)	(1.7)
inverse price	**6.6** [a]	**5.8** [a]	**5.6** [a]	**1.8**	**0.95**	**0.6**	**-1.8**	**-1.6**	**0.2**
	(8.0)	(5.9)	(6.3)	(1.7)	(0.8)	(0.4)	(-0.9)	(0.9)	(0.2)
Firm Age	**0.39** [b]	**0.3**	**0.47** [a]	**-0.16**	**-0.08**	**0.13**	**-0.05**	**0.02**	**0.05**
	(3.0)	(1.7)	(5.0)	(-0.6)	(-0.4)	(0.9)	(-0.4)	(0.3)	(0.6)
# Analyst	**0.02**	**0.06**	**-0.03** [b]	**0.14**	**0.1**	**0.01**	**0.01**	**0.04**	**-0.001**
	(0.8)	(1.3)	(-2.9)	(0.8)	(0.8)	(1.0)	(0.5)	(1.1)	(-0.1)
Leverage		**-0.14**			**0.43**			**-0.05**	
		(-1.6)			(1.3)			(-0.4)	
# Investors			**0.062** [a]			**0.02**			**0.004**
			(6.2)			(0.6)			(0.2)
# Regressions	**36**	**36**	**24**	**36**	**36**	**24**	**36**	**36**	**24**
R-squared	**0.296**	**0.378**	**0.264**	**0.151**	**0.183**	**0.125**	**0.139**	**0.180**	**0.125**

(**a)** significant at 1% , (**b)** significant at 5% and (**c)** significant at 10%

stock closing price at the end of the quarter, as a proxy for trade transaction cost, firm age, which is the number of months since the firm is first available in our data, number of analysts, firm leverage or debt to assets ratio, and number of investors investing in the firm at the end of the quarter.

We run three different regression models for each dependent variable in table 16. These model differ according to independent variables used and their availability in the data. For example, leverage is not applicable if the firm operates in Banks & Financial Service or Insurance sectors, therefore, model 2 exclude firms from these two sectors. Also the number of investors variable is only available from Jan 2010 to Dec 2015, therefor, model 3 uses data between these two dates only.

The estimated coefficients have expected signs. For example, return comovements increase with stock return volatility, firm age, and number of investors but decrease with firm size, book-to-market, leverage, and stock return and closing price. Liquidity commonality decreases with earning comovements when measured by Amihud's illiquidity but when measured by stock turnover ratio, liquidity commonality increases with earning comovement and with stock return volatility. Interestingly, even after we control for earning comovements, analysts' coverage, and other firm characteristics, Islamic stocks return comovements and commonality in liquidity with other stocks from it class are higher than that of conventional stocks as indicated by the positive and economically and statically Islamic dummy variable at 1% level of significance.

Note that in table 16, Stock return comovements in Islamic stocks are high especially in model 3, where the sample period starts from Jan 2010 to the end of the sample. For liquidity commonalities, in model 2, where we exclude stocks from Banks & Financial Service or Insurance sectors, we have the highest difference in liquidity commonality between Islamic and conventional stocks as indicated by the coefficient of Islamic dummy variable. It is also important to note that positive sign on the coefficients of number of investors variable indicate that investors

contribute positively to stock return comovements and commonalities, which supports our hypothesis that investors are the main driver of excess stock comovements and commonalities. Holding other variables constant, the higher the number of investors investing in a stock, the higher the excess comovement or commonality the stock will have with other stocks from same class.

It is safe to assume that in a market that is traded by four million Saudi individuals and where their trading activity account for almost ninety percent of total stock market trading activity, that a firm with a high number of investors also have a higher percentage of their active investors as individual or retail investors. This is in line with Canepa and Ibnrubbian (2014) and Alhomaidi et al. (2016), who find that Islamic stocks are more attractive and widely recognized by market participants especially individual or retail investors. Therefore, our conclusion that retail or individual investors are the main driver of excess stock return and liquidity comovements is consistent with Kumar and Lee (2006) and Kumar et al. (2013) where they find that excess stock return comovements are high among stocks that are actively traded by retail investors.

