Impact of Heterogeneity in The Investment Horizons on Portfolio Diversification; impact of Islamic finance on the growth of agribusiness and small and medium-sized enterprises (SMEs) in Pakistan' An Empirical Analysis in the Perspective of Pakistani Investors

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Abstract

This study investigated the impact of Islamic finance on the growth of agribusiness and small and medium-sized enterprises (SMEs) in Pakistan. This study involved the empirical analysis of four stock markets to give Pakistani investors the most reliable information related to their investment in these stock markets. The period of 2013 to 2019 was selected for the investigation, and in this research, the most reliable and modern techniques are used for analysis. Those techniques are MGARCH-DCC and CWT. Analysis was done using the software MATLAB and Microfit 5.5. This software has provided us with results based on the settled objectives, such as whether the stock markets of China, India, and Bangladesh benefit Pakistani investors if they diversify their investment portfolios in these stock markets. Another objective included analyzing which type of investment horizon (short-term or long-term) is more suitable for these investors to get the higher international portfolio diversification benefits. To evaluate whether Pakistani investors should invest in Bangladesh, China, or Indian stock exchanges to obtain international portfolio

diversification advantages, it is seen that investing in the Chinese stock market would be a better option for Pakistani investors. To investigate whether international portfolio diversification benefits change given different investor stockholding periods analysis through CWT confirms that there seem to be yellow spots in the series of short-term investment horizons (e.g., four to eight days, eight to sixteen days) in all three stock markets separately indicating that there are more benefits in investing for short term investment horizons ignoring the long term one because there seems no any evidence or correlations in the figures regarding investment in long term horizons.

Keywords: International portfolio diversification, short term investment, horizons and long term investment horizons.

Introduction

Stock markets, investment horizons and international portfolio diversification are the major focus of this investigation. Now-a-days stock markets are known to be the home of investors. Investing in stocks is like the ownership of the investment company. It is something that no other investment vehicle can provide. A Capital market is defined as a market whereby securities such as bonds, stocks are bought and sold by the investors. The main function capital markets perform is that these markets allow effective transfer of funds between borrower and the lender (The Economic Times, 2019). People attach great importance to investment because investment is the main means of a country's economic growth and development.

It is analyzed in the financial markets by Beber et al., (2018) that those agents incite the heterogeneity who have very different consumption requirements, manifold levels of trust and risk tolerance, varied incorporation of information, organizational constraints and heterogeneous belief. There is a close linkage of these heterogeneities to mixed perceptions towards the investment horizon. Such as due to the negative news short-term agent is influenced to sell the stock, whereas the long-term agent may observe this news as an opportunity to buy. Because it is rationalizing from that the news will be having a temporary bearing on the market. Therefore, here it is investigated that horizon heterogeneity is the result of heterogeneous perceptions.

Regardless of above perceptions there is no hard rule that these always work in this context. In order to gain maximum returns with least risks, investors bifurcate their investments that is said to be the portfolio diversification and the basis is to inspect the impacts of heterogeneity in investment horizons on diversified portfolios of Pakistani investors.

The coexistence of various frequency ranges proves different investment horizons, and each range must match the corresponding time period. As the term time period is a duration consisting of a given number of trading days. The investment term is the number of trading days that the investor holds the asset. Trading frequency refers to the number of complete cycles in which assets complete transactions within a period of time. Volatility is the indicator that shows the difference between asset returns and expected returns (Chen & Li 2016).

Investment means increasing capital expenditure and helping to build economy healthier. An investment decision of an individual investor is the trade between instant consumption and deferred consumption in order to enjoy greater utilization in the coming times. Reilly and Brown (2011) define investment as a financial commitment over a period of time with the

purpose of achieving a certain amount of return that will allow investors in the investment fund to compensate for the period of time relative to the expected inflation rate during the investment period and also for the risks involved.

