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Risk Appetite Discriminated Investors Wealth Accumulation: Regime-Switching versus Non-Regime-Switching Models-Based Strategies

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ABSTRACT

Main objective of current research is to assess which strategy from Regime-Switching and Non-Regime-Switching Models is better for wealth accumulation by investors who are discriminated based on their risk appetite having portfolio in Sharia-Compliant cement stocks listed on PSX. The sample is consisting of 14-Sharia-Compliant cement stocks which are registered on Pakistan Stock Exchange while the daily closing balances of selected companies are retrieved from different reliable secondary sources of data for the period 18-Nov-2015 to 15-Dec-2021 and the collected data is being processed through statistical tools. The ending wealth attained through Regime-Switching Model of risk-averse investors, risk-neutral investors and risk-taker investors are 1.443, 1.340, and 1.476 respectively which are higher than attained through Non-Regime-Switching and sharp ratios are also better of all investors in RS. Hence, the results indicate that Regime-Switching Strategy is better than Non-Regime-Switching for wealth accumulation. This is very helpful for investors in making investment decisions wisely and policy maker in formulating of policies to rescue the investors from risk. Uniqueness of study derives from focus on risk-appetite investors wealth maximization problem, for which two entirely different models used.



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Introduction

In traditional financial management, mostly theories are based on risk, return and asset price but behavioral elements lacking while there is considerable impact of behavioral factors on investment decision making and on the investors' performance. New concept in finance has developed is "Behavioral Finance" which a branch of "Behavioral Economics" deals with human perceptions regarding risk and return. Based on risk perception/ risk appetite, investors are classified into risk aversion (avoid taking risk), risk seekers (like to take risk) and risk indifferent (don't consider the risk element while making investment decisions). In this case it is confirmed that behaviors have impact on financial decision making (Wong & Wing-Keung, 2020).

For investment, one option is stock exchanges which facilitate both the investors and the firms in achieving their objective of wealth maximization and equity generation respectively. Stock markets/ stock exchanges are the places where already issued shares are being traded, just like NYSE is stock exchange in America and PSX in Pakistan. The main attraction of capital markets is return on investment in the form of stock appreciation and dividend. The conclusion is that return can be depended on previous trend analysis of risk and return (Zoicas-Ienciu, Adrian, 2017). From USA, the researchers establish the relationship between risk and return, risk appetite of each investor is different based on their thinking and behavior. the result reveals that there is positive relationship between recent risk compensation and stock returns while there is negative relationship between previous risk compensation and stock return (He, He & Wen, 2019).

Cement sector is one of the sectors from stock exchange. Now a day, cement industry in Pakistan gets importance due to Govt.'s priority in housing sector, so cement is a basic element in construction industry. The authors of a research have developed a case study on Cement Industry to assess its sustainability. SLR is being done to understand the strength and weakness of the framework and 121-KPIs are being developed (Sangwan et al., 2019).

When we talk about sectors of stock markets, the further segregation of business is Sharia compliant and non-Sharia compliant. . Even in developed world, Sharia Compliant stock is taken as device to diversify portfolio and get better returns. Islamic stock index is consisting of companies which are qualified on Sharia rules and indicate the business activities of said companies on stock market, like in Pakistan KMI (Karachi Meezan Index) and in developed world like Dow Jones Islamic Index. The stock of sharia qualified companies is called Sharia Compliance Stock. The result reveal that there is impact of oil prices change on the index (Mongi, 2019).

Market trends are the situation where market is going up or down, in capital market these trends are termed as bearish and bullish trends. Upward trend is also called as bullish trend and downward trend is call bearish trend. In bullish trend business activities are on peak and chance of return are high while in bearish trend business activities are on declining and investors must face losses on their investments. To analyze the return during these two phases of market "Markov Regime-Switching Model is being used. Through this model we can assess the performance of investors get more benefits to shift their investment decisions by keeping in view the market trends. The regime-switching method is being used which is helpful to see the trends (bearish and bullish) of markets. The relationship between international portfolio returns and market trend is such as return are high when there was bearish trench in market and return was low on bullish trend of market.

The use of Regime-Switching is important in international asset allocation. The result indicate that regime-switching is very important in international asset allocation and portfolio diversification. (Ang & Bekaert, 2002).

Moreover, in a guest editor's introduction, two models are being discussed one is regime switching model and other is Threshold Model. In regime switching model pattern show in different times. On the other hand, in threshold model some values are being set as benchmarks and then results will be compared. These models can be utilized in evaluation of stock performance of any stock exchange (Chan, Hansen, Bruce & Timmermann, 2017). Capital Asset Pricing Model (CAPM) is converting into mathematical equation to test on sharia compliant stock evaluation/ pricing. The data which is used for analysis is taken from 10-Shariah Compliant public limited companies from Malaysia and tenure of data is from 1-Jan-2002 to 31-Dec-2015. The result indicates that proposed Sharia CAPM is applicable to measure risk and return of Islamic firms (Hazny, Hasim & Yusof, 2020).

Further CAPM discussion, the wealth maximization is the goal of investors for which they bear risk and make decisions, they select assets, make portfolios, do review, and keep in touch with stock market to make right decisions at right time. In investment decision, forecasting is a vital tool. Based on previous data/ trend, investor makes decision in right way. Moreover, market trends perform important role in investment decision making and have impact on wealth maximization. The role of forecasting technique like Markowitz approach in investment decision. The method auto regression, the result of a research confirms that prediction tools have impact in investment decisions (Moeini, Bijari, & Khashei, 2019).

In recent times, regimes and non-regimes moles are used in a good way "Using Regime-Switching Models in Sharia Compliant Stocks: Performance Assessment of Investors with Discriminated Risk-Appetite" (Saleem & Ahmad-Zaluki, 2021) and second is "Regime Switching Portfolio Optimization for International Indices: Case of Indian Subcontinent" (Javed, 2020). So, the problem is wealth accumulation by all three types of investors having portfolio of cement stocks. Now it is examining the impact Regime-Switching and Non-Regime-Switching models on wealth accumulation by investors classified based on their risk appetite. Overall, our research follows the pattern of research outlined in top research studies in social sciences (e.g., Anser et al., 2020; Gulzar et al., 2022; Hameed et al., 2019; Iqbal et al., 2021; Masood, Feng, Rasheed, Ali, & Gong, 2021; Naeem, Weng, Hameed, & Rasheed, 2020; Pitafi, Rasheed, Kanwal, & Ren, 2020; Zhang, Wu, & Rasheed, 2020).

