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Stock Returns and Volatility: Comparative Investigation from SAARC Countries

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Abstract
This research article analyses the stock return and volatility of three selected SAARC countries (Pakistan, India, and Bangladesh), focusing on the role of natural resources in influencing market performance. This study aims to determine the robustness of the performance, considering the economic significance of these countries' natural resources. The daily data from the PSX 100 index (Pakistan Stock Exchange), BSE index (Bombay Stock Exchange), and DSE index (Dhaka Stock Exchange) for the years 2019 to 2021 has been obtained from their websites. The data is treated in MS Excel to compute the daily Geometric Returns for BSE, PSX, and DSE indices. Furthermore, the data were analyzed using the specialized package EViews for Time Series Graph, Descriptive Statistics, Unit Root Test, and GARCH Model. The findings of this research show that the BSE index has the highest return value of 6.78 percent compared with 4.56 percent and 3.75 percent for DSE and PSX, respectively. The Half-life model has been applied to calculate the volatility observed by the indices. The result shows that BSE is the most volatile and takes the highest time of 45 days to revert to its mean position, followed by PSX and DSE, which take 19 and 10 days, respectively. Therefore, investing in the BSE index is better for risk-lover investors. At the same time, DSE has the fastest mean reversion compared to the other two indices. Therefore, it is feasible for risk-averse investors.

Keywords
Stock return, Volatility, GARCH Effect, ARCH Effect, Mean Reversion, SAARC Countries

Introduction

Stock Returns can be defined as earnings per share that the shareholders own through the capital market. These earnings are in terms of a dividend for the shareholders. Investors' financial objective in the stock market is profit or return (Kashif et al., 2021). The return on stocks indicates the amount of investment made for the shareholder. Hence, investors and portfolio managers are associated with a greater focus on market returns (Ali et al., 2020; Kotishwar, 2020; Wu, You, 2022). The finance theory states that the stock price is an element through which investors can expect the forthcoming micro and macro-economic scenes. In the modern world, the stock market is comfortable with the intermediation between creditors and debtors. An efficient stock market is necessary for domestic and international capital mobilization because of risk diversification and financial integration. However, an unstructured capital market restricts the development of the economy (Bhutto et al., 2020). Therefore, the economy's real growth comprises an efficient and structured stock market (Fernando, 2018; Hewamana et al., 2022; Milos et al., 2024).

In any economy, natural resources play a vital role in influencing stock prices, specifically when an economy depends on these resources. The agricultural products, minerals, oil, and gas resources significantly influence the stability and financial health of the country. Countries like Pakistan, India, and Bangladesh are heavily dependent on agricultural products and also extracting minerals like oil, gas, copper, salt, and iron. These natural resources help the companies increase revenues and profitability, increasing their stock prices. However, companies can face financial uncertainty and reduced investor conviction if these natural resources are not utilized efficiently. For instance, volatility in oil prices can directly hit the stock returns of oil-extracting and marketing companies. Furthermore, the rich natural resources countries attract foreign direct investment, significantly affecting stock market development and overall economic activities (Osah & Mollick, 2023; Sharma et al., 2018). Thus, understanding and managing natural resources are imperative for portfolio managers and investors to focus on stock returns.

The relationship between stock returns and volatility is widely examined in financial economics. Few theoretical frameworks and models are commonly used to understand this relationship: 1) Leverage Effect, often pragmatic the negative correlation relation between stock returns. When an economy performs poorly, its leverage increases, making the stock more volatile (Pan & Liu, 2018); 2) Risk reward trade-off, as the fundamental principle in finance is that higher expected returns are the compensation of higher risk (volatility) while it is often true for comparing asset classes (e.g., stocks vs bonds) (Ahmed, 2020); 3) Macro forces, the economic indicators like interest rates, inflation, and GDP growth can also stimulus both stock returns and volatility (Wang et al., 2023); and 4) international factors, where the globalized world, country-specific proceedings and risks can spill over and affect volatility and returns in other nations (Hoque et al., 2023). Such theoretical frameworks have assumptions and limitations when analyzing the relationship between stock returns and volatility (Ahmed et al., 2018a).