The results so far support the conclusion that Islamic stocks have high return and liquidity comovements and this is because investors develop the categorization or habitat view in the stock market and trade only a subset of all available stocks and whenever these investors' liquidity needs or sentiment change, they will change their exposure to the stocks in their habitat, thereby inducing a common factor in the returns and liquidity of these stocks. We next want to explore possible mechanisms for stock classification causes an increase in stock return and liquidity comovements. As we saw earlier in tables 11 and 12, the difference in same class stock return comovements between Islamic and conventional stocks was statically insignificant in the sample before the publication of Sharia stock classification reports in late 2007 and it was economically and statically significant in the sample period after 2007.

3.5. Commonality dynamics

To understand the mechanism of stock classification effect on stock return comovement, it is helpful to look at the time series graph of same class return comovements of the two classes of stocks. Figures 3,4, and 5 show the monthly plot of equally weighted average of same class beta coefficients for Islamic and conventional stocks estimated using firm-year monthly rolling over regression of equations (8) and (10) for stock return comovement and liquidity commonalities respectively. The graphs show a big shift in average beta coefficients of same class comovements around 2008. The divergence in same class comovements is clear in the case of return comovement in which Islamic stocks comovements stay above 0.3 but conventional stock return comovements drop below that level.

The best way to examine the dynamic effect of Sharia stock classification on stock comovements, we use the difference-in-differences approach and test the effect of introducing Sharia stock classification on the comovements of Islamic and conventional stocks. The application of difference-in-differences approach requires exogenous shock to the effect of classification on stock return and liquidity comovements. We think that the publication date of the first Sharia classification report by Dr. Al-Fozan is a good quasi-natural experiment because it is unlikely that publication of Sharia stock classification affects firm fundamentals directly. Difference-in-differences methodology compares comovements of a sample of treatment firms that have been classified as Sharia compliant or Islamic to that of control firms that have not been classified as Sharia compliant (conventional) firms, before and after the release of Sharia stock classification reports.

We construct a treatment group that includes all stocks that have been classified as Islamic in the first classification report and a control group of stocks that includes all stocks that have not been classified and were listed in stock market during that time.