Literature Review

No doubt cement sector is very important both for developed and under-developing economies, but cement industry is also a threat for human health and environment. So, its negative impacts are being examined in Pakistan, for this multi-criteria decision-making (MCDM) techniques is used. The result indicates that cement industry ha negative impact on environment and as well as on human health (Zeb, Ali, & Khan, 2019). New concepts in cement sector have developed, the researchers do comparison of all conventional concrete with green concrete which is consisting of earth wastage. The tool of analysis which is used in study is gene expression programing is used which proved that the predictive strength of green concrete (Murad, Imam, Abu Hajar, Habeh,

Hammad & Shawash, 2019). Whereas in 2020, researchers developed a case study on implementation of green building in Gauteng which is a province of South Africa. The theme behind is to find the principles of green building, benefits of it and hurdles in the way of its implantation. The two green building are taken, interviewing technique is being adopted. The result indicates, 1. principles are energy, water efficiency and its environmentally friendly (Masia, Kajimo-Shakantu & Opawole, 2020).

It means, cement industry is very important for economy but adoption of better technologies it make harmless for atmosphere and investment environment. The stock markets in the world have impact on each other based on geopolitical and economic situation and common international investors and basic attraction of stock markets is return on investment. The researcher examine that is there any linkages among stock exchanges. For this, four stock exchanges from Pakistan, India, Bangladesh, and Sri Lanka for period of Jan-2002 to Dec-2018. The result confirms linkages among stock exchanges in long-run (Kumar, 2019).

Stock market and shares always remain attractive for investors but Sharia Compliant stock are getting attention for investors not only from local market as well as from international market as tool for portfolio diversification and higher returns. In a study the researchers examine the Islamic stock is more valuable than conventional in India. The sharp ratio is also used, and result reveals those differences in return of both conventional and Islamic stocks (Alam & Ansari, 2020). Islamic stock index is consisting of companies which are qualified on Sharia rules and indicate the business activities of said companies on stock market, like in Pakistan KMI (Karachi Meezan Index) and in developed world like Dow Jones Islamic Index. The stock of sharia qualified companies is called Sharia Compliance Stock. The examining of relationship between oil prices and Islamic Stock Index (Dow Jones). In year-2020, a study deals with forecasting of alpha of Islamic Indices. The data which is used is taken from 4 from Dow Jones, 1 from Financial Times Stock Exchange, 5 from Morgan Stanley Capital International. The Ordinary Least Square (OLS) is used as method and result shows alpha is generated (Anjum & Rajput, 2021).

From Developed world, the researchers examine the relationship of risk and return for the sake of portfolio optimization. For evaluation/ methodology, mean-variance approach of Markowitz adopted while data is being taken from Indian's NSE, China's SSE, UK's LSE and USA's NYSE from Feb-2005 to Jun-2018. Expected Shortfall of portfolio is equal to expected return, standard deviation and modified expected shortfall of distribution. The result indicates that consistent for all four stock exchanges (Jadhav & Ramanathan, 2019).

Under Regime Switching Model, the investors shift their decision according to market scenario e.g; bearish market and bullish market. To analyze the return during these two phases of market "Markov Regime-Switching Model is being used. Through this model we can assess the performance of investors get more benefits to shift their investment decisions by keeping in view the market trends. Through this research article, the relationship between international stock market and portfolio diversifications. This piece of work sought out portfolio management for USA's investors. The regime-switching method is being used which is helpful to see the trends (bearish and bullish) of markets. The, the researchers exploring the venture capital financing as diversification too by using MGACH-DCC, Markov Switching and Wavelet approaches. Just like Islamic bank's profits and loss criteria, venture financing is also crisis on its equity risk sharing,

the objective is to link PLS investment with portfolio optimization which is confirmed by its study (Jaffar, Dewandaru, & Masih, 2018).

When investors do not make investment decision keeping in view the bearish and bullish trend of the of the market, it means they are using non-regime switching strategy. The researcher examines portfolio optimization and regimes in Indian Subcontinent. The, the data of three stock exchanges: Pakistan's Karachi Stock Exchange-100Index, Indian's Bombay Stock Exchange-100 Index and Bangladesh's Dhaka Stock Exchange while MSCI is used as benchmark. It is confirmed that Asian markets are less efficient and least correlated as compared to international markets during crisis. (Javed. Zubair, Shezad & Hina, 2020).

The portfolio is called combination of different companies' stock, which is helpful in diversifying and minimizing risk. the Islamic stock is being examine as portfolio diversification tool. The co-movement analysis tells whether investment is safe or not during crises times. The results confirm that investment in Islamic stock is tool for portfolio diversification (Antar & Alahouel, 2019).

Data, Variables, and Methodology

The population of my research is consisting of all firms from cement sector of Pakistan Stock exchange (PSX). Cement sector on PSX is consisting of 20-Companies from which 3-Companies are defaulter and 16-Companies are with Sharia Compliance Status and remaining 1-Company is with non-Sharia Compliance status. According to company's profile two companies named JVDC and SMCPL having no cement plant and deal in readymade concrete. That is why sample of my study remained to 14-Sharia Compliant Cement Stocks. In this researcher, secondary data of 14-Sharia Compliant Cement Stocks from Pakistan Stock Exchange is being taken for which Karachi Meezan Index is based. The sample is consisting of all cement firms from cement sector is being used which is also included on KMI All Index. The sample tenure is of 01-Jan-2017 to 31-May-2020. Following 14-Companies qualify on set criteria: 1. Attock Cement Pakistan Limited (ACPL) 2. Bestway Cement Limited (BWCL),3. Cherat Cement Company Limited (CHCC), 4. Dewan Cement Limited (DCL), 5.D.G. Khan Cement Company Limited (DGKC), 6. Fauji Cement Company Limited (FCCL), 7. Fecto Cement Limited (FECTC), 8. Flying Cement Company Limited (FLYNG), 9. Gharibwal Cement Limited (GWLC), 10. Kohat Cement Company Limited (KOHLC), 11. Lucky Cement Limited (LUCK), 12. Maple Leaf Cement Factory Limited (MLCF) 13. Power Cement Limited (POWER), 14. Thatta Cement Company Limited (THCCL),

Econometric Methodology

Based on literature review, the wealth of investors from Sharia-Compliant cement stock of Pakistan is being compared by using regime switching model and non-regime switching model. In Regime Switching Model two probabilities can occur, there are two stages of 1st order Markov process Stage-1 which is denote as Regime-1 in Diagram-3.1 is represented as bull market (in such situation returns are high and market volatility is low) while Stage-2 which is denoted in diagram as Regime-2 which represent bear market (in such situation returns are low and market volatility is high).