Volatility is associated with investment markets and represents the fluctuation in stock prices for a certain period. A drastic change can be seen in stock prices due to higher volatility, which can be altered in another direction in a short span. Volatility tends to increase quickly as the stock price decreases. It increases during the recession and financial crises, creating uncertainty and hampering powerful speculation (Qureshi et al., 2023; Schwert, 1989). In financial markets, volatility is of great significance. The fluctuation in the stock returns is associated with managing risk, portfolio allocation, and hedging. According to Hirshleifer et al. (2015), volatility is viewed as an asset and investment pricing variable. According to Kashif et al. (2021), sometimes, investors lower their confidence due to the overwhelming fear caused by higher volatility, resulting in an imbalanced market order. To avoid these imbalances, the process of economic fluctuations and the approximation of future volatility must be understood.

In the globalized modern world, any country's development depends on regional association and mutual alliances with other countries. Integration in the stock markets has improved far better than in the decades (Kashif et al., 2020). When the countries are in close association with regional countries, it will be an excellent opportunity for the country’s economy in terms of trade and growth of the economy (Wade, 2003). Furthermore, more economic conditions are needed to transfer toward other countries due to economic integration with regional countries, which causes adverse effects (Tripathi & Seth, 2016). The South Asian Association for Regional Corporation (SAARC) is a group of eight countries based in Asia. It was established in 1985 and consists of Pakistan, India, Sri Lanka, Afghanistan, Nepal, Bhutan, Maldives, and Bangladesh. The objectives were to cultivate the state of government existence and the standard of life and increase social and economic growth (Hakeem et al., 2023). The stock markets in the SAARC countries are different in size, whereas India, Pakistan, Sri Lanka, and Bangladesh's stock markets are highly involved in the economic growth of SAARC.

This study aims to empirically test and analyze the powerful connection between changes in currency exchange rates and financial exchange returns in SAARC countries. This interrelationship is significant for monetary arrangements and choices in worldwide capital planning, especially when adverse shocks influencing one market are quickly sent to different business sectors. Some econometric methodologies are significant in predicting the volatility of stocks and market indices by financial firms (Ramya & Sumathy, 2022). Moreover,

some analytics are performed to determine the relationship between return and volatility with the help of a stochastic framework (Ahmed et al., 2018b).

The rest of this study is driven as section 2 provides an extensive review of literature related to stock returns and volatility. The research methodology and the data sources are part of section 3. Research findings and their interpretation are given in section 4, while section 5 describes the conclusion and some policy recommendations subject to their research findings.

Substantiation from previous literature

Concerning monetary globalization, particularly after the effect of the contemporary global financial crises, the securities exchange has encountered phenomenal fluctuations (Kashif et al., 2021). This volatility builds the uncertainty and risk of the financial market. To decrease this uncertainty, it is essential to quantify the instability of stock list returns. Simultaneously, because of the significant place of the securities exchange in the worldwide economy, the advantageous improvement of the securities exchange has become the focus (Bhowmik & Wang, 2020). A previous study suggests there is a significant relationship. However, a finding from the other study indicates a positive but insignificant relationship between Stock returns and market volatility (Schwert, 1990). However, many studies have also reported a negative and significant relationship between stock returns and market volatility (Ahmed et al., 2018a; Poornima & Chitra, 2015). The fluctuation in stock prices with time can be termed volatility (Bagh et al., 2017).

According to Schwert (1990), the sources contributing to the volatility are difficult to find, and this specific estimator is based on estimation techniques. Many studies have shown that market elements tend to be volatile (Ahmed et al., 2018b). In volatility, macroeconomic factors are essential (Umar et al., 2021). According to Kashif et al. (2020) and Wachter (2013), consumption disaster is one factor that readily affects stock market volatility. Another factor is that corporate social responsibility primarily affects the stock market. Previous empirical studies show a positive, non-significant, and negative association between corporate social responsibility and a firm's financial performance (Orlitzky, 2013). Oil price shock is another factor affecting stock market volatility (Bastianin et al., 2016). So, these are the essential factors for developing markets and participating in volatility structure.