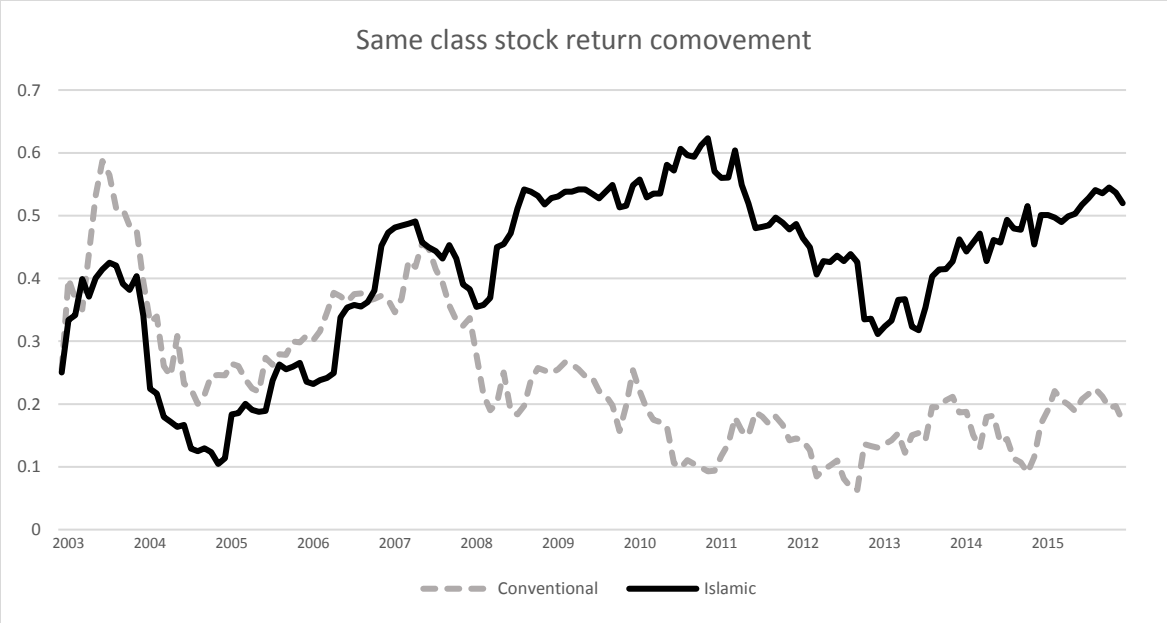

Figure 3: Same-class stock return comovements

This figure shows monthly plot of equally weighted average of same class beta coefficients for Islamic and conventional stocks estimated using firm-year monthly rolling over regression of equations (3) for stock return comovements for the period from 2002-2015.

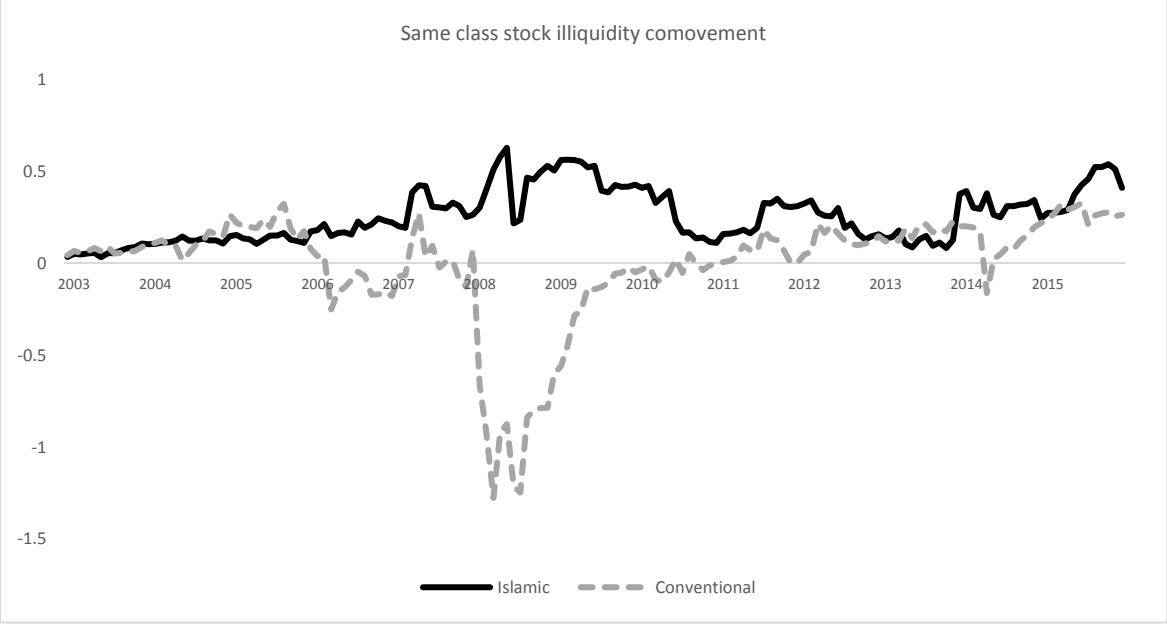

Figure 4: Same-class stock liquidity commonality (Amihud's (2002) illiquidity)

This figure shows monthly plot of equally weighted average of same class beta coefficients for Islamic and conventional stocks estimated using firm-year monthly rolling over regression of equations (5) for stock liquidity comovements measured using Amihud's (2002) illiquidity measure for the period from 2002-2015.

Figure 5: Same-class stock liquidity commonality (Turnover)
This figure shows monthly plot of equally weighted average of same class beta coefficients for Islamic and conventional stocks estimated using firm-year monthly rolling over regression of equations (5) for stock liquidity comovements measured using stock turnover for the period from 2002-2015.