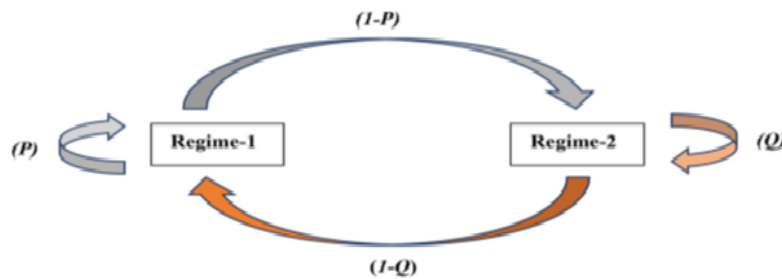


Figure 1 Regime Switching Model

Explanation: In RS, equation-2 & 3 are filtered probabilities while equation-4 represents transformed CAPM. By using MATLAB software, the probabilities of returns of different types of investors will be calculated.

Type of Data and Statistical Analysis

The data which is utilized in this research is consisting of daily closing balance of all selected 14-companies from 18-Nov-2015 to 15-Dec-2021 to calculate daily returns, KSE-All daily closing which is used as benchmarks of said period and KIBOR rate for said period which is used as risk free rate. The data is categorized into three streams for analysis purpose, Whole-Sample Data, In-Sample and Out-Sample. The statistical analysis which will be used like mean, variance, kurtosis, skewness and R2 for all above types of data streams. The data has been collected and analyses the guidelines of previous research in social sciences (Rasheed, Jamad, et al., 2020; Rasheed, Okumus, Weng, Hameed, & Nawaz, 2020; Saleem, Rasheed, Malik, & Okumus, 2021; Yousaf et al., 2014; Zhang, Rasheed, & Luqman, 2019).

Analyses and Results

The data is being divided into two portions, one is called in-sample which is daily closing of 14-Sharia-Compliant Cement Stocks from 18th Nov,2015 to 01-Nov-2016 while the other data stream is called Out-Sample which is daily closing of 14-Sharia Compliant Cement Stocks from 02-Nov-2016 to 15-Dec-2021. The total observations of data are 1,506 from which one observation deleted due to unavailable of data of 17-Nov-2015 as there were no official segregation of Sharia and Non-Sharia stocks, that why total remaining observation are 1,505 from which 335-observation are In-Sample and 1,270-observations are Out-Sample. The analysis techniques which are being used:

1. Statistical measures like Mean, Variance, Standard Deviation, Excess Kurtosis and Skewness are being used for Whole-Sample data, In-Sample, Out-Sample and KSE-All (which is being used as benchmark).
2. OLS Regression statistics computed like Intercept, Slope, Standard Error, R-squared for Whole-Sample, In-Sample and Out-Sample.
3. Covariance and Correlation Matrices are being calculated to gauge the relationship among the Sharia-Compliant cement stocks.
4. Trend chart is being developed (which is based on KSE-100 index which is representative of capital market) to identify the market trends (Bear/Bull) as a result 8-trends of each

(Bear/Bullish) founded and then Mean and Standard Deviation computed for all companies and KSE-ALL.

5. Correlation matrices of all 16-trends (Bear/Bull) are being calculated to see the relationship among Stocks.
6. For Out-Sample data, end-wealth of three types of investors (Risk Averse, Risk-Neutral and Risk-Taker) are computed by using MATLAB (R2018a) in Regime Switching and Non- Regime Switching strategies.
7. The Sharp Ratios are also computed by using MATLAB (R2018A).

The calculation of said statistics are based on 1,505 observations/ daily returns from 18-Nov-2015 to 15-Dec-2021. The means of all 10-companies out of 14-companies are negative even the mean of benchmark (KSE_All) is also in negative but near zero. BWCL, CHCC, FLYNG, and LUCK have positive Mean. But variance & Standard Deviations of all stocks and KSE_All is positive. Because of Kurtosis, ACPL has highest value of 17, and 12-companies are Platykurtic and 3-companies (ACPL, KOHC, POWER) and even benchmark are leptokurtic. Because of skewness, 12-companies have positive values while only 2-companies (ACPL, KOHC) and including benchmark are with negative values.

Dashboard-B, (Table-1) is consisting of Mean, Variance, Standard Deviation, Excess Kurtosis and Skewness of In-Sample of 14-Sharia Compliant Cement Stocks. The calculation of said statistics are based on 235 observations/ daily returns from 18-Nov-2015 to 01-Nov-2016. The means of all 14-companies are positive even the mean of benchmark (KSE_All) is also positive. But variance & Standard Deviations of all stocks and KSE_All is positive. On account of Kurtosis, 12-Companies are Platykurtic, 1-company (POWER) is Mesokurtic, and 1-company (FLYNG) is leptokurtic and benchmark is also leptokurtic. On account of skewness, 12-companies have positive values while only 2-companies (FCCL and THCC) but benchmark is also with positive value.

Dashboard-C, (Table-1) is consisting of Mean, Variance, Standard Deviation, Excess Kurtosis and Skewness of Out-Sample of 14-Sharia Compliant Cement Stocks. The calculation of said statistics are based on 1,270 observations/ daily returns from 02-Nov-2016 to 15-Nov-2021. All 11-companies out of 14-companies are with negative mean even the mean of benchmark (KSE_All) is also in also but the only 3-companies are with positive mean which are CHCC, FLYNG. But variance & Standard Deviations of all stocks and KSE_All is positive. Because of Kurtosis, 11-Companies are Platykurtic, and 3-companies (ACPL, KOHC, and POWER) are leptokurtic and benchmark is also leptokurtic. Because of skewness, 12-companies have positive values while only 2-companies ACPL and KOHC are negative, and benchmark is also with negative value of skewness.

Dashboard-A, having the results of Mean, Variance, Standard Deviation, Excess Kurtosis and Skewness of Whole Sample of 14-Sharia Compliant Cement Stocks' return and return of KSE_All (Which is used as benchmark. Around 71% (i.e., 10 out of 14) of stocks having negative mean including KSE All but are closer to zero. BWCL, CHCC, FLYNG, and LUCK have positive Mean. The variance of all firms including benchmarks is less than 0% while standard deviation is between 1%-4% The Excess Kurtosis statistics reveal that ACPL, KOHC, POWER are Leptokurtic (i.e., Kurtosis Value>3) even the benchmark KSE All is also Leptokurtic which means that they are with positive kurtosis and peaked curves. The other 11-firms are Platykurtic (i.e., Kurtosis<3) which means that they have negative kurtosis and have flatted curves. The 12-Companies having positive values of skewness (i.e., skewness>0) which means these stocks are with long right-tail and lower values, in the contrast 2-Companies and KSE_All are with negative skewness (i.e.,

skewness <0) which means that these stocks having long left-tail with higher values. However, through observing Dashboard-B and C, the story is very interesting almost opposite to the dashboard-A, majority of the companies during sample period are with positive means, variance and standard deviation in Dashboard-B while majority of means are negative in out-sample period of Dashboard-C. The results reveal the all companies (which are included in study) are making higher returns with less volatility in the market during in-sampled period as compared to out-sampled period.

