



Using regime-switching models to compare Shariah and Non-Shariah compliant Stocks for portfolio optimization of risk appetite discriminated investors: Evidence of Fertilizer companies listed in Pakistan Stock Exchange

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Keywords:

Regime-switching models (RSM); Portfolio optimization; Shariah-compliant (SC); Non-Shariah compliant (NSC); Fertilizer industry; Risk-appetite

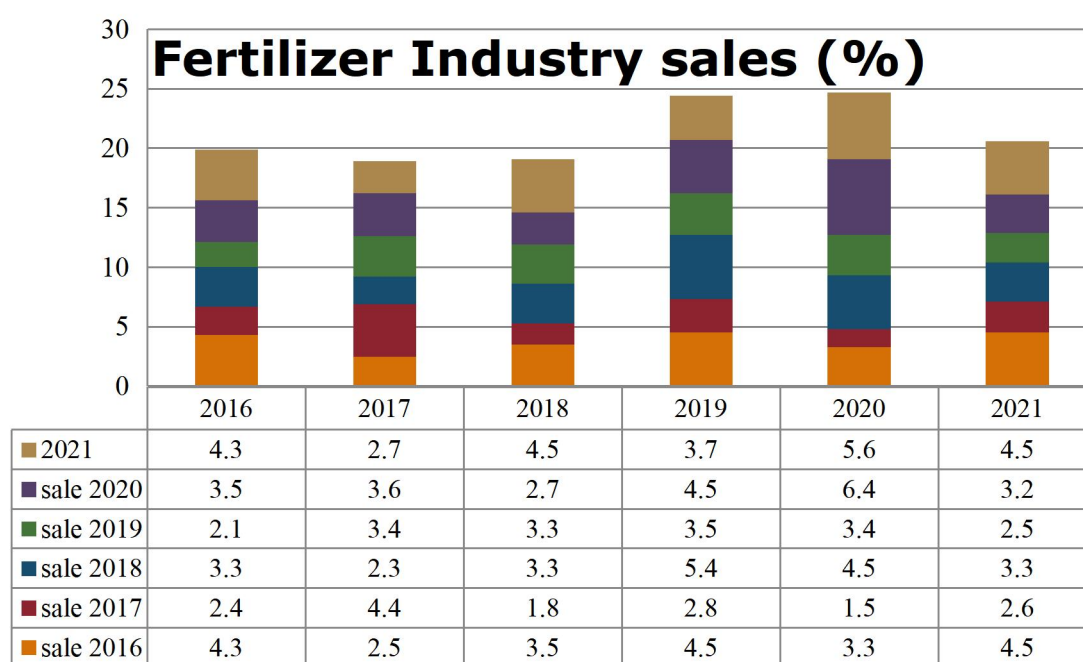
Abstract

The objective of this study is to compare the performance of Shariah-compliant and non-Shariah-compliant companies in the Pakistan Stock Exchange (PSX) listed fertilizers business, using regime-switching models to maximize the value of investors' portfolios. In six listed fertilizer companies in PSX there are three Shariah-compliant companies and three appears as non-Shariah compliant companies which are identify through the Karachi Meezan index semi annually review from 2015 to 2021. The research criteria 18 November 2015 to 30 June 2021 are classified into two sections: out sample and in sample and completely described by the existence of unpredictability related bear stage and bull stage. The regime-switching model is used continuously during the out-sample time period in order to make forecasts on the cumulative wealth of investment. The accumulated value of each investment is tracked and analyzed on a daily basis through a series of checks and studies. The cumulative daily wealth's risk appetite discriminated investors (RA, RN and RT investors) in Shariah-compliance stock (SC), as calculated by RSM, is greater than that of investors in non-Shariah compliant fertilizer firms. Investors, traders, regulators, and policymakers should take note of the findings. This study is helpful for all the investors not compulsory which behavior they have to compare their portfolios and if necessary, transfer to the new regime. As an outcome of this, this study is also beneficial for investors in determining whether or not to invest in fertilizers companies in Pakistan that comply with Shariah or do not comply with Shariah. This study is significant because it pays attention to the problem of

	risk-appetite investors trying to maximize their portfolio wealth. Technical analysis is investigated this problem, employing completely different models in the developing market's SC and NSC companies. This attention to the problem is what gives this study its distinctive quality.
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1. Introduction