We follow Fang et al. (2014) and retain firm-quarterly observations for both treatment and control firms for a seven-year window centered on the classification report publication year and estimate the following regression:

$$Com_{i.t} = \boldsymbol{a} + \mathbf{b}\, Treat * Before^{1} + \mathbf{c}\, Treat * Current + \mathbf{d}\, Treat * After^{1} + \mathbf{e}\, Treat * After^{2\&3} + \mathbf{f}\, Before^{1} + \mathbf{g}\, Current + \mathbf{h}\, After^{1} + \mathbf{i}\ After^{2\&3} + \mathbf{j}\, Treat + \boldsymbol{\varepsilon} \qquad (11)$$

The dependent variable $Com_{i.t}$ is firm i's beta coefficient estimated from either stock returns or liquidity quarterly regressions using equations (8) and (10) above. The variable *Treat* is a dummy that equals one for treatment firms and zero for control firms, $Before^{1}$ is a dummy that equals one if an observation is from the year before the release of classification report (year 2007) and zero otherwise, $Current$ is a dummy that equals one if an observation is from the year of the publication or release of classification report (year 2008) and zero otherwise, $After^{1}$is a dummy

that equals one if an observation is from the year immediately the year of the publication of classification report (year 2009) and zero otherwise, and $After^{2\&3}$ is a dummy that equals one if an observation is from two or three years after publication year (years 2010 and 2011) and zero otherwise; the omitted group (benchmark) therefore comprises the observations two or three years before publication year (years 2006 and 2005).

We report the regression results estimating equation (11) in table 17. The key coefficient estimates are interaction coefficients **b**, **c**, **d**, and **e**. In the columns of stock returns and Amihud's illiquidity, we observe statically insignificant coefficient estimates of **b** which suggests that, before the release of classification reports, there is no significant difference in stock same class return comovements or liquidity commonality between Islamic and conventional stocks. Moreover, in all the three columns in table 17, we observe statically significant coefficient estimates of **c** and **d** coefficients, suggesting that, compared to control firms, treatment firms have a higher return and liquidity commonalities with other stocks from same class. The overall conclusion from table 17 is that the difference in stock return and liquidity commonalities between Islamic and conventional stocks was not statically different until the release of Sharia stock classification report and that the difference was statically significant during the first two years after the publication date of the first classification report.

4. Robustness Checks

We now summarize several other untabulated robustness checks that do not alter the main

inferences of our study. Since industry and class portfolios in our tests were constructed using equally weighted averages, we repeat the test using value weighted portfolio instead and the results are almost the same. We also change the frequency of the regressions, instead of annual (or quarterly in table 16) regressions we do quarterly, monthly, and whole sample regressions and the results lead to the same conclusion. In liquidity commonality, an alternative method to

using log difference of liquidity measures is to take the first difference. We apply this method on our commonality in liquidity tests and the results are similar to what we find using log difference.

Table 17: Comovements Difference-in-Difference

The table reports Fama-MacBeth (1973) time-series regression estimates, where the dependent variable is either stock return, Amihud's illiquidity, or turnover comovement measures calculated annually using daily observations. Before^{-1}, Current, After^{1}, and After^{23} is a dummy that equal 1 for observations before, in, one year after, and two to three years after 2008, the year before the publication of the first Islamic classification report and zero otherwise respectively. Islamic is a dummy that equal one if the firm is classified as Islamic and zero if the firm is conventional.

	Returns	Amihud's illiquidity	Turnover
Islamic × Before^{-1}	**-0.043** (-0.5)	**0.193** (0.8)	**0.658** [a] (6.1)
Islamic × Current	**0.205** [b] (2.3)	**0.925** [a] (4.7)	**0.355** [a] (3.0)
Islamic × After^{1}	**0.244** [b] (2.2)	**0.617** [a] (4.2)	**0.181** [c] (1.8)
Islamic × After$^{2\&3}$	**0.092** (0.9)	**0.208** (1.3)	**-0.02** (-0.2)
Before^{-1}	**0.018** (0.3)	**-0.178** (-0.8)	**-0.46** [a] (-5.2)
Current	**-0.071** (-1.3)	**-0.663** [a] (-3.9)	**-0.102** (-1.2)
After^{1}	**-0.089** (-1.3)	**-0.190** [c] (-1.8)	**-0.211** [a] (-2.9)
After$^{2\&3}$	**-0.001** (-0.01)	**-0.050** (-0.4)	**0.01** (0.1)
Islamic	**0.096** [c] (1.9)	**0.450** [a] (5.3)	**-0.09** (-1.4)
Intercept	**0.291** [a] (8.5)	**-0.255** [a] (-3.7)	**0.16** [a] (3.6)
Number of obs. used	**2,685**	**2,685**	**2,685**
R-squared	**0.011**	**0.037**	**0.020**