Broad value changes are an exceptionally normal behaviour on worldwide securities exchanges as investors continue to notice any economy, businesses, and Political occasions. The interest in these developing business sectors has increased due to expanded globalization and the overall integration of world economies. The globalization and joining of these business sectors have created numerous opportunities for the domestic and worldwide financial market to broaden their global portfolios (Bhutto et al., 2020; Ahmad, 2010). Investigating the volatility of financial asset returns is considered one of the main problems in recent financial research. This instability is often depicted and estimated by the fluctuation of the rate of return. Forecasting the stock return volatility is difficult to work, and regardless of the availability of different models and procedures, only some of them turn out similarly for every financial exchange. Hence, researchers and financial examiners face such intricacies in estimating market returns and volatility (Ahmed et al., 2018a).

If the stock is more volatile, there will be uncertainty among financial investors, which may adversely influence securities exchange activities. As we know, the stock market plays a core role in economic development. Following the 2008 monetary crisis, the issue has become more fundamental: the securities exchange is, as of now, extremely critical, with incessant upswings and slumps, interruptions, supporting, and crashes. Numerous parts of this relationship have been noticed a few times, utilizing various experimental methods; however, more compelling strategies have been utilized to portray market fluctuations across various systems.

Sensational changes in the behaviour of the numerous economic time series correlate with such events as monetary stocks, wars, crises, or varieties in governmental financial approaches. The securities exchange market directly or indirectly impacts domestic and global crises because of the cash market and other macroeconomic variables. Likewise, unexpected varieties in inflation forecasting, contractionary money-related policies, and an expansion in oil prices apply downward pressure on the financial stock market valuation. Hence, uneven economic results bring unpredictable trade rates and capital business sectors (Ahmed & Mustafa, 2019).

One of the famous economic editors endorsed that, by the year 2050, developing countries like Bangladesh will have a promising future, and the country will leave behind the Western countries. As of 2017, Bangladesh's economy has grown by about 7% and is the most valued rate. In South Asia. Bangladesh's stock market has a significant role in financial markets. In today's world, the volatility in global markets has increased, so many researchers and academicians have focused more on market volatility. In the prices of stock indexes, volatility has a significant role. The economy of the country and the individual's income are directly affected by volatility, and it has a negative effect. There is a probability of alteration in future value from the expected price due to the stock market's volatility (Roni et al., 2017).

The Dhaka Stock Exchange (DSE) deeply crashed in 2011. According to (Hasan et al., 2022), the cause of this crash was studied, and the reason was an asset pricing bubble. In November 2009, the DSE index increased

to 4,000 points; in the middle of 2010, the DSEX passed over 8500 points with a decreased index level. After some time, the DSEX fell dramatically, and the share price fell sharply. It has been viewed as a clear progress in the policies of DSEX after 2010. The cause was that the Bangladesh Security & Exchange Commission (BSEC) had provided conveniences to control and defer transactions to safeguard financial investors and protect against the ruination of the share price in the future. Bangladesh's stock market volatility is usually low. However, the spirit of the market is that volatility is an unavoidable factor for stock markets of both developed and developing countries. That is why volatility is significant in today's world. In the finance world, there are many tools through which volatility can be forecasted, including value at risk and different models that have ended up in the markets.