The article's text should begin with an introduction that gives more information about the paper's goals, inspiration, research strategy, and conclusions. An informed reader should be including "Arif Habib Corporation Limited (AHCL)", "Fauji Fertilizer Bin Qasim Ltd. (FFBL)", "Fauji Fertilizer Company Ltd. (FFC)", "Engro Corporation Ltd. (ENGRO)", "Fatima Fertilizer Co. Ltd. (FATIMA)", and "Engro fertilizer Ltd. (EFERT)" six prominent fertilizer companies in which first three as Non-Shariah compliant and the next three Shariah compliant companies. Sales of a few years are shown in this graph. The first year's sales in 2016 increased by 4.3%, 2.5% in the following year, 3.3 in the following two, and 4.5 in the following year. And finally, given this entire sales rate in 2021 will be increasing at a significant level, as illustrated in this graph of the fertilizer sector. Islamic Wealth Management is a growing industry that both Muslims and non-Muslim investors should take into account to appreciate the introductions significance without it being overly technical. Fertilizer is an essential component for the contemporary agricultural technology to reach at the huge production of the crop. The introduction of high-yield fertilizer types in 1966–1967 opened the way for the green revolution. In 1952–1953, Pakistan first started using commercial fertilizers (Quddus et al., 2008). Chemical fertilizer is the most effective way to increase crop yields and reduce the gap between food production and consumption on a global scale. While chemical fertilizers are a great start, there are other ways to maximize their effectiveness in boosting crop yields. Soil, seed, irrigation, price support policy, and market development policy all play roles (Butt, 1996).



Although a formal statistical or mathematical model of the relationship between risk and return has not yet been developed within the Islamic financial system, the principle is clear: the Shariah framework bases its entire approach to business and investment on the idea that one must be willing to take on some degree of risk in exchange for a potential reward. According to Hadith: *“Sales transaction of something which is not in your possession is not lawful, nor is the profit arising from something which does not involve liability”* (English translation by Khan, 1989). There is nothing as a risk-free return opportunity, which is a well-established and well-articulated premise of Islamic finance. The profit in this the underlying project is tied to bearing the risk of loss; otherwise, it is interesting which banned in Shariah. Profit on the underlying project is linked to bearing the risk of loss. According to the principle of rationality, the return on initiatives with a lower level of risk should be lower than the return on projects with a higher level of risk. The fundamental principles of Islamic finance are laid down in Shariah, which also encourages banks to share their gains and losses with investors. However, it is still unclear what it means for a company to be "Shariah-compliant" and what connections, if any, there might be between that and the firm's worth or profitability. This study aims to provide an answer to that query. The purpose of this study is to determine how Shariah compliance effects on business performance. The findings would be helpful in guiding decision-making for investors, firms, governments, academics, and practitioners to achieve better economic and business gains both locally and globally. Securities from a publicly traded firm that have been categorized as Shariah investment-permissible are said to be “Shariah-compliant securities.”

Bansal and Yaron (2004) proposed that the economic appetite for risk should be meditated on aggregate intake or stock market combination data. However, risk appetite measures from aggregates. (e.g., Lettau and Ludvigson (2004) are usually unsuccessful in explaining significant amounts of actual rate distinctions as well as in estimating future macroeconomic results. In this article, propose a brand-new risk appetite decision, which is very much related to real hobby costs and has huge predictive strength for monetary activity. Our pragmatic technology is based on the concept that investors should be more unwilling to protect excessive volatile properties if their risk appetite is low, and should choose low-volatility properties as risk much less. This concept is implemented in the cross-phase of equities by assessing the volatile stock prices at the price of low volatility stocks.

According to the study of Saleem and Ahmad-Zaluki (2020) suggested that when an investor preferred the natural risk it is known as risk-averse if he completely ignores the risk while investing, he is known as risk-neutral and if he leans towards unknown risk, he is known to be a risk-taker. The current study demonstrates that investors' risk perceptions (such as their risk reward) are typically reflected by the risk-return trade-off where risk is clarified by market downturn. Therefore, the investor's consumption abundance may be different due to their diverse risk appetite or the uncertain mental practices usually referred to as risk quality. Even though stocks are considered a high-risk investment, they are also capable of producing high returns.

Currently, in Pakistan, Investors may construct an asset portfolio that optimizes anticipated return for a particular level of risk using the Modern Portfolio Theory (MPT), a theory of investments. Investors consistently preferred the portfolio with lower risk for a given amount of predicted return, the theory said. As a result, according to Modern Portfolio Theory, an investor's expected return must be larger to balance off a higher amount of risk. Keeping a portfolio of assets from different classes is less dangerous than doing the same for a portfolio of comparable assets, according to MPT, which is the core premise of diversification (Alquraan et al., 2016).