(**a)** significant at 1% , (**b)** significant at 5% and (**c)** significant at 10%

For the classification part of our data, we relied on Dr. Al-Fozan's stock classification reports for the reasons mentioned earlier in this paper. To check that our results are not driven

by the classification used, we use an alternative Sharia stock classification by Dr. Al-Osaimi and the results are similar to that

already reported in our study. One criticism about our results, is that even if we use another Sharia classification the results will still be driven by fundamental related Sharia classification criteria such as firm level of leverage. To address this issue, we pick stocks that have no meaningful debt ratios and therefore, their classifications will depend only depend on their business operations and how they operate. Specifically, we pick firms that operate in Banks & Financial Service or Insurance sectors where their Sharia classifications does not depend on how much debt they hold.

Table 18 shows the stock return and liquidity commonalities for Islamic and conventional stocks using regressions (8) and (10) above. The results indicate that Islamic stocks comove more with other stocks from same class than stocks from different class. Islamic stocks have positive and statically significant return and liquidity commonalities with other stocks from same class whereas conventional stocks have either positive and statically insignificant or negative and statically significant return and liquidity commonalities with stocks from it same class. The difference in same class stock return and liquidity commonalities between Islamic and conventional stocks are statically significant at 10% level of significance except when using turnover. This lead us to conclude that, our previous results are not driven by commonalities in fundamentals and that the only possible driver for commonalities between Islamic stocks is the commonality in preferences between Islamic which possibly makes their trading behavior to be correlated and thus generates commonalities in their stock return and liquidity.

Table 18: Stock return and liquidity commonalities of Banks & Financial Service and Insurance sectors

This table reports average coefficients from annual stock-level time-series regressions of daily stock returns, turnover, and iliquidity on an equal-weighted average of same class, market, and industry portfolios. Stocks are classified into Islamic and conventional according to Dr. Al-Fozan's classification. We report average coefficients for Islamic and Conventional stocks for the period from 2008 to 2015 for two sectors that are classified based on firm operations only and without looking at firm debt ratio. We average the coefficients cross-sectionally in each year and then across years. Newey-West adjusted t-statistics are reported below the coefficients.

	Stock return			**Amihud's illiquidity**			**Turnover**		
	Islamic	**Conventional**	**Difference**	**Islamic**	**Conventional**	**Difference**	**Islamic**	**Conventional**	**Difference**
Islamic	**0.31** [b]	**0.08** [c]	**0.22** [c]	**0.50** [b]			**0.16**		
	(3.6)	(2.9)	(2.3)	(4.9)		**-0.84** [a]	(1.9)		**0.09**
Conventional	**-0.24**	**0.07**	**-0.31** [c]		**-0.34** [a]	(7.1)		**0.07**	(0.8)
	-(2.0)	(1.6)	-(2.4)		-(5.6)			(1.2)	
Market	**1.13** [a]	**1.05** [a]	**0.09**	**0.71** [a]	**0.63** [a]	**0.08**	**0.47** [a]	**0.63** [a]	**-0.16** [b]
	(14.1)	(101.2)	(1.3)	(9.3)	(9.4)	(0.9)	(7.4)	(19.9)	-(2.3)
Industry	**0.53** [c]	**0.80** [a]	**-0.27** [c]	**0.28** [c]	**0.55** [a]	**0.27** [b]	**0.54** [a]	**0.47** [a]	**0.06**
	(3.3)	(33.6)	-(2.1)	(3.2)	(13.1)	-(3.4)	(7.9)	(34.6)	(0.9)
Market return $_{t-1}$				**1.08**	**0.40**	**-0.68**	**-1.94**	**-1.13** [c]	**-0.81**
				(0.6)	(0.5)	(0.3)	-(2.0)	-(3.5)	-(0.7)
Market return $_{t}$				**-2.80**	**-1.75** [c]	**1.05**	**3.64** [b]	**2.16** [b]	**1.48**
				-(1.7)	-(3.1)	-(0.6)	(4.3)	(4.6)	(1.3)
Market return $_{t+1}$				**1.23**	**0.08**	**-1.15**	**0.34**	**0.32**	**0.03**
				(1.3)	(0.1)	(1.0)	(0.7)	(0.9)	(0.0)
Difference in squared returns				**168** [a]	**141** [a]	**-27**	**136** [b]	**109** [a]	**27**
				(8.9)	(6.3)	-(1.0)	(4.0)	(5.5)	(0.6)
R-squared	**0.548**	**0.457**		**0.154**	**0.163**		**0.186**	**0.149**	