OLS Regression

This dashboard is computed based on whole sampled data of 14-Sharia Compliant Cement Stocks from 18-Nov-2015 to 15-Dec-2021 and data covers 1,505-observations. In calculation Ys are KSE_All index and Xs are daily return of, 5-companies (DCL, DGKC, FCCL, FECTC, MLCF) are with positive intercept, which reflects that these stocks are above market index. While most stocks of 9-companies are below market index. All 14-companies are with positive slope which means there is volatility in returns of all stocks, but LUCK-Company has highest slope which means it is more volatile among all companies and THCCL-company with lowest slope value means it is less volatile amongst all companies. The standard error of mean of all companies are positive and LUCK with lowest SE amongst all companies. R2 indicates how KSE_All variance can be defined through variance of companies return. All companies are with positive R2, but LUCK is with highest R2.

Dashboard-B (Table-2): This dashboard is computed based on In-sampled data of 16-Sharia Compliant Cement Stocks from 18-Nov-2015 to 01-Nov-2016 and data covers 235-observations. In calculation Ys are KSE_All index and Xs are daily return of, in contrary to dashboard-A, all companies of in sampled of Dashboard-B having 5-companies positive intercept, which reflects that these stocks are above market index. All 16-companies are with positive slope which means there is volatility in returns of all stocks, but DGKC-Company has highest slope which means it is more volatile among all companies and GWLC-company with lowest slope value means it is less volatile amongst all companies. The standard error of mean of all companies are positive but THCCL is with highest SE and LUCK with lowest SE amongst all companies. R2 indicates how KSE_All variance can be defined through variance of companies return. All companies are with positive R2, but LUCK is with highest R2 and THCCL with least value amongst 16-companies.

Dashboard-C (Table-2): This dashboard is computed based on Out-sampled data of 16-Sharia Compliant Cement Stocks from 02-Nov-2016 to 15-Dec-2021 and data covers 1,270-observations. In calculation Ys are KSE_All index and Xs are daily return of, in contrary to Dashboard-B, 12 companies of Out-sampled of Dashboard-C having negative intercept, which reflects that these stocks are above market index while 4-companies (DCL, DGKC, FECTC, MLCF) are with negative intercept which indicates that return of these companies are below the benchmark (KSE_All). All 14-companies are with positive slope which means there is volatility in returns of all stocks, but LUCK-Company has highest slope which means it is more volatile among all companies and JVDC-company with lowest slope value means it is less volatile amongst all companies. The standard error of mean of all companies are positive but MLCF with lowest SE amongst all companies. R2 indicates how KSE_All variance can be defined through variance of companies return. All companies are with positive R2, but LUCK is with highest R2 amongst 14-companies.

The OLS-Regression analysis, which is also part of CAPM, reveals all stocks have minor values and only 31% have positive intercept from which FECTC have highest value of intercept with less SE. The slope of all stocks is minor and positive whereas LUCK has highest among all companies.

In-Sample, the values of intercept of all stocks turned into positive while in out-sample, the intercept of all stocks turned into negative except DCL, DGKC, FECTC, MLCF. In Whole-Sample, the R2 of LUCK is highest with 49% more correlated with benchmark.

In-sampled calculation like means, standard deviations are applied to predict regimes and OLS variables like intercept, slope and standard error are applied in calculation of covariance matrix of the study. For verifying the stability/ consistency of parameters, results of in-sample are compared with out-sample which confirm the consistency of parameters. Overall, our study has followed analyses techniques as discussed in previous social science research studies (Kanwal, Pitafi, Rasheed, Pitafi, & Iqbal, 2022; Khan, Liu, Khan, Liu, & Rasheed, 2020; Luqman, Masood, Shahzad, Imran Rasheed, & Weng, 2020; Rasheed, Malik, et al., 2020; Rasheed, Weng, Umrani, & Moin, 2021).

Identification of Bullish/ Bearish Trends

To identify the bearish and bullish trend, the data of KSE-100 index is used from 18-Nov-2015 to 15-Dec-2021, as a result following trend chart attained:



Figure 2 Graph of KSE-100 Index

Mean & Standard Deviation of Regimes

Forecasting of Out-Sampled Data

The criteria of forecasting of out-sampled data is to invest Rs. 1 initially from start date of 02-Nov-2016 to the end of out-sampled period 15-Dec-2021 and observe the results of different types of investors (Risk-Averse/Risk-Neutral/Risk-Taker) by using to different Regime-Switching Based Model and Non-Regime Switching Based Model.