Chen and Li (2016) accentuate that heterogeneity may be related to portfolio goals, modeling techniques, trading frequency, investment strategies, herd behavior, speculative intent and momentum trading. Of course, incomplete information and transaction costs tend to exacerbate differences among investors. Consequently, investors often focus on certain instruments that trade in a particular market during a given investment period. Therefore, it is not surprising that many investors focus on certain market developments that may affect short-term price changes and volatility, while others emphasize those factors that may cause long-term price changes and volatility. Investors' emphasis on the development of specific markets in a specific period will definitely affect their market prospects. Of course, this investor is not prevented from adjusting his attention and scope of observation over time.

Review of previous studies

Recently Guesmi et al., (2019) have explored the properties of Bitcoin within the financial marketplace. Authors use multivariate GARCH specifications to determine the effects of conditional cross and volatility spillovers in between financial indicators and Bitcoin. The results show that there comes significant returns and volatility spillovers confirming all of the models used in this research but the main finding suggests that there is a best-fit model in order to model various financial assets with regards to the joint dynamics that is VARMA (1,1)-DCC-GJR-GARCH (proposed by Glosten et al., 1993). It is also shown that those hedging strategies decrease a great deal of portfolio's risks which are comprised of gold, oil, equities and Bitcoin apart from those which include oil, gold and equities only.

Bergin and Pyun (2016) have studied the behavior of investors which suggest that investors are oriented not only toward the domestic assets but when they do foreign investment they prefer those countries whose assets are more correlated with and more profitable than the home assets. In this study it is evaluated that correlation puzzle regarding the preference for familiarity reduces effective diversification.

Many determinants of international portfolio are controlled in modern times with regards to the persistent international portfolio diversification relevance and the results of Coeurdacier and Guibaud (2011) provide that investors try to transfer their foreign investment holdings to those states which offer better opportunities for diversification than others.

The strategies of portfolio diversification are studied by Goetzmann and Kumar (2008), where they have made U.S individual investors as basis of their study and their studies find that under-diversified portfolios are hold by the individual investors. It is evidenced that the degree of under-diversification is higher among those investors who are young, have low-income, less education, and less sophistication. Furthermore, their results indicate that diversification is compelled by the portfolio size or transactional costs. Along with this they also indicate that no doubt under-diversification is expensive for most of the investors but a small group of investors, who have some superior information, deliberately under-diversify the investments.

Driessen and Laevan (2007) have studied the differentiation of international portfolio diversification of different countries from local investor perspective. Their findings show that

there are largest advantages to those investors in developing countries who are investing abroad rather checking for currency effects are also included. The benefits of diversification are greater when foreign investments are to be made.

On the other hand, there is a contradiction in the traditional theories about the portfolio choice data that is the individual investors' alleged lack of financial portfolio diversification. Investors hold those undiversified portfolios that are made up of a limited number of assets (Goetzmann and Kumar 2005).

Methodology

The purpose of our research is to use some historical prices to test international portfolio diversification opportunities with regards to different investor stockholding periods, therefore this research relates to quantitative research method, secondary type of data that has been collected from the official websites of stock exchanges such as Pakistan stock exchange (Pakistan), Bombay stock exchange (India), Shanghai stock exchange (China) and Dhaka stock exchange (Bangladesh). Secondary data typically involves the return indexes of mentioned stock exchanges from the time period of April 2013 to October 2019 (1700 days) is collected, as for the Conditional Correlations software of MATLAB is used. We use Microfit 5.5 to produce the Continuous Wavelet Transform (CWT) graphs. Microfit 5.5 is typically used for time series analysis.

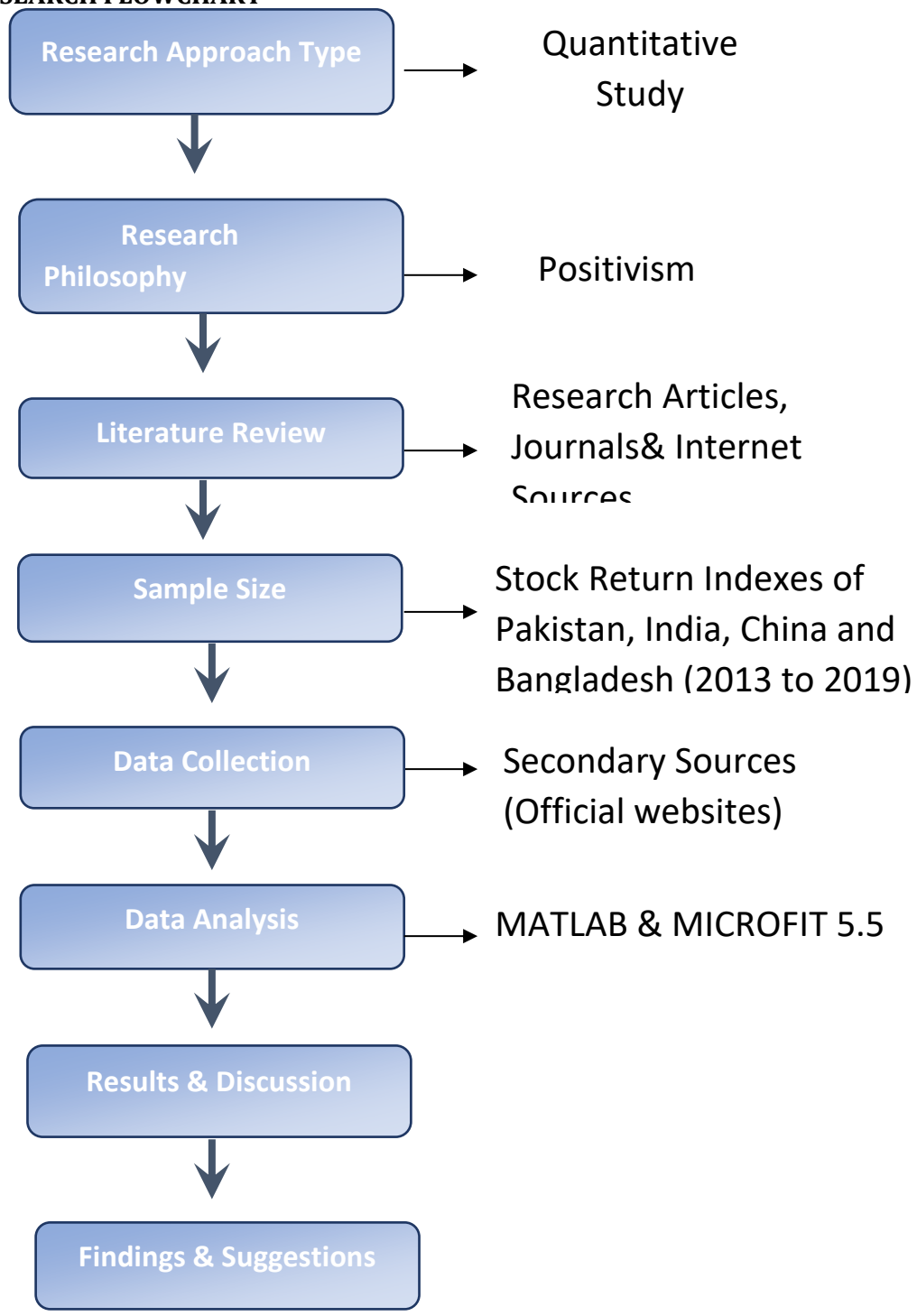
MGARCG-DCC (Multivariate Generalized Autoregressive Conditionally Heteroskedastic —Dynamic Conditional Correlation)

It is important for domestic and foreign investors to understand how the volatility and interrelationships of asset returns change, including their direction (whether it is positive or negative) and scale (strong or weak). It is of the view that the portfolios will be diversified in order to hedge the unforeseen risks. Dynamic Conditional Correlation (DCC) enables to determine whether the impact on shocks to volatility in terms of asset returns is an alternative or a complement. The model permits us to identify the variations in interdependence between the financial variables (when and how these occur) (Ku 2008).

THE CONTINUOUS WAVELET TRANSFORM (CWT)

The wavelet transform localizes the time series and the frequency $\psi\tau$, s (t) as a function of wavelet or wavelet time series decomposition. These wavelets are generated by mother waves and can be represented as the function of time position τ (parameter of translation) and scale s (parameter of expansion), associated with frequency.

RESEARCH FLOWCHART



Results and Discussion

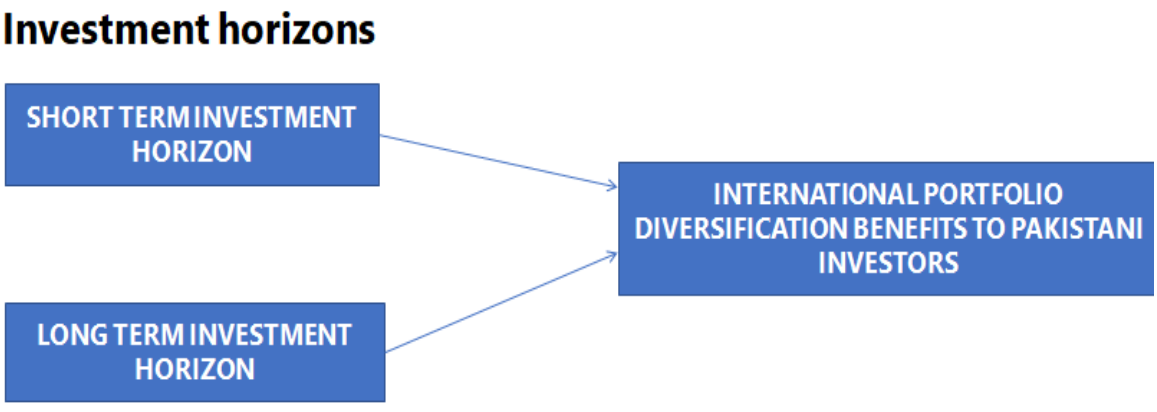
In this study total four of the stock exchange markets are selected for the investigation. Table 1 represents the selected stock market indexes that are used as a targeted research population. Stock market return indexes are used for the time period of 2 April 2013 to 29 October 2019 including total of 1625 observations. All the data is obtained from the official websites of these four stock markets.

The reasons behind the selection for these stock markets (PSX, BSX, SSX and DSX) are that basically there are two categories whereby a stock market or a country comes under one of these two on the basis of performance and development. The categories involve developed markets and emerging markets. All the four stock markets come under the category of emerging markets. And the emerging markets are those countries that are in the process of rapid growth and development. But their level of maturity and per capita income is less than that of the developed market.

Selected Stock Market Indexes for Research

Symbol	Definition
PSX	Pakistan Stock Exchange (Pakistan)
BSX	Bombay stock Exchange (India)
SSX	Shanghai Stock Exchange (China)
DSX	Dhaka Stock Exchange (Bangladesh)

In this study two types of variables dependent variables and independent variables. Overall investigation circles around the two things investment horizons (short term investment horizons and long term investment horizons) and international portfolio diversification benefits to Pakistani investors. Here for our convenience we have framed conceptual framework based on this study. In the conceptual framework types of investment horizons such as short term and long term are the independent variables, whereas international portfolio diversification benefits to Pakistani investors is the dependent variable.



Conceptual Framework {Source: Derrien *et al.,* (2013)}

RESULTS

Table 2 enlists the descriptive index of daily stock returns for the all four stock markets. It reports the mean, median, maximum, minimum, standard deviation, skewness and kurtosis values. It also includes the number of observations for the four stock markets. It is analyzed that India (-0.00047) and Pakistan (-0.00038) have lowest means of returns. Whereas the mean returns of Bangladesh (-0.00015) and China (-0.00008) are little higher. As compared to all, the Chinese stock market shows the highest mean returns. The median values range from -0.00063 (Bangladesh) to -0.00007 (China). The highest maximum returns are in Bangladesh (0.08873) and India (0.06120), as are the lowest minimum returns (Bangladesh -0.05604 and India -0.05186 respectively).

Descriptive Statistics of Index Return Series

	Pakistan	India	Bangladesh	China
Mean	-0.00038	-0.00047	-0.00015	-0.00008
Median	-0.00043	-0.00061	-0.00063	-0.00007
Maximum	0.04765	0.06120	0.08873	0.05358
Minimum	-0.04419	-0.05186	-0.05604	-0.03685
Standard Deviation	0.00986	0.00896	0.01432	0.00800
Skewness	0.27037	0.18714	1.10759	0.02376
Kurtosis	2.15898	3.07095	6.93676	3.28191
Observations	1625	1625	1625	1625

Index Return of stock market indices (e.g., Pakistan, India and China) are significantly skewed distributions. This shows that in these stock markets there is a greater probability of getting higher returns. While when analyzing the Bangladesh, table 2 reveals that its stock market index is highly skewed. Kurtosis values range from 2.15898 (Pakistan) to 6.93676 (Bangladesh).

Log= In (closing price) –In (closing price+1)

The purpose of transformation of data is that it is impossible to analyze the index returns directly in the softwares. The transformation of data is a mandatory requirement to get the results. Thus the data is computed to produce returns of continuously compounded time-series.

Non-Normality Test

	Jarque-Bera	Probability	ARCH Effects (5)	Probability	Ljung-Box Q2-Q2 Stat(10)	Probability
Pakistan	335.3996	0.000	8244.36	0.000	16269.08	0.000
India	648.0242	0.000	8199.55	0.000	16239.31	0.000
Bangladesh	3590.2792	0.000	8032.41	0.000	15825.52	0.000
China	729.4348	0.000	7983.1	0.000	15765.34	0.000

First of all calculation of data is shown in descriptive statistics from to provide an overview that what is mean, median, standard deviation and skewness, kurtosis values. Total of 1625 observations of each stock market are taken under the consideration (from the time period of April 2013 to October 2019).

Conclusion

This study involved the empirical analyzation of four stock markets to give Pakistani investors the most reliable information related to the investment in these stock markets. The time period of 2013 to 2019 was selected for the investigation and in this research we have used the most reliable and modern techniques for analysis. Those techniques are MGARCH-DCC and CWT. Analysis has been done by using the softwares of MATLAB and Microfit 5.5. These softwares have provided us the results based on the settled objectives. Objectives of this research include whether the stock markets of China, India and Bangladesh are beneficial for the Pakistani investors if they diversify their investment portfolios in these stock markets. Another objective included the analyzation of which type of investment horizon (short term or long term) is more suitable for these investors to get the higher international portfolio diversification benefits.

It is concluded from this study for the first objective (To evaluate whether Pakistani investors should invest in Bangladesh, China, Indian stock exchanges to obtain international portfolio diversification advantages) that Pakistani investors should invest in Chinese stock market in order to obtain the portfolio diversification opportunities as here in this it is seen that investing in Chinese stock market would be a better option for Pakistani investors to invest.

For the second objective (To investigate whether international portfolio diversification benefits change given different investor stockholding periods) analysis through CWT confirms that there seems yellow spots in the series of short term investment horizon (e.g., four to eight days, eight to sixteen days) in all three of stock markets separately indicating that there are more benefits in investing for short term investment horizons ignoring the long term one because there seems no any evidence or correlations in the figures regarding investment in long term horizons.

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