(**a)** significant at 1% , (**b)** significant at 5% and (**c)** significant at 10%

5. Concluding Remarks

One of the fundamental goals of asset pricing theory is to understand the sources of common variation in stock prices. The traditional asset pricing theory shows that return comovements stems from correlated fundamentals, for example, cash flows or interest rates. However, a number of studies in finance document the existence of return comovements that are not easily explained by these fundamentals. The literature has provided several evidences for excess comovements by analyzing stock splits, change of firm headquarter location, and addition and deletion of stocks in major market indices. In order to understand the source of comovement and its mechanism, we use a variety of trading-based measures and examine directly to what extent investors trading activities generate excess comovements or commonalities in stock return and liquidity.

In this paper we study whether shared beliefs and personal preferences of investors have any effect on their trading and investment decisions. We anticipate that the process of classifying stocks into Sharia compliant (Islamic) and non-sharia compliant (conventional) has an effect on investibility and acceptance of the stock especially by unsophisticated or individual investors. The wide acceptance of Islamic stocks between individual investors promote and facilitate the circulation of firm related information between certain group of investors. Therefore, we show that, even after controlling for industry and other class comovements, risk factors, and firm characteristics, stock classification has an effect on the stock price comovement and liquidity commonality through increased stock trading correlation between the group of Islamic investors. Using difference-in-difference approach, we show the dynamics of how Sharia stock classification increases the commonalities between Islamic stocks especially in the first two years after classification reports were released to the public. Our results are robust to battery of robustness tests such as, changing portfolio weighting, regressions frequency, and classification methodology, we find that classifying stock as an Islamic stock increase its price comovement with other Islamic stocks and also increase its commonality in liquidity Islamic stocks.

References

Ahn, D.H., Conrad, J. and Dittmar, R.F., 2009. Basis assets. Review of Financial Studies, 22(12), pp.5133-5174.

Alhomaidi, A.K, Hassan, M.K. and Hippler, W.J., 2016. The Effect of Implicit Market Barriers on Stock Trading and Liquidity. Unpublished working paper. University of New Orleans.

Amihud, Y., 2002. Illiquidity and stock returns: cross-section and time-series effects. Journal of Financial Markets, 5(1), pp.31-56.

Baker, M. and Stein, J.C., 2004. Market liquidity as a sentiment indicator. Journal of Financial Markets, 7(3), pp.271-299.

Baker, M. and Wurgler, J., 2006. Investor sentiment and the cross-section of stock returns. The Journal of Finance, 61(4), pp.1645-1680.

Barberis, N. and Shleifer, A., 2003. Style investing. Journal of Financial Economics, 68(2), pp.161-199.

Barberis, N., Shleifer, A. and Wurgler, J., 2005. Comovement. Journal of Financial Economics, 75(2), pp.283-317.

Barber, B.M. and Odean, T., 2008. All that glitters: The effect of attention and news on the buying behavior of individual and institutional investors. Review of Financial Studies, 21(2), pp.785-818.

Barber, B.M., Odean, T. and Zhu, N., 2009. Do retail trades move markets?. Review of Financial Studies, 22(1), pp.151-186.

Broman, M.S., 2016. Liquidity, style investing and excess comovement of exchange-traded fund returns. Journal of Financial Markets, 30, pp.27-53.

Brown, J.R., Ivković, Z., Smith, P.A. and Weisbenner, S., 2008. Neighbors matter: Causal community effects and stock market participation. The Journal of Finance, 63(3), pp.1509-1531.