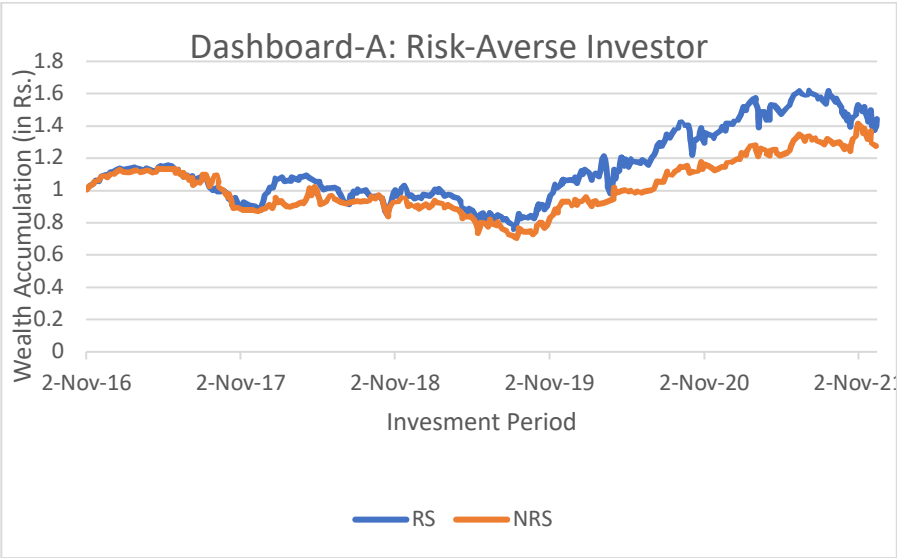


Figure 3. Wealth Accumulation by Risk-Averse Investor

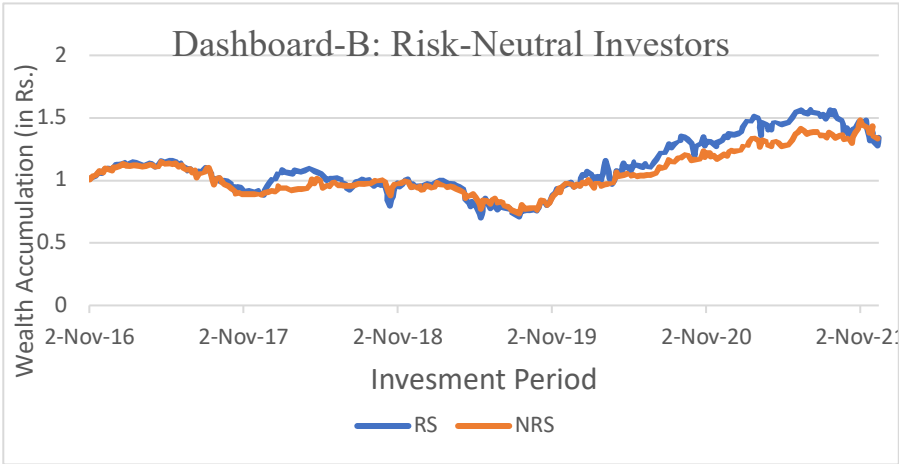


Figure 4. Wealth Accumulation by Risk-Neutral Investor

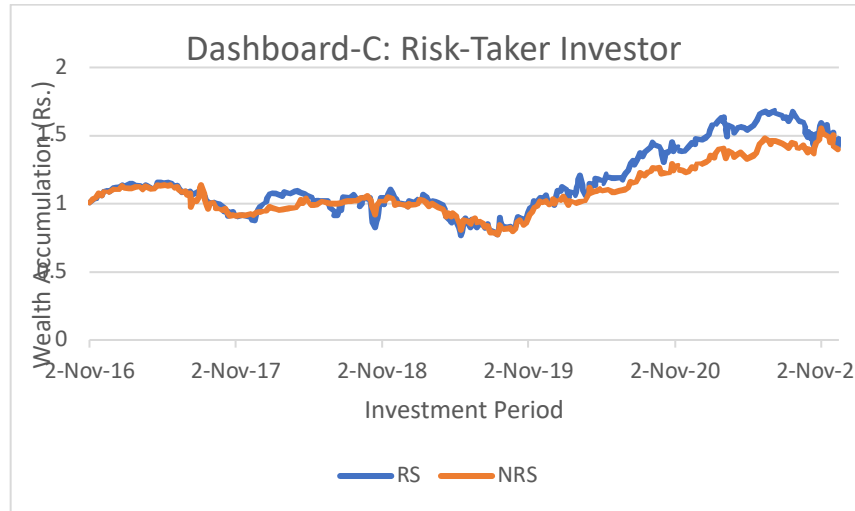


Figure 4. Wealth Accumulation by Risk-Taker Investor

In short, we can see through diagrams that about 65% of the investment periods, regime-switching and non-regime-switching remaining parallel but after that the wealth accumulation by regime switching turn into better mode in comparison of non-regime switching model/strategy.

Diagram-2: It is comparison of daily wealth accumulated by three types of investors discriminated based on their risk appetite like Risk-Averse, Risk-Neutral and risk taker as well as it is also comparison of daily wealth attained through using two model-based investment strategies like Regime-Switching and Non-Regime-Switching. The diagram reflected that about 65% of out sampled period the returns of all types of investors and both types of investment strategies remaining parallel. But after that the wealth accumulation of all types of investors become better in Regime-Switching Model as compared to non-regime switching model.

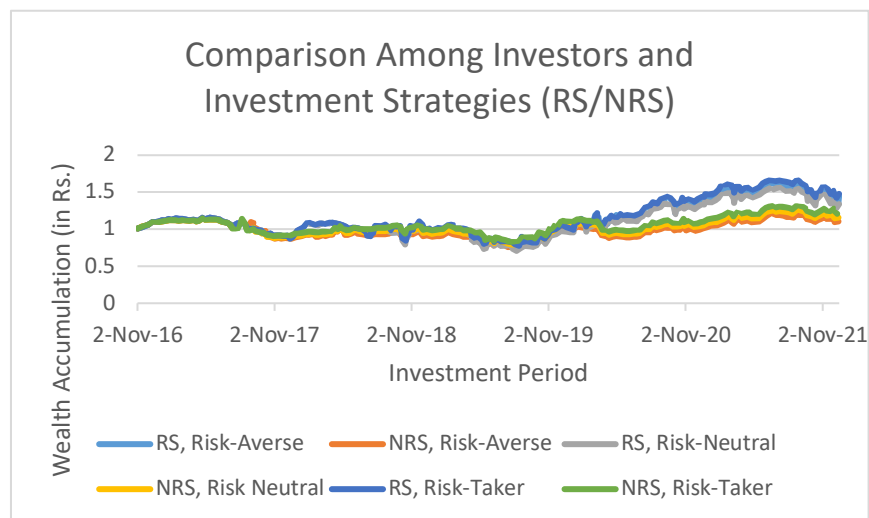


Figure 5. Comparison of Wealth Accumulation of All Investors

In above table of summary, it is very clear that Ending wealth obtained through Regime-Switching is far better than Non-Regime-Switching, as Risk-inverse ending wealth is 44% better than wealth attained through non-regime-switching strategy, Risk-neutral ending wealth is 34% better than wealth attained through non-regime-switching strategy and likewise Risk-taker ending wealth is 48% better than wealth attained through non-regime-switching strategy. Moreover, it is also reflected that returns in regime-switching having relationship Risk-Taker>Risk-Averse>Risk-Neutral while in non-regime-switching it is Risk-Taker>Risk-Neutral>Risk-Averse.

Models Forecasting	Ending Wealth of Investors (in Rs.) / Sharp Ratio		
	Risk Averse Investor	Risk Neutral Investor	Risk Taker Investor
Regime-Switching (RS)	1.443000	1.340500	1.476500
Sharpe Ratio (RS)	0.100500	0.100500	0.100500
Non-Regime-Switching (NRS)	1.277300	1.336000	1.402200
Sharpe Ratio (NRS)	0.000000	0.000000	0.000000

Table 1.

Shape ratio tells us the risk associated with investment in comparison of risk-free rate. In Regime-Switching returns are greater than risk free rate while in non-regime-switching returns are equal to risk free rate. (in this study we have taken KIBOR-Monthly as risk free rate.