Shariah compliant stock is getting prominence both in developed and developing countries for portfolio diversification and getting better returns. In a study the investigator tries to find out the better stock between Islamic and conventional on the basis of their information efficiency and risk during instable phase of market. The analytical tool which is used is based on a state space along with standard GARCH (Generalized Autoregressive Conditional Heteroskedasticity) and data is taken from DOW Jones Islam Index. The results indicate that Islamic Stock is more volatile than conventional one and are away from getting impact of crises, moreover in the account of information efficiency Islamic stocks also good (Rejeb&Arfaoui, 2019). The research consists of a case study that was conducted on the Malaysian Stock Exchange about the performance comparison between Shariah and Non-Shariah Stocks. The panel date for the 634-Shariah Listed Firms comes from the years 2000 to 2014. According to the findings of the study, companies that comply with Shariah law have an edge over companies that do not comply with Shariah law (Saba et al., 2021). Most of the researches are done and concluded that the Shariah-compliant perform better as matched to non-Shariah stocks but research uses RSM to analyze how well SC and Non-SC investors handle with risk while making investing choices because regime switching strategy also helps the investors to take investment decisions.

Based on above stated problem statement, the research question of the study is;

RQ1: Does investment in Shariah-compliant fertilizer companies perform better as compared to the non-Shariah compliant fertilizer companies through Regime switching models?

2. Literature Review

Even in the developed countries, Shariah-compliant stock is taken advantage of as a technique to diversify portfolios and obtain greater results. An Islamic stock index consists of firms that are qualified on Shariah laws and indicates the commercial activity of those companies on the stock market. Examples of Islamic stock indices include the Karachi Meezan Index (KMI) in Pakistan and the Dow Jones Islamic Index in developed countries. Shariah Compliance Shares is the name given to the stock of firms that are qualified according to Shariah law the investigation of the link between rising oil prices and the performance of the Islamic stock index (Dow Jones). The data that is used in this study comes from the DJIMI and spans the time period of January 2007 through April 2015. The Auto-regressive Distributed Lags, or ARDL, test statistic was utilized, and the findings indicates that there is an influence of changes in the prices of oil index (Mongi, 2019).

Shariah-compliant businesses only goal is to be regulated by "Allah's" supreme authority. This motivates SCs to conduct morally and in accordance with the established and stated Islamic norms (Imamah et al., 2019). Managers are only responsible to Allah and His authority (SWT). Max Weber has done a great deal of research on how religion affects the economy and how people make decisions. This study examined Catholicism and Protestant ideas in order to compare the two branches of Christianity. This research suggests a connection between Catholic preaching and economic prosperity. Similar to this Elnahas et al. (2017) demonstrates a clear and advantageous link between religion and economic growth. In their study, Hastuti and Arifin (2016) came to the conclusion that the TPF and FDR factors significantly affected the amount of finance. In the meantime, the financing volume was unaffected by the NPF variable and demonstrated that the USD Exchange Rate has a considerable impact on the Indonesian Shariah Stock Index both in the short and long terms (ISSI).

According to research done by Soebagyo and Panjawa (2016), the exchange rate variable had a substantial impact both in the long run and short term. While inflation and the BI rate have a big negative impact on the stock prices of the Jakarta Islamic Index, the exchange rate variable has a significant positive impact. This study differed from earlier studies in some ways. The OLS (Ordinary Least Square) method was used to evaluate the variables that impacted Islamic finance of the agriculture sector, which was the first distinction. Additionally, there was a change in the research year, which was updated to include the seven-year period from 2014 to 2020. It is therefore reasonable to assume that this research will be able to provide an update on the variables that have an impact on Islamic Financing in Indonesia's agriculture industry. Shariah-compliant investing can be seen as a part of environmental, social, and governance (ESG) investing.

The market efficiency hypothesis makes assumptions about how policymakers and stockbrokers interact in the financial sector. The stock values in Islamic markets so reflect the future performance of enterprises. Stock prices ought to be regarded as a performance indicator as a result. By assuming that the dividend of the stock price grows at a steady rate, the dividend theory also made stock valuation simpler. The inefficient market theory is not supported by long-term anomalous returns, although there is a substantial correlation between the buy-and-hold strategy and the stock market's moderate efficiency (Albaity& Said, 2016). Low performance was found when Hakim and Rashidian (2000) combined the Wilshire 5000 and 3-month T-bill performance with the Dow Jones Islamic Market Index (DJIM). According to Shaikh et al. (2019), the link between beta and returns is more favorable in large markets than it is for small market shares. According to Ousama et al. (2019), utilized capital and human capital have a greater impact on the financial performance of Islamic banks than structural capital.

Regime switching model

Incorporating the fact that financial markets often react unexpectedly and that the changing behavior of financial variables often persists for lengthy periods of time following a transition is achievable in regime-switching models. In the realm of financial modeling, regime-switching models are frequently utilized for a variety of different reasons for their widespread application. To begin, the observation that the regime ought to be modified is one that is not only common but also insightful. Recession and economic growth are without a doubt the main duties in Hamilton's (1989) new request for switching the regime, and the regime appropriately follows the long-term pattern of economic activity cycles. There is a strong connection between Hamilton's system and the concept of recession indicators that are acknowledged by the Business Cycle Dating Committee Regulations, as was discussed before.