In emerging states like Pakistan, the securities exchange gradually creates significant channels for investors to raise assets. Pakistan has three leading stock trading sites: 1) the Karachi Stock Exchange, 2) the Lahore Stock Exchange, and 3) the Islamabad Stock Exchange. Later, those were merged into the Pakistan Stock Exchange (PSX), declared the third largest stock market in Asia and performing fifth best worldwide. In 2020, a US-based international stock markets research firm ranked Pakistan's stock market as the 4th best-performing market in the world and has been marked as the best performer in Asia despite the global outbreak of the coronavirus pandemic. In addition, PSX considers the world-driving rising stock market into account to yield maximum outcome and liquidity as developing markets are highly volatile markets because of macroeconomic inconsistencies and political risk. However, it has been observed that over the last three years, the economy of Pakistan has been compromised due to violence, war, political turbulence, and natural disasters. The following index covers the below-mentioned significant uncertainty events in Pakistan, like terrorization activity, increasing prices of oil and gas, political turbulence, disastrous floods in 2010, uncertainty in volatility rates and the IMF program in 2019, and the latest global epidemic coronavirus (Ghani et al., 2022; Kashif et al., 2021).

India is the biggest economy and significantly affects the general improvement of the capital market. India has seen critical changes in technology and rich natural resources, including agricultural products, oil, and gas, which enhance the productivity of the financial market and administration construction. It has also invited foreign direct investment (Kotishwar, 2020). One of the researchers investigates the fluctuation in time in the volatility of the Indian Stock Market. He studied the data from 1979-2003 and applied the GARCH model. The results found an unpredicted change in equity volatility. The researcher identified the leading cause behind these changes in volatility. Consecutively, to study the bearish and bullish trends, the researcher studied various stocks that rushed into the Indian Stock Market and, at last, determined the higher volatility rate in a particular period (Ahmad et al., 2016).

The researcher examined the volatility by using the GRACH model. Their study concluded that the volatility could be increased by lousy news compared to good news, and the level of irregularity is also greater for future markets (Koutyos & Tucker, 1996). To predict the volatility of the Indian stock market, the author used the GARCH and TARCH models from 1961 to 2005. The GARCH model suggested the impactful proof of time and differing volatility, and to test the asymmetric effect of volatility, the TARCH model was used (Ahmed et al., 2028a; Karmakar, 2006). The authors used the GARCH and TARCH models in their study to measure the impact of individual stock fates on the volatility of the Indian stock market from 1996-2006. The study's results suggested that stock future derivatives are independent of spot market volatility (Rao et al., 2008).

Mishra, Das, and Pradhan (2009) conducted a study to predict the volatility of the Indian stock market. They used the Bombay stock market's daily stock prices from 1991 to 2008 for their research. Using the GARCH, TARCH, and EGARCH models, the study found that the irregularity in stock market behaviour was due to global economic conditions and recession.

Material and Methods

For this research, we have selected three significant rising stock markets of SAARC countries to check their volatility. We have taken the PSX 100 index (Karachi, Pakistan), the BSE index (Bombay, India), and the DSE index (Dhaka, Bangladesh). Our main reason for this research is to analyze the return and volatility and to know which country from SAARC performs better. The secondary data for our study was collected from the websites www.investing.com for the BSE index and DSE index and www.Scstrade.com for the PSX 100 index for stock prices. This is the latest data on Stock Markets to demonstrate the current performance of selected SAARC countries in the stock market. For this research, the daily data from 2019 to 2021 was selected. This research is based on daily prices and their returns. The data were treated with Microsoft Excel to compute the Geometric Mean against BSE, PSX, CSE, and DSE. Moreover, the data was analyzed using a specialized package, E-Views for Time Series Graph, Descriptive Statistics, Unit Root Test, and GARCH Model.

In the time series graph, we predict the future value of indices. As in the graph, the x-axis shows the time, and the y-axis shows the returns. The natural log precedes the stock returns for three selected South Asian countries. The mathematical equation for the log return is expressed below:

$$R_t = ln\left(\frac{P_t}{P_{t-1}}\right)$$

R_t = Stock returns at time "t"; P_t = Stock market index at time "t"; P_{t-1} = Stock market index at the first lag of time "t." Standard deviation is a statistical tool used to test the volatility of stock returns and calculate the extent of the mean for data from every stock market over a given period.

$$\sigma = \sqrt{\frac{\sum_{i=1}^{n}(X_i - \bar{X})^2}{N-1}}$$

The Augmented Dickey-Fuller test checks the unit root to verify the data's stationarity. This test was developed by Dickey and Fuller in 1979 and again in 1981. In addition, it assists in determining whether or not the series contains unit roots.