Canepa, A. and Ibnrubbian, A., 2014. Does faith move stock markets? Evidence from Saudi Arabia. The Quarterly Review of Economics and Finance, 54(4), pp.538-550.

Carhart, M.M., 1997. On persistence in mutual fund performance. The Journal of Finance, 52(1), pp.57-82.

Chen, H., Singal, V. and Whitelaw, R.F., 2016. Comovement revisited. Journal of Financial Economics, 121(3), pp.624-644.

Chordia, T., Roll, R. and Subrahmanyam, A., 2000. Commonality in liquidity. Journal of Financial Economics, 56(1), pp.3-28.

Cohen, L., Frazzini, A. and Malloy, C., 2008. The Small World of Investing: Board Connections and Mutual Fund Returns. Journal of Political Economy, 116(5).

Colla, P. and Mele, A., 2010. Information linkages and correlated trading. Review of Financial Studies, 23(1), pp.203-246.

Cooper, M.J., Gulen, H. and Rau, P.R., 2005. Changing names with style: Mutual fund name changes and their effects on fund flows. The Journal of Finance, 60(6), pp.2825-2858.

Coughenour, J.F. and Saad, M.M., 2004. Common market makers and commonality in liquidity. Journal of Financial Economics, 73(1), pp.37-69.

Dewandaru, G., Bacha, O.I., Masih, A.M.M. and Masih, R., 2015. Risk-return characteristics of Islamic equity indices: Multi-timescales analysis. Journal of Multinational Financial Management, 29, pp.115-138.

Dimson, E., 1979. Risk measurement when shares are subject to infrequent trading. Journal of Financial Economics, 7(2), pp.197-226.

El Alaoui, A.O., Dewandaru, G., Rosly, S.A. and Masih, M., 2015. Linkages and co-movement between international stock market returns: Case of Dow Jones Islamic Dubai Financial Market index. Journal of International Financial Markets, Institutions and Money, 36, pp.53-70.

Eun, C.S., Wang, L. and Xiao, S.C., 2015. Culture and R 2. Journal of Financial Economics, 115(2), pp.283-303.

Fama, E.F. and French, K.R., 1993. Common risk factors in the returns on stocks and bonds. Journal of Financial Economics, 33(1), pp.3-56.

Fama, E.F. and MacBeth, J.D., 1973. Risk, return, and equilibrium: Empirical tests. Journal of Political Economy, 81(3), pp.607-636.

Fang, V.W., Tian, X. and Tice, S., 2014. Does stock liquidity enhance or impede firm innovation?. The Journal of Finance, 69(5), pp.2085-2125.

Feng, L. and Seasholes, M.S., 2004. Correlated trading and location. The Journal of Finance, 59(5), pp.2117-2144.

Froot, K.A. and Dabora, E.M., 1999. How are stock prices affected by the location of trade?. Journal of Financial Economics, 53(2), pp.189-216.

Green, T.C. and Hwang, B.H., 2009. Price-based return comovement. Journal of Financial Economics, 93(1), pp.37-50.

Grinblatt, M. and Keloharju, M., 2001. How distance, language, and culture influence stockholdings and trades. The Journal of Finance, 56(3), pp.1053-1073.

Gruber, J.H., 2005. Religious market structure, religious participation, and outcomes: Is religion good for you?. The BE Journal of Economic Analysis & Policy, 5(1).

Guiso, L., Sapienza, P. and Zingales, L., 2004. The role of social capital in financial development. The American Economic Review, 94(3), pp.526-556.

Hammoudeh, S., Mensi, W., Reboredo, J.C. and Nguyen, D.K., 2014. Dynamic dependence of the global Islamic equity index with global conventional equity market indices and risk factors. Pacific-Basin Finance Journal, 30, pp.189-206.

Han, B. and Yang, L., 2013. Social networks, information acquisition, and asset prices. Management Science, 59(6), pp.1444-1457.

Heinkel, R., Kraus, A. and Zechner, J., 2001. The effect of green investment on corporate behavior. Journal of financial and quantitative analysis, 36(04), pp.431-449.