Regarding financial consistency, the system recognized by the econometric method is repeatedly associated with different learning strategies and other changes in the world. For example, when the Federal Reserve set a target financial aggregate, the efficiency of interest rates changed significantly between 1979 and 1982. Other recognized interest rates refer to the number of years of each president of the Federal Reserve System Sims and Zha (2006). Diverse regimes maintain contact during periods of high and low instability, as well as extended bear and bull market periods (Pagan & Sossounov, 2003). Therefore, regime-switching models can be used to tell descriptive stories about changing fundamentals that can be explained only on a case-by-case basis since their last publication but can be used to predict previous real-time interest rates, cheaper survey options, and other economic applications.

Second, the regime-switching model bears economic responsibility for many stylized behaviors at the financial income level, including fat tails that appear in certain chaotic periods, followed by unstable periods of low asymmetry (ARCH effect) and random correlations time changes.

3. Research Methodology

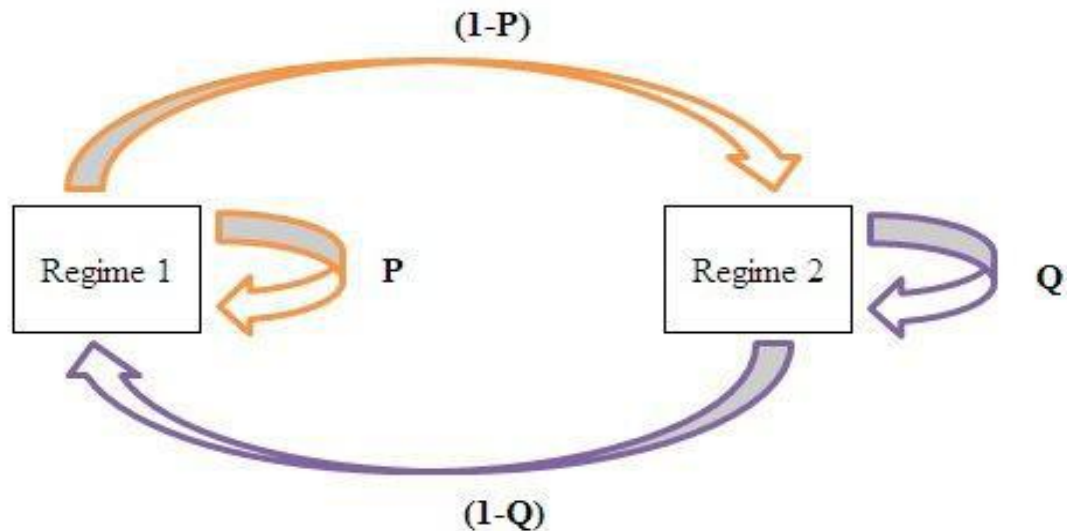
In this research secondary source of data collection is being used which is Karachi Stock Exchange (KSE All) daily closing data will be used as bench marks, daily Closing balance of Karachi Meezan Index (KMI) which is revised on semi-annual basis (data is taken from Pakistan Stock Exchange official website.) and KIBOR data is taken from State Bank of Pakistan (SBP) website which is used as risk free rate. Daily closing prices of sampled stocks are used while KMI all's daily closing balance is taken as benchmark from 18-Nov-2015 to 30-June-2021. MATLAB is used to analyze the data. The Karachi Meezan Index is used to identify Shariah-Compliant and non-compliant stocks, which are evaluated semi-annually. This sample study includes complete fertilizer companies which were listed in "KMIALL Share Index" earlier of study and that will not be left out until after it has concluded. The criteria have allowed all six fertilizer companies as Shariah-compliant or non-compliant AHCL, FFBL, and FFC are non-compliant, while ENGRO, FATIMA, and EFERT are Shariah-compliant.

Regime switching strategy

The number of clearly described regimes is important in RS models. Because their nature is unknown, evaluating estimation of the fundamental states is difficult. Hence, the '1st Markov process' is utilized to model two distinct scenarios: a prosperous bull market with low volatility and great profits, and a disastrous bear market with high volatility and low earnings.

Bull and bear markets have become a long part of the history of the modern economy. Large-scale changes have been referred to as "regime shifts" since the innovative research of Hamilton (1989), For the first time, regime changes were examined with reference to stock market returns and portfolio optimization by (Ang&Bekaert, 2002). When it comes to stock index returns, the most important stylized facts to know are that boom times with positive mean stock returns are associated with low volatility, and bear markets with negative mean stock returns are associated with high volatility.