As my analysis of data has completed and results are presented in chapter-3 of The. Now, the discussion and interpretation of results are as following According to Table-4.1, the statistical descriptive analysis reveals that mean of means of majority of companies on Whole-Sample data are negative, they are 79% of total companies and even their benchmark is also having negative mean. But the variance, standard deviation, of all stocks are positive. The kurtosis of majority companies-12 is Platykurtic (78%) while 2-companies are with leptokurtic and only 2-companies' kurtosis is Mesokurtic. But In-Sampled statistics revealed that all companies have positive mean and even their benchmark is also having positive mean. And the variance, standard deviation, of all stocks are positive. The kurtosis of majority companies-12 is Platykurtic (87.5%) while 1-companies are with leptokurtic and only 1-companies' kurtosis is Mesokurtic. While Out-Sampled statistics revealed that majority of companies-11, (78%) have negative mean and even their benchmark is also having negative mean. And the variance, standard deviation, of all stocks are positive. The kurtosis of majority companies-11 is Platykurtic (78.5%) while 2-companies are with leptokurtic and only 1-companies' kurtosis is Mesokurtic. The overall result of statistical descriptive analysis reveals that the in-Sample period (18 Nov 2015 – 01 Nov 2016) remain good for investors where mostly companies' return is good as compared to out-sampled period. The benchmark is also has return during in-sampled period and has negative return during out-sampled period.

According to Table-4.2 which is consisting of OLS-regression (intercept, slope, standard error and R²) calculations reveal that during sample period intercept is positive where stocks return are above benchmarks and volatility is low in contrary out-sample period results reveal those stocks in out-sampled period returns are under benchmark of market with high volatility.

According to Table-4.3, covariance and correlation matrices founded which reflect that there is relationship among stocks as well as positive relationship. The reason behind this positive relationship is that all 14-companies are from same sector which is 'cement sector'.

As per Table-4.4, which is consisting of mean and standard deviations of 8-market trends (4-Bearish and 4-Bullish). This trend is being attained from trend diagram of KSE-100 Index from 18 Nov 2015 – 15 Dec-2021. The Regime-I (Bullish Period) 18 Nov 15 – 29 May 17, the regime-II (Bearish Period) 30 May 17 – 19 Dec 17, The regime-III (Bullish Period) 20 Dec 17 – 13 Apr 18, the regime-IV (Bearish Period) 14 Apr 18 – 16 Aug 19, The Regime-V (Bullish Period) 17 Aug 19 – 24 Jan 20, the regime-VI (Bearish Period) 26 Jun 20 – 25 Mar 20. The regime-VII (Bullish Period) 26 Mar 20 – 21 Jun 21, the regime-VIII (Bearish Period) 22 Jun 21 – 15 Dec 21. The mean and standard deviation confirms that the assessment through trend graph is correct as means of bullish periods are positive along with small values of S.D. while means of bearish periods are negative along with large S.D. in comparison. In table-5 of said 8-periods also calculated which means companies and market benchmark are correlated.

From point 4.4.1 to 4.4.3 of chapter-3, for prediction purpose, out-sampled date (02-Nov-2016 to 15-Dec-2021), Rs. 1.00 is being invested and data put into MATLAB (R2018a) by using regime-switching and non-regime switching models. The result forecasting of daily return calculation of different investors discriminated on the basis risk-appetite, are generated, and convert them into trend diagrams which reveals that Risk-Averse, Risk-Neutral and Risk-Taker daily wealth through Regime-Switching is better than that of daily wealth attained through Non-Regime Switching Model. In the same way, the ending wealth of all investors are also better in Regime-Switching Model in comparison of No-Regime-Switching Model. The Sharp ratios of all three investors are also better in Regime-Switching as compared to No-Regime-Switching Model.

Hypotheses Status based on Results

Hence all hypothesis of the study is decided below:

Hypothesis 1: Daily returns of Risk-Averse Investor are better though Regime-Switching Model Based Strategy as compare Non-Regime Switching Based Strategy.

(Decision: Yes, H1 is accepted that Daily returns of Risk-Averse Investor are better though Regime-Switching Model Based Strategy as compare Non-Regime Switching Based Strategy.)

Hypothesis 2: Daily returns of Risk-Neutral Investor are better though Regime-Switching Model Based Strategy as compare Non-Regime Switching Based Strategy.

(Decision: Yes, H2 is accepted that Daily returns of Risk-Neutral Investor are better though Regime-Switching Model Based Strategy as compare Non-Regime Switching Based Strategy.)

Hypothesis 3: Daily returns of Risk-Taker Investor are better though Regime-Switching Model Based Strategy as compare Non-Regime Switching Based Strategy.

(Decision: Yes, H3 is accepted that Daily returns of Risk-Taker Investor are better though Regime-Switching Model Based Strategy as compare Non-Regime Switching Based Strategy.)

Hypothesis 4: Ending wealth of Risk-Averse Investor is better through Regime-Switching Model Based Strategy as compare Non-Regime Switching Based Strategy.

(Decision: Yes, H4 is accepted that Ending wealth of Risk-Averse Investor is better through Regime-Switching Model Based Strategy as compare Non-Regime Switching Based Strategy.)

Hypothesis 5: Ending wealth of Risk-Neutral Investor is better through Regime-Switching Model Based Strategy as compare Non-Regime Switching Based Strategy.

(Decision: Yes, H5 is accepted that Ending wealth of Risk-Neutral Investor is better through Regime-Switching Model Based Strategy as compare Non-Regime Switching Based Strategy.)

Hypothesis 6: Ending wealth of Risk-Taker Investor is better through Regime-Switching Model Based Strategy as compare Non-Regime Switching Based Strategy.

(Decision: Yes, H6 is accepted that Ending wealth of Risk-Taker Investor is better through Regime-Switching Model Based Strategy as compare Non-Regime Switching Based Strategy.)

Hypothesis 7: Sharpe Ratio of Risk-Averse Investor is better through Regime-Switching Model Based Strategy as compare Non-Regime Switching Based Strategy.

(Decision: Yes, H7 is accepted that Sharpe Ratio of Risk-Averse Investor is better through Regime-Switching Model Based Strategy as compare Non-Regime Switching Based Strategy.)

Hypothesis 8: Sharpe Ratio of Risk-Neutral Investor is better through Regime-Switching Model Based Strategy as compare Non-Regime Switching Based Strategy.

(Decision: Yes, H7 is accepted that Sharpe Ratio of Risk-Neutral Investor is better through Regime-Switching Model Based Strategy as compare Non-Regime Switching Based Strategy.)

Hypothesis 9: Sharpe Ratio of Risk-Taker Investor is better through Regime-Switching Model Based Strategy as compare Non-Regime Switching Based Strategy.

(Decision: Yes, H8 is accepted that Sharpe Ratio of Risk-Taker Investor is better through Regime-Switching Model Based Strategy as compare Non-Regime Switching Based Strategy.)