$$\Delta Y_t = Y_t - Y_{t-1} = \alpha + \beta t + \rho Y_{t-1} + \varepsilon_t$$

When we have the sum of alpha (ARCH) and beta (GARCH), the GARCH model, if the sum of alpha and beta is less than 1, the mean of returns is reversed. However, if the sum of alpha and beta is equal to 1, then the series of returns is said to follow a random walk.

$$\sigma^2_t = \omega + \alpha\varepsilon^2_{t-1} + \beta\sigma^2_{t-1} + \varepsilon_t$$

Apart from the GARCH model, we used the Half-life model to format the speed of mean reversion. This model helps estimate the time taken for return to move half the distance of the long-term average of the Karachi Stock Exchange, Dhaka Stock Exchange, and Bombay Stock Exchange indices. The following formula was used to calculate the half-life.

$$HL = 1 - (log2/log\lambda)$$

Where λ shows the sum of alpha (ARCH) and beta (GARCH) coefficients represented in the GARCH model; moreover, such hypotheses are constructed to test, as given below*:*

H₁: The stock return of BSE, CSE, DSE, and PSX 100 indices have an ARCH effect.

H₂: The stock return of BSE, CSE, DSE, and PSX 100 indices have a GARCH effect.

H₃: The stock return of the BSE, CSE, DSE, and PSX 100 indices is in mean reversion.

Results

This segment describes the statistical outcomes. Fig. 1 highlights the cumulative stock market indices returns for three selected SAARC countries. The R_PSX 100, R_BSE, and R_DSE refer to the returns on Pakistan, India, and Bangladesh, respectively. The indices' period is from 1 January 2019 to 31 December 2021. The review of these graphs indicates no growth trends while fluctuating throughout their mean. It predicts that the returns of cumulative stock market indicators are non-stationary.

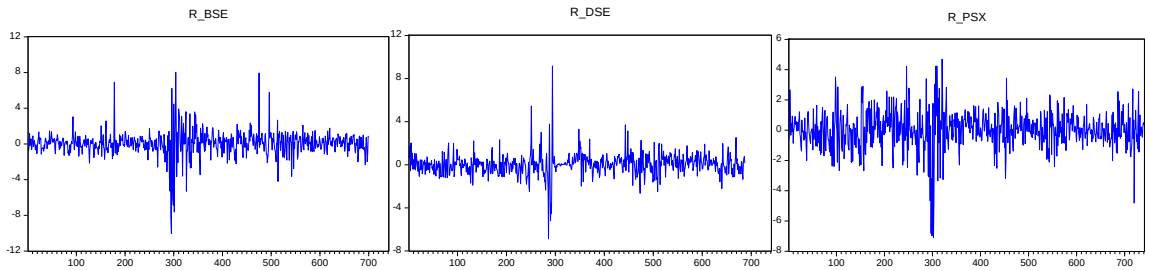

Fig. 1. Returns of Cumulative Stock Market Indicators

After analyzing the data stationarity through the graphical method, the Augmented Dickey-Fuller (ADF) test is used. The probability values and the significant t statistics are signs of rejecting the null hypothesis at a 1% significance level. It indicates no unit root in the targeted indicators (See Tab. 1).

Tab. 1. Unit Root Analysis using Augmented Dickey-Fuller Test

Unit Root Test		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			
BSE index		-24.02440	0.0000
DSE index		-18.33210	0.0000
PSX index		23.93797	0.0000
Test critical values:	1% level	-3.439668	
	5% level	-2.865542	
	10% level	-2.568958	

To check the data normality of the stock market indices, a descriptive analysis was performed, in which mean, standard deviation, skewness, kurtosis, and Jarque-Bera were used (see Tab. 2). The mean values of targeted daily returns of prices are favourable, where the mean value of R_BSE is more remarkable than other indices. In comparison, the standard deviation of R_BSE is relatively more significant than the others. The numeric of the Jarque-Bera of the stock market returns from the selected SAAR countries is significantly normalized.