Data having a normal distribution and separate means, correlations, and variances for each state are utilized by the RS model with two states. Parameters are needed to calculate transition probability using optimal design specifications/system signal. The filter probability is obtained at time t after observing r_{mt} . Since this is the case, we can state explicitly the probability function as:



Note: If the market is in Regime 1 at time t , then P_t is the likelihood that it will stay in Regime 1 at time $t+1$ (as shown in Figure). When entering Regime 2, this likelihood is complemented by $(1-P_t)$. Or, as shown in Figure 1, if the market is in Regime 2 at time t , then Q_t represents the likelihood that it will still be in Regime 2 at time $t+1$, while $(1-Q_t)$ represents the likelihood that it will transition to Regime 1. Markets can be said to be in a "bull" phase when returns are high and volatility is low, or a "bear" phase when returns are low and volatility is high.

Source: (Iqbal, 2018)

Depending on the regime in which it is implemented, the old CAPM equation changes from the CAPM equation:

$$r_{it} = \alpha_i + \beta_i r_{mt} + \varepsilon_{it} \quad (1)$$

In this equation, r_{it} is the risk-free rate, time period= t , α_i = intercept, β_i is the slopes of the data, r_{mt} = market index returns at time t and ε_{it} is the random error terminology.

Forecasting data of out sample period

The data divided into two sections, In sample (18 November 2015–21 November 2016) and the out sample (22 November 2016–30 June 2021). The amount of 1.00 Rs invested in as out sample start date to evaluate the performance of risk-appetite discriminated investors in SC and NSC stocks.

4. Results and Discussions

1.1 Descriptive Statistics and Analysis

The statistical data collected of the sample stocks is described in three parts in addition to the returns of their respective benchmarks. This description includes the standard deviation (Std. dev), variance (Var.), mean ($\bar{X}$), and skewness (skew) of the returns. In addition, Ordinary Least Squares regression (OLS) is connected to the Capital Asset Pricing Model (CAPM) in order to determine the standard error of data, the intercept, and the R-Squared (R-SQ) of the data.

Descriptive Statistics and OLS regression							
	A.H.C.L	F.F.B.L	F.F.C	E.N.G.R.O	F.A.T.I.M.A	E.F.E.R.T	K.S.E
In sample Section: A							
Var.	0.00035	0.00025	0.00015	0.00019	0.00025	0.00016	0.00005
$\bar{X}$	-0.00114	-0.00023	-0.00057	0.00008	-0.00127	-0.00117	0.00069
Intercept	0.00079	0.00071	0.00075	0.00068	0.00079	0.00088	-
Std. Dev	0.01861	0.01585	0.01225	0.01375	0.01567	0.01252	0.00005
Skew	-0.04680	0.31662	0.17296	0.45999	0.03808	-0.06691	0.27163
S.E slope	0.00677	0.00681	0.00684	0.00660	0.00686	0.00666	-
R-SQ	0.20781	0.06238	0.08130	0.11530	0.18284	0.59765	-
Out sample Section: B							
Var.	0.00057	0.00066	0.00023	0.00031	0.00033	0.00025	0.00010
$\bar{X}$	-0.00005	-0.00060	0.00001	0.00003	-0.00014	0.00009	-0.00016
Intercept	-0.00015	-0.00006	-0.00015	-0.00016	-0.00012	-0.00017	-
Std. Dev	0.02393	0.02564	0.01534	0.01764	0.01826	0.01588	0.01019
Skew	0.23597	0.01481	-0.05405	-0.2003	-0.20579	-0.56121	-0.66535
S.E slope	0.00979	0.00938	0.00958	0.00890	0.00956	0.00951	-
R-SQ	0.68041	0.58810	0.00647	0.43948	0.45143	0.01632	-
Whole sample Section: C							
Var.	0.00053	0.00058	0.00022	0.00029	0.00032	0.00023	0.39188
$\bar{X}$	-0.00021	-0.00054	-0.00009	0.00001	-0.00034	-0.00013	-0.00001
Intercept	0.00002	0.00008	0.00002	-0.00005	0.00006	0.00003	-
Std. Dev	0.02310	0.02417	0.01482	0.01700	0.01782	0.01533	0.69117
Skew	0.22448	0.02647	-0.02439	-0.1388	-0.16928	-0.50315	-0.63933
S.E slope	0.00933	0.00898	0.00916	0.00856	0.00916	0.00908	-
R-SQ	0.08250	0.04077	0.03757	0.33543	0.03834	0.01588	-

