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Regime-Dependent Volatility Spillovers: Extrication of the Effect of Geopolitical Risk of China on South Asian Equity Markets

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Abstract

The study explores the regime-dependent volatility spillover and clustering from the geopolitical risk of China to the equity markets of South Asia by employing the econometric models of Markov-Switching GARCH and DCC-GARCH. The findings have shown that the impact of geopolitical risk is different across different regimes. It has negatively affected the stock markets of India (NIFTY-50) and Nepal (NEPSE) during the low-volatility regimes. Moreover, its impact is more negative and significant on the stock exchange of Pakistan (KSE) during the regime of high volatility. The finding confirms the persistence of volatility in the long run; however, the volatility spillover in the short run is not significant. Moreover, the study has found positive and weak correlations among the geopolitical risk of South Asian equity markets except for Nepal, which has having negative correlation with it. It suggests the benefits of diversification for international portfolio managers and investors as well. Overall, the findings provide insights for portfolio managers, investors, and policymakers by emphasising the importance of geopolitical risk while administering risk management and hedging strategies for mitigating its effects in today's globalised financial markets.

Keywords: Geopolitical Risk, Volatility Spillover, Markov-Switching GARCH, DCC GARCH

Introduction

Volatility spillover across international markets is an important area of finance, especially due to the rising geopolitical risks (Elsayed & Helmi, 2021; Sweidan & Elbahnasawy, 2025). The interconnectedness among the financial markets has increased in the last two decades due to the impact of globalisation (РУДА & КРАУС, 2024; Raddant & Kenett, 2021). Markets are more susceptible to external shocks in the global markets, especially those that are coming from the geopolitical risk of the world's most powerful nations. The impact of geopolitical risk on the stock markets of South Asian countries is significant due to the escalated economic integration between these regions. Moreover, China is playing an active role in global investment and trade. Existing literature has shown that political tensions and international crises result in volatility spillover, where disturbance in one part of the world creates volatility in distant markets (Charfeddine & Al Refai, 2019; Naeem et al., 2023). Such volatilities affect the stability level of the markets and change in the investors' behaviour as well (Mu et al., 2022; Gala et al., 2023).

Despite the much research on the subject of volatility spillover, there remains a gap in

comprehending the impact of the geopolitical risk of China on the South Asian stock markets. The diverse structure of the economies of these two regions, coupled with the complexities of their stock markets, along with different levels of exposure of these markets to the geopolitical risk of China, has necessitated the nuanced investigation (Gong et al., 2023; Gao et al., 2025). This investigation addresses the issues of modelling and quantifying the volatility transmission from the political risk of China to South Asian equity markets (Iqbal et al., 2024; Beirne et al., 2009). The focus is on finding the regime-dependent volatility clustering and persistence with time (Aye et al., 2018).

The theoretical framework of this study is based on the efficient market hypothesis, the Spillover Effect, and the Contagion theory. The Efficient Market hypothesis posits that all the information regarding the political issues is reflected in the prices of the assets (Malkiel, 2011). Then, the theory of spillover effects explains the mechanisms through which the volatility is transmitted among the markets and amplified during the time of crises (Onwumere et al., 2018). Moreover, contagion theory explains how shocks in one market transfer to another market and get escalated during the time of heightened stress in the market (Ndiritu