Tab. 2. Descriptive Analysis of Daily Returns of Prices

	R_BSE	R_DSE	R_PSX
Mean	0.067814	0.045671	0.037576
Median	0.131318	0.055914	0.070000
Maximum	8.038481	9.163448	4.684000
Minimum	-10.04083	-6.877359	-7.102000
Std. Dev.	1.438293	1.027092	1.290039
Skewness	-0.640554	0.651888	-0.724429
Kurtosis	15.21852	18.68556	7.658508
CV	21.20938	22.48893	34.33146
Jarque-Bera	3943.135	6472.116	621.7982
Probability	0.000000	0.000000	0.000000
Sum	42.51931	28.63555	23.56000
Sum Sq. Dev.	1294.998	660.3783	1041.790
Observations	627	627	627

The coefficient analysis follows the ARCH and GARCH models where the α and β values must be positive. Tab. 3 highlights that the coefficients (α and β) values are significantly positive for all the indices, indicating that higher past variances lead to higher current conditional variance of the stock returns in the case of Pakistan, India, and Bangladesh. Furthermore, the sum of the α and β highlights the stock returns' mean-reversion phenomena (slower / faster). As per the principle, the sum of the ARCH coefficient (α) and GARCH coefficient (β) must be positive and close/far to 1 to describe a slow/fast speed of mean reversion.

Tab. 3. Coefficient Analysis Using ARCH and GARCH Models

Indices	A	B	α + β	Half-life
BSE	0.094789***	0.889981***	0.98477	46 days
PSX	0.131424***	0.830826***	0.96225	19 days
DSE	0.381323***	0.547195***	0.928518	10 days

Discussion

The study's findings show that α and β are the values of the ARCH and GARCH coefficients, respectively. While $\alpha + \beta$ shows the sum of ARCH and GARCH coefficients, which describes the mean-reversion phenomena (slower / faster), and Half-life indicates the number of days (the data is daily) each stock return takes to revert to its mean position. The research findings cited in Table 3 highlight that the GARCH coefficient of the stock returns is relatively more volatile than the ARCH coefficients, where the Bombay Stock Exchange has extreme volatility (GARCH coefficient (β)= 0.889). In contrast, the Dhaka Stock Exchange has the least volatility (GARCH coefficient (β)= 0.547).

Regarding the speed of mean reversion in the stock returns, the sum of the ARCH and GARCH coefficients is close to 1, which is a sign of data stationarity and assures the diminishing effect of the stock returns over time. Specifically, the Bombay Stock Exchange has an enormous sum of the ARCH and GARCH coefficients ($\alpha + \beta$= 0.984) compared to the other stock markets indices (0.962 and 0.929 for the Pakistan Stock Exchange and Dhaka Stock Exchange, respectively). It predicts that the Bombay Stock Market is highly volatile compared to other

targeted stock markets (Patjoshi & Tanty, 2017; Sudhagar & Eswaran, 2023). Conversely, the Dhaka stock market is comparatively the least volatile. It is the ratification of Khan and Billah (2023) regarding the Dahaka stock market and its return with low volatility. As per the speed of the mean reversion in the stock return, the Bombay stock market takes 46 days because of the high volatility, while the Dhaka stock market takes 10 days because of the relatively minor volatility. The Pakistan stock exchange is showing moderate behaviour compared to other markets (See Table 3) and is taking around 19 days in mean reversion.

The fundamental concept in finance and investment theory suggests a positive relationship between the level of risk associated with an investment and the potential return or reward that an investment can offer. Concerning investment behaviour, the nature of the portfolio investment is significant for the investor (Bhutto et al., 2020). An investor with a risk-averse investment behaviour must consider the highly volatile stock market like the Bombay stock market because of the high volatility (Kashif et al., 2020). However, it will be a long-term investment because of the low speed of mean reversion. In contrast, the Dhaka stock market is the least volatile. It has a high speed of mean reversion, allowing investors to make short-term portfolio investments with lesser returns. The Pakistan stock exchange is running moderately, which can signify equal opportunity for investors (risk-averse/risk-taker) to invest at the moderate speed of mean reversion.