This table demonstrates that Section A, in sample, and Section C, whole sample, have similar average mean returns, however Section B, out sample, does not. This shows that when the regime changes from "in sample" to "out sample," the values can move from negative to positive, indicating that the market condition for both Shariah-compliant and non-Shariah compliant equities is steady after 2016, compared to 2015 and 2016. All six equities exhibit positive intercept, R-SQ, and Standard Error-values in the in-sample analysis of OLS Regression. Nonetheless, (FATIMA) has the lowest standard error. In the in-sample, the R-SQ value of FFC is 8% when invested through a non-Shariah compliance firm, but it increases to 11% when invested through a Shariah compliant company, indicating stock market regime change behavior. Similarly, the R-SQ value of ENGRO when invested

through a Shariah-compliant firm is 11% in the in-sample, but it increases to 43% when invested across the entire sample. The regression table shows that both Shariah-compliant and non-Shariah compliant companies shows the regime switching behavior but SC companies have more regimes as compared to NSC companies.

1.2 Covariance and Correlation matrix of the Whole Sample

Information for the entire data set is shown in Table below. The correlation between ENGRO and the KSE ALL benchmark return is the lowest, whereas FFBL has the best correlation. The correlation between FFBL and ENGRO is highest while that between AHCL and EFERT is lowest. The correlation matrix is also displayed in Table; the covariance between ENGRO and EFERT is the largest (51.62%), while the covariance between AHCL and EFERT is the lowest (22.17%). With a correlation of 46.82%, ENGRO has the strongest association with the benchmark return; while the least correlated stock is AHCL (27.14%), indicating a weaker relationship.

Covariance and Correlation matrix							
Stocks' Names	A.H.C.L	F.F.B.L	F.F.C	E.N.G.R.O	F.A.T.I.M.A	E.F.E.R.T	KSE ALL
Covariance Matrix							
A.H.C.L	0.00053	0.00016	0.00008	0.00011	0.00011	0.00008	0.00006
F.F.B.L	0.00016	0.00058	0.00017	0.00017	0.00014	0.00014	0.00009
F.F.C	0.00008	0.00017	0.00022	0.00012	0.00009	0.00011	0.00005
E.N.G.R.O	0.00011	0.00017	0.00012	0.00029	0.00011	0.00013	0.00008
FATIMA	0.00011	0.00014	0.00009	0.00011	0.00032	0.00009	0.00006
E.F.E.R.T	0.00008	0.00014	0.00011	0.00013	0.00009	0.00023	0.00005
KSEALL	0.00006	0.00009	0.00005	0.00008	0.00006	0.00005	0.00009
Correlation Matrix							
A.H.C.L	1.00000	0.28093	0.24915	0.27037	0.27337	0.22167	0.27147
F.F.B.L	0.28093	1.00000	0.47259	0.41548	0.31653	0.38400	0.37534
F.F.C	0.24915	0.47260	1.00000	0.48098	0.35285	0.49986	0.32699
E.N.G.R.O	0.27037	0.41548	0.48098	1.00000	0.34931	0.51619	0.46866
FATIMA	0.27337	0.31654	0.35285	0.34931	1.00000	0.32168	0.32589
E.F.E.R.T	0.22167	0.38401	0.49986	0.51618	0.32168	1.00000	0.35013
KSEALL	0.27147	0.37534	0.32699	0.46866	0.32589	0.35013	1.00000

1.3 Asymmetrical stages of market

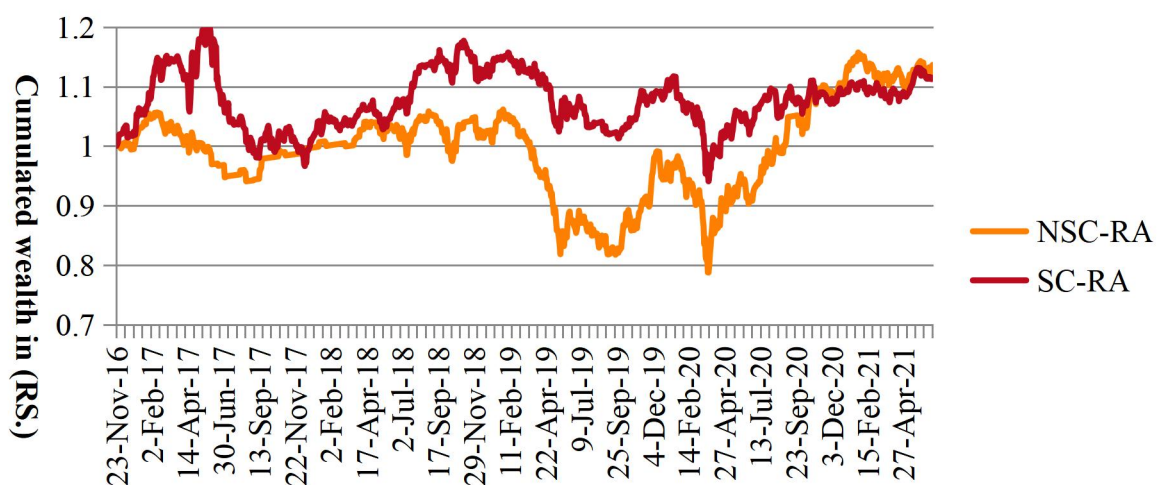
The above table displays the inequality between stock and component returns during different bull and downturn markets. Standard deviations are less and average returns are higher during the bull market period (regime 1) than they are during the subsequent bad market phase (regime 2). To back up our claim about the uneven stock returns described in Table, Four sections show the benchmark and company means ($\bar{X}$) and standard deviations (Std. dev): (Section A) bear period (18 Nov 2015- 30 Dec 2016); (Section B) bull period (02 Jan 2017-23 Jan 2018); (Section C) bear period (24 Jan 2018-26 Dec 2019); and (Section D) bull period (27 Dec 2019-30 June 2021).The benchmark index depicts the stock market's total