Hong, H. and Kacperczyk, M., 2009. The price of sin: The effects of social norms on markets. Journal of Financial Economics, 93(1), pp.15-36.

Hong, H. and Kostovetsky, L., 2012. Red and blue investing: Values and finance. Journal of Financial Economics, 103(1), pp.1-19.

Hong, H., Kubik, J.D. and Stein, J.C., 2004. Social interaction and stock-market participation. The Journal of Finance, 59(1), pp.137-163.

Hou, K., 2007. Industry information diffusion and the lead-lag effect in stock returns. Review of Financial Studies, 20(4), pp.1113-1138.

Ivković, Z. and Weisbenner, S., 2007. Information diffusion effects in individual investors' common stock purchases: Covet thy neighbors' investment choices. Review of Financial Studies, 20(4), pp.1327-1357.

Kamara, A., Lou, X. and Sadka, R., 2008. The divergence of liquidity commonality in the cross-section of stocks. Journal of Financial Economics, 89(3), pp.444-466.

Karolyi, G.A., Lee, K.H. and Van Dijk, M.A., 2012. Understanding commonality in liquidity around the world. Journal of Financial Economics, 105(1), pp.82-112.

Koch, A., Ruenzi, S. and Starks, L., 2016. Commonality in liquidity: a demand-side explanation. Review of Financial Studies, p.hhw026.

Kumar, A. and Lee, C., 2006. Retail investor sentiment and return comovements. The Journal of Finance, 61(5), pp.2451-2486.

Kumar, A., 2009. Who gambles in the stock market?. The Journal of Finance, 64(4), pp.1889-1933.

Kumar, A., Page, J.K. and Spalt, O.G., 2011. Religious beliefs, gambling attitudes, and financial market outcomes. Journal of Financial Economics, *102*(3), pp.671-708.

Kumar, A., Page, J.K. and Spalt, O.G., 2013. Investor sentiment and return comovements: Evidence from stock splits and headquarters changes. Review of Finance, 17(3), pp.921-953.

Kumar, A., Page, J.K. and Spalt, O.G., 2016. Gambling and comovement. Journal of Financial and Quantitative Analysis, 51(01), pp.85-111.

Merdad, H.J., Hassan, M.K. and Hippler, W.J., 2015. The Islamic risk factor in expected stock returns: an empirical study in Saudi Arabia. Pacific-Basin Finance Journal, 34, pp.293-314.

Morck, R., Yeung, B. and Yu, W., 2000. The information content of stock markets: why do emerging markets have synchronous stock price movements?. Journal of Financial Economics, 58(1), pp.215-260.

Ozsoylev, H.N. and Walden, J., 2011. Asset pricing in large information networks. Journal of Economic Theory, 146(6), pp.2252-2280.

Pástor, Ľ. and Stambaugh, R.F., 2003. Liquidity risk and expected stock returns. Journal of Political Economy, 111(3), pp.642-685.

Pirinsky, C. and Wang, Q., 2006. Does corporate headquarters location matter for stock returns?. The Journal of Finance, 61(4), pp.1991-2015.

Rizvi, S.A.R., Arshad, S. and Alam, N., 2015. Crises and contagion in Asia Pacific—Islamic v/s conventional markets. Pacific-Basin Finance Journal, 34, pp.315-326.

Shu, T., Sulaeman, J. and Yeung, P.E., 2012. Local religious beliefs and mutual fund risk-taking behaviors. Management Science, *58*(10), pp.1779-1796.

Vijh, A.M., 1994. S&P 500 trading strategies and stock betas. Review of Financial Studies, 7(1), pp.215-251.

VITA

Asem Alhomaidi was born in Riyadh, Saudi Arabia in 1984. He received his B.A. (Honors) in Business Administration from King Saud University, Riyadh in 2006. He obtained an M.Sc. in Finance from University of Tampa in 2009. He joined the University of New Orleans in August, 2013 and obtained his M.S. in Financial Economics in August, 2015 and his PhD in Financial Economics in August, 2017 from the Department of Economics and Finance. His research interest includes empirical asset pricing, investment analysis, and behavioral finance.