Interpretation of Research Objectives based on Results

1. To analyze the impact of Regime-Switching Model on wealth accumulation of risk appetite discriminated investors. (On the basis of results, it is confirmed that Regime Switching strategy supplement into the wealth accumulation of investors.)
2. To analyze the impact of Non-Regime-Switching Model on wealth accumulation of risk appetite discriminated investors. (On the basis of results, it is confirmed that Non-Regime Switching strategy is less effective for wealth accumulation of investors.)
3. To evaluate which model is better for wealth accumulation by the investors from Regime-Switching and Non-Regime-Switching Models. (On the basis of results, it is confirmed that Regime Switching strategy is more effective for wealth accumulation of investors as compared to Non-Regime Switching Strategy)

Interpretation of Research Objectives based on Results.

1. What is the impact of Regime-Switching Model on wealth accumulation of risk appetite discriminated investors? (Results of my analysis reveals that investors who follow Regime Switching Model accumulate more wealth.)
2. What is the impact of Non-Regime-Switching Model on wealth accumulation of risk appetite discriminated investors? (Results of my analysis reveals that investors who follow Non-Regime Switching Model accumulate less wealth.)

3. Which model is better for wealth accumulation by the investors from Regime-Switching and Non-Regime-Switching Models? (Results of my analysis reveals that investors who follow Regime Switching Model accumulate more wealth as compared to Non-Regime Switching Model).

Conclusion and Discussion:

On regime-switching and non-regime-switching for Sharia and Non-Sharia Compliant Stocks studies are few one is of (Javed,2020) and second is of (Saleem & Ahmad-Zaluki, 2021) which is non-Automobile sector, and my study is on cement sector while still there are 32-sectors on which same study can be executed. Secondly, for further future research cost of transaction like bid-ask spread, duties and commission can be added for more realistic results. This Research will be beneficial for both investors in making right investment decision and Govt. in formulating policies to rescue the interest of investors in unseen events. Moreover, this research will open a new window of knowledge for new researchers and scholars. Throughout our manuscript, we have followed the pattern of social science research papers (Moin, Omar, Wei, Rasheed, & Hameed, 2021; Nisar, Rasheed, & Qiang, 2018; Sattar, Rasheed, Khan, Tariq, & Iqbal, 2017; Yousaf, Rasheed, Hameed, & Luqman, 2019).

References

- Alam, M., & Ansari, V. A. (2020). Are Islamic indices a viable investment avenue? An empirical study of Islamic and conventional indices in India. *International Journal of Islamic and Middle Eastern Finance and Management*, 13(3), 503–518. <https://doi.org/10.1108/imefm-03-2019-0121>
- Ang, A., & Bekaert, G. (2002). International Asset Allocation with Regime Shifts. *The Review of Financial Studies*, 15(4), 1137-1187. doi:10.1093/rfs/15.4.1137
- Ang, A., & Bekaert, G. (2004). How Regimes Affect Asset Allocation. *Financial Analysts Journal*, 60(2), 86-99. doi:10.2469/faj.v60.n2.2612
- Anjum, N., & Rajput, S. K. O. (2020). Forecasting Islamic equity indices alpha. *International Journal of Islamic and Middle Eastern Finance and Management*, 14(1), 183–203. <https://doi.org/10.1108/imefm-02-2019-0068>
- Anser, M. K., Zaigham, G. H. K., Imran Rasheed, M., Pitafi, A. H., Iqbal, J., & Luqman, A. (2020). Social media usage and individuals' intentions toward adopting Bitcoin: The role of the theory of planned behavior and perceived risk. *International journal of communication systems*, 33(17), e4590.
- Antar, M., & Alahouel, F. (2019). Co-movements and diversification opportunities among Dow Jones Islamic indexes. *International Journal of Islamic and Middle Eastern Finance and Management*, 13(1), 94–115. <https://doi.org/10.1108/imefm-04-2018-0137>
- Chang, Y.-S., Yue, Z., Qureshi, M., Rasheed, M. I., Wu, S., & Peng, M. Y.-P. (2022). Residents' waste mobile recycling planned behavior model: the role of environmental concern and risk perception. *International Journal of Emerging Markets*(ahead-of-print)
- Chan, K.-S., Hansen, B. E., & Timmermann, A. (2017). Guest Editors' Introduction: Regime Switching and Threshold Models. 159-161. DOI: 10.1080/07350015.2017.1236521
- related to student engagement and creativity: investigating through the lens of intrinsic motivation. *Behaviour & Information Technology*, 41(11), 2283-2293.

- Hameed, Z., Khan, I. U., Sheikh, Z., Islam, T., Rasheed, M. I., & Naeem, R. M. (2019). Organizational justice and knowledge sharing behavior: The role of psychological ownership and perceived organizational support. *Personnel Review*.
- Hazny, M. H., Mohamad Hasim, H., & Yusof, A. Y. (2020). Mathematical modelling of a shariah-compliant capital asset pricing model. *Journal of Islamic Accounting and Business Research*, 11(1), 90–109. <https://doi.org/10.1108/jiabr-07-2016-0083>
- He, Z., He, L., & Wen, F. (2019). Risk compensation and market returns: The role of investor sentiment in the stock market. *Emerging Markets Finance and Trade*, 55(3), 704-718. DOI: 10.1080/1540496x.2018.1460724
- Iqbal, J., Ahmad, Z., Akhtar, S., & Ismail, H. (2020). Regime Switching Portfolio Optimisation for International Indices: Case of Indian Subcontinent. *Pakistan Journal of Social Sciences (PJSS)*, 40(1), 205-226.
- Iqbal, Javed & Ahmad, Zubair & Akhtar, Shahzad & Ismail, Hina. (2020). Regime Switching Portfolio Optimisation for International Indices: Case of Indian Subcontinent. 206.
- Iqbal, J., Yu, D., Zubair, M., Rasheed, M. I., Khizar, H. M. U., & Imran, M. (2021). Health consciousness, food safety concern, and consumer purchase intentions toward organic food: The role of consumer involvement and ecological motives. *SAGE Open*, 11(2), 21582440211015727.
- Jadhav, D., & Ramanathan, T. (2019). Portfolio optimization based on modified expected shortfall. *Studies in Economics and Finance*, 36(3), 440–463. <https://doi.org/10.1108/sef-05-2018-0160>
- Jaffar, Y., Dewandaru, G., & Masih, M. (2017). Exploring portfolio diversification opportunities through venture capital financing: Evidence from MGARCH-DCC, Markov switching, and wavelet approaches. *Emerging Markets Finance and Trade*(just-accepted).DOI: 10.1080/1540496X.2016.1277420
- Kanwal, S., Pitafi, A. H., Rasheed, M. I., Pitafi, A., & Iqbal, J. (2022). Assessment of residents' perceptions and support toward development projects: A study of the China–Pakistan Economic Corridor. *The Social Science Journal*, 59(1), 102-118.
- Khan, S. U., Liu, X., Khan, I. U., Liu, C., & Rasheed, M. I. (2020). Assessing the investors' acceptance of electronic stock trading in a developing country: the Mediating role of perceived risk dimensions. *Information Resources Management Journal (IRMJ)*, 33(1), 59-82.
- Kuldip Singh Sangwan, Vikrant Bhakar, Abhijeet K. Digalwar, (2019) "A sustainability assessment framework for cement industry – a case study", *Benchmarking: An International Journal*, <https://doi.org/10.1108/BIJ-01-2018-0021>
- Kumar Singla, H. (2019). A comparative analysis of long-term performance of construction and non-construction IPOs in India. *Engineering, Construction and Architectural Management*, 26(10), 2447–2473. <https://doi.org/10.1108/ecam-01-2019-0009>
- Kumar, R. (2019). Does trade interdependency lead linkages between stock markets? A case of South Asian countries. *International Journal of Emerging Markets*, 15(3), 490–506. <https://doi.org/10.1108/ijjoem-08-2018-0446>
- Luqman, A., Masood, A., Shahzad, F., Imran Rasheed, M., & Weng, Q. (2020). Enterprise social media and cyber-slacking: an integrated perspective. *International Journal of Human–Computer Interaction*, 36(15), 1426-1436.
- Masia, T., Kajimo-Shakantu, K., & Opawole, A. (2020). A case study on the implementation of green building construction in Gauteng province, South Africa. *Management of*