movement, which is derived from the sum of all its businesses changes. In table clearly shows that when moving from A to B the mean return changes and also the same when to move from B to C and C to D. The bear and bull market period's changes when moving the parts. This demonstrates an asymmetrical relationship between the stocks.

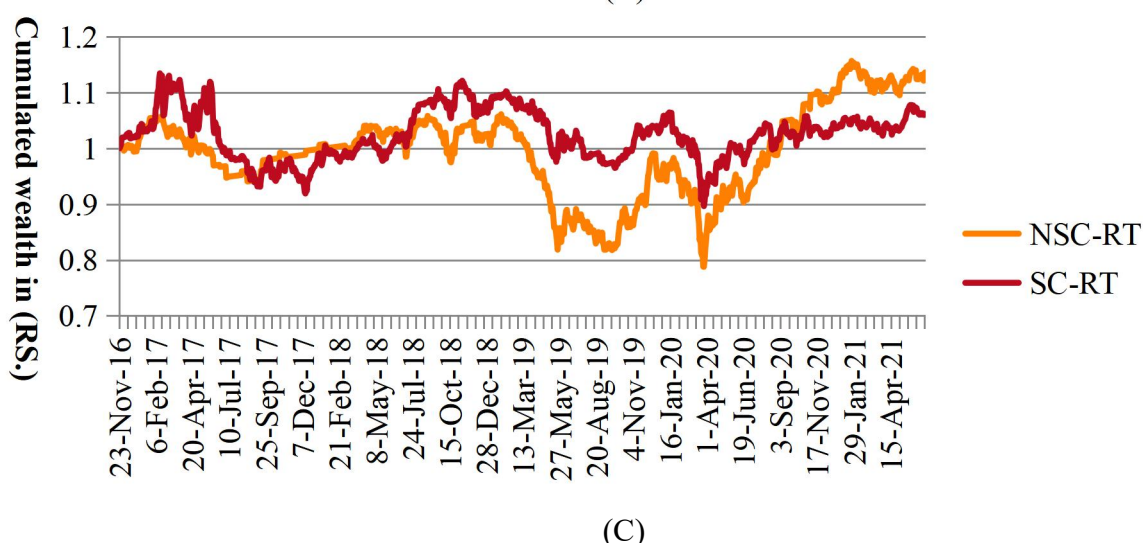
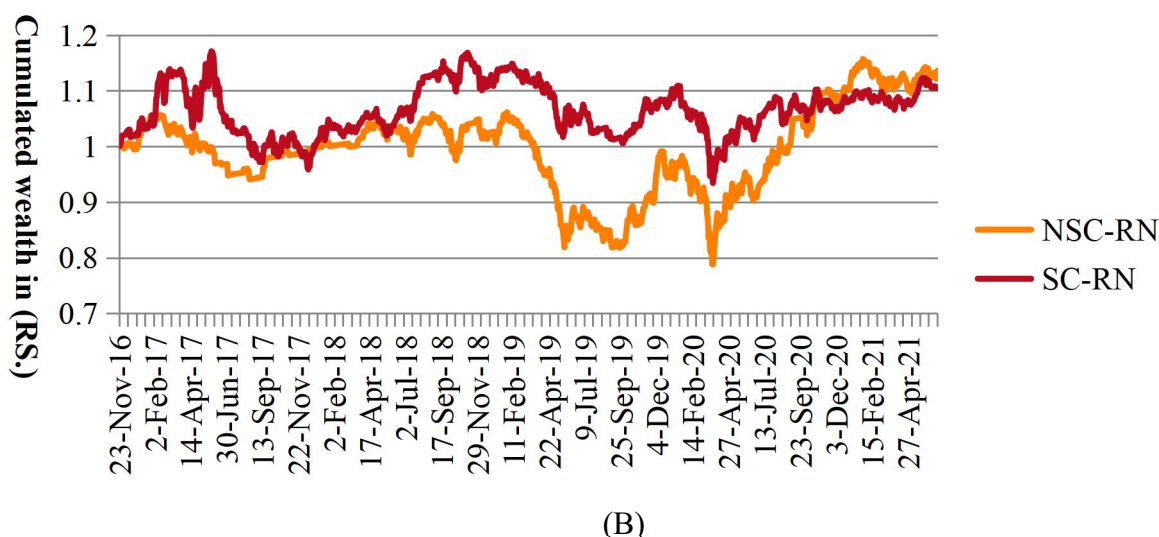
Asymmetrical bear and bull market stages								
Time Period	Section A Bear Stage		Section B Bull Stage		Section C Bear Stage		Section D Bull Stage	
	18 Nov 2015- 30 Dec 2016		02 Jan 2017- 23 Jan 2018		24 Jan 2018- 26 Dec 2019		27 Dec 2019- 30 June 2021	
Stocks' Names	$\bar{X}$	St. Dev	$\bar{X}$	St. Dev	$\bar{X}$	St. Dev	$\bar{X}$	St. Dev
A.H.C.L	-0.00070	0.01803	0.00069	0.01894	-0.00025	0.02291	0.00053	0.02875
F.F.B.L	-0.00027	0.01544	0.00104	0.01983	-0.00154	0.02499	0.00087	0.03041
F.F.C	-0.00041	0.01187	0.00071	0.01689	-0.00027	0.01524	0.00013	0.01472
E.N.G.R.O	0.00042	0.01354	0.00021	0.01933	-0.00022	0.01625	0.00039	0.01844
FATIMA	-0.00076	0.01568	0.00050	0.01977	-0.00051	0.01725	0.00028	0.00096
E.F.E.R.T	-0.00075	0.01270	0.00005	0.01633	0.00009	0.01510	0.00008	0.01664
KSEALL	0.00103	0.00684	0.00329	0.00130	-0.00049	0.00933	0.01161	0.01063