Moreover, the Bombay stock market is highly volatile; its half-life is 46 days, and average returns are 0.067/day. Conversely, the Dhaka stock market is relatively low volatile, with a half-life of 10 days and average returns of 0.0456/day. The Pakistan stock market works moderately, with a half-life of 19 days and average returns of 0.0375/day. In policy discourse, it is suggested that because of risk-averse behaviour, investors must invest in the Dhaka stock market as it is the least volatile compared to the Bombay stock market. Still, the least volatility may lead to low returns. Moreover, such findings are endorsed in the previous literature as the low volatility has relatively most diminutive returns (Ang et al., 2006; Blitz & Van Vliet, 2007). In the continuation of the research findings by Akram et al. (2023) and Ahmed et al. (2018b), the Pakistan stock exchange is showing moderate behaviours regarding the volatility of stock returns, allowing all investors (risk averse/ risk takers) to make investment decisions subject to the mean reversion scenarios. Another reason for this moderate behaviour is because of the stock portfolios of those companies, which have powerful natural resources, including agricultural products, oil, and gas stocks. These natural resources have the most vital role in economic growth and stability, and natural resources also attract foreign direct investments, boosting economic activity and stock markets.

Conclusions

This study empirically tests the mean reversion in stock market indices of selected SAARC countries. First, the stock market behaviour is analyzed using graphical methods. Second, a descriptive analysis is conducted, and the data normality and stationarity are checked. The ARCH and GARCH models were used to check the indices' volatility, and the speed of mean reversion of SAARC countries' indices was also evaluated. The result shows that the BSE index has a higher mean value; it predicts that the BSE index has a higher return and is a riskier stock than the other two indices. It is found that the BSE (Bombay, India), DSE (Dhaka, Bangladesh), and PSX 100 (Karachi, Pakistan) indices have a significant mean, meaning that the returns of these three indices will return to their preceding price after some time. However, it allows investors to predict upcoming returns based on their historical value of indices, which helps them earn superior returns. A half-life formula is used to verify the speed of mean reversion. The result shows that the BSE takes longer to revert to its mean position than the PSX and DSE indices. So, long-term investors must invest in the BSE. The DSE has the fastest mean reversion compared to the other two indices, which is a good signal for investors to make short-term investments and get a short-term return. The results from the GARCH model determine the least volatility of returns in the case of DSE compared to BSE and PSX. Policy discourse suggests that the investor must invest in DSE as it is less volatile than BSE and PSX. Moreover, investors may form a portfolio of stocks from these markets based on their risk-aversion profiles. As per the limitation of this study, the focus is to see the stock market's volatility by considering three indices of selected SAARC countries. The sample size can be enhanced by considering more countries based on the availability of the data sets.

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Appendix

Dependent Variable: R_BSE
Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)
GARCH = C(1) + C(2)*RESID(-1)^2 + C(3)*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
	Variance Equation			
C	0.035357	0.009636	3.669413	0.0002
RESID(-1)^2	0.094789	0.012700	7.464010	0.0000
GARCH(-1)	0.889981	0.013725	64.84604	0.0000

Dependent Variable: R_DSE
Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)
GARCH = C(1) + C(2)*RESID(-1)^2 + C(3)*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
	Variance Equation			
C	0.111844	0.020011	5.589152	0.0000
RESID(-1)^2	0.381323	0.039021	9.772305	0.0000
GARCH(-1)	0.547195	0.041071	13.32302	0.0000

Dependent Variable: R_PSX
Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)
GARCH = C(1) + C(2)*RESID(-1)^2 + C(3)*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
	Variance Equation			
C	0.055112	0.020598	2.675628	0.0075
RESID(-1)^2	0.131424	0.023413	5.613425	0.0000
GARCH(-1)	0.830826	0.030126	27.57840	0.0000

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