- Environmental Quality: An International Journal, 31(3), 602–623.
<https://doi.org/10.1108/meq-04-2019-0085>
- Masood, A., Feng, Y., Rasheed, M. I., Ali, A., & Gong, M. (2021). Smartphone-based social networking sites and intention to quit: self-regulatory perspective. *Behaviour & Information Technology*, 40(11), 1055-1071.
- Moeini Najafabadi, Z., Bijari, M., & Khashei, M. (2019). Making investment decisions in stock markets using a forecasting-Markowitz based decision-making approaches. *Journal of Modelling in Management*, 15(2), 647–659. <https://doi.org/10.1108/jm2-12-2018-0217>
- Moin, M. F., Omar, M. K., Wei, F., Rasheed, M. I., & Hameed, Z. (2021). Green HRM and psychological safety: How transformational leadership drives follower's job satisfaction. *Current issues in Tourism*, 24(16), 2269-2277
- Mongi, A. (2019). The global influence of oil futures-prices on Dow Jones Islamic stock indexes. *International Journal of Emerging Markets*, 14(4), 523–549. <https://doi.org/10.1108/ijoem-11-2017-0471>
- Mongi, A. (2019). The global influence of oil futures-prices on Dow Jones Islamic stock indexes. *International Journal of Emerging Markets*, 14(4), 523–549. <https://doi.org/10.1108/ijoem-11-2017-0471>
- Murad, Y., Imam, R., Abu Hajar, H., Habeh, D., Hammad, A., & Shawash, Z. (2019). Predictive compressive strength models for green concrete. *International Journal of Structural Integrity*, 11(2), 169–184. <https://doi.org/10.1108/ijsi-05-2019-0044>
- Naeem, R. M., Weng, Q., Hameed, Z., & Rasheed, M. I. (2020). Ethical leadership and work engagement: A moderated mediation model. *Ethics & Behavior*, 30(1), 63-82.
- Nisar, S. K., Rasheed, M. I., & Qiang, W. (2018). They can't safeguard you when they are under stress: An exploratory study on issues and problems of job stress in police. *International Journal of Police Science & Management*, 20(2), 124-133.
- Pitafi, A. H., Rasheed, M. I., Kanwal, S., & Ren, M. (2020). Employee agility and enterprise social media: The Role of IT proficiency and work expertise. *Technology in Society*, 63, 101333.
- Rasheed, M. I., Jamad, W. N., Pitafi, A. H., & Iqbal, S. M. J. (2020). Perceived compensation fairness, job design, and employee motivation: The mediating role of working environment. *South Asian Journal of Management*, 14(2), 229-246.
- Rasheed, M. I., Malik, M. J., Pitafi, A. H., Iqbal, J., Anser, M. K., & Abbas, M. (2020). Usage of social media, student engagement, and creativity: The role of knowledge sharing behavior and cyberbullying. *Computers & Education*, 159, 104002.
- Rasheed, M. I., Okumus, F., Weng, Q., Hameed, Z., & Nawaz, M. S. (2020). Career adaptability and employee turnover intentions: The role of perceived career opportunities and orientation to happiness in the hospitality industry. *Journal of Hospitality and Tourism Management*, 44, 98-107.
- Rasheed, M. I., Weng, Q., Umrani, W. A., & Moin, M. F. (2021). Abusive supervision and career adaptability: The role of self-efficacy and coworker support. *Human Performance*, 34(4), 239-256.
- Saleem, S., Rasheed, M. I., Malik, M., & Okumus, F. (2021). Employee-fit and turnover intentions: The role of job engagement and psychological contract violation in the hospitality industry. *Journal of Hospitality and Tourism Management*, 49, 385-395.
- Saleem, H. M. N., & Ahmad-Zaluki, N. A. (2021). Using regime-switching models in Sharia-compliant stocks: performance assessment of investors with discriminated risk-appetite. *Nankai Business Review International*, ahead-of-print(ahead-of-print).

- Sattar, M. A., Rasheed, M. I., Khan, I. U., Tariq, H., & Iqbal, J. (2017). Why adaptable individuals perform better: The role of orientation to happiness. *Australian Journal of Career Development*, 26(3), 134-141.
- Wong, W. K. (2020). Review on behavioral economics and behavioral finance. *Studies in Economics and Finance*, 37(4), 625–672. <https://doi.org/10.1108/sef-10-2019-0393>
- Yousaf, S., Humayon, A. A., Rasheed, M. I., Ahmed, H. M., & Danish, R. Q. (2014). Factors affecting retention of female employees in organizations. *Journal of Basic and Applied Scientific Research*, 4(7), 1-9.
- Yousaf, S., Rasheed, M. I., Hameed, Z., & Luqman, A. (2019). Occupational stress and its outcomes: the role of work-social support in the hospitality industry. *Personnel Review*.
- Zhang, Y., Rasheed, M. I., & Luqman, A. (2019). Work–family conflict and turnover intentions among Chinese nurses: The combined role of job and life satisfaction and perceived supervisor support. *Personnel Review*.
- Zhang, Y., Wu, S., & Rasheed, M. I. (2020). Conscientiousness and smartphone recycling intention: The moderating effect of risk perception. *Waste Management*, 101, 116-125.
- Zoicas-Ienciu, Adrian, (2017). What Drives Trend-Following Profits? Available at SSRN: <https://ssrn.com/abstract=2944679> or <http://dx.doi.org/10.2139/ssrn.2944679>