1.4 Shariah-Compliant and Non-Shariah Compliant investor cumulated wealth through RS models:

Shariah-compliant stock investments overlapped with non-Shariah-compliant stock investments, as shown in figure (A). RSM showed that the risk-averse investors' Shariah-compliant stock investments move higher to 3/4th of the observations and slightly downward at the end of the observations, but overall cumulative wealth of risk averse investor is better when invested through Shariah-compliant, which accepts the hypothesis that investment of risk-averse investors through Shariah-compliant stock is better than the Non-Shariah compliant stock in regime-switching models and same in the risk neutral investors case which is shown in figure (B) and also in risk taker investor the investment through RSM in Shariah-compliant stocks has an edge over Non-Shariah stocks.



(A)



In Figures (A), (B), and (C), respectively, the (A) RA investor, (B) RN investor, and (C) RT investor each predict their accumulated wealth after investing 1.00 on the out-sample start date in Shariah-compliant and non-Shariah compliant stocks employing strategies based on Regime switching models.

5. Conclusion

In this study we compare the Shariah-compliant and non-Shariah compliant stocks returns through regime switching model from the period November 18, 2015 to June 30, 2021. Firstly, we divided the data into two samples in-sample and out-sample period. The results of descriptive statistics and OLS regression shows that the SC companies' regimes better as to non-SC fertilizer companies. A single rupee is put into SC and NSC stocks on the out-sample period's first day, 22 November 2016. The stocks fall into one of two categories with respect to volatility: the "bear regime" and "bull regime". The "bull regime" as well as the "bear regime" are shorthand for the first and second regimes, respectively. Each investment's total value is tracked and studied on a daily basis. The regime switching model is used to perform this for the entire out sample period (22 November 2016- 30 June 2021). RSM-based investing in Shariah-compliant assets outperforms those in non-Shariah-compliant stocks when looking at the daily accumulation of wealth. This demonstrates the RS models' ability to deal with market volatility in both positive and unfavorable conditions, which is critical for determining the long-term financial success of investors. All investors, regardless of whether or not they are required to compare their portfolios, can

benefit from this research. As a result, the findings of this research may be used by Pakistani investors to make informed decisions about whether or not to put their money into fertilizer firms that adhere to Shariah law. More empirical research is needed in new and emerging markets to verify the stylized truths previously established in mature markets. These two sorts of market places need to be the focus of future research. Regime-switching models must also be examined and validated for these exchanges. The model described in the thesis may be empirically verified by comparing it to other approaches in Regime Switching Models. Suggestions can be made regarding which method is appropriate for various markets, and you can concentrate your research on either SC or NSC stocks exclusively in fertilizer or other stocks.

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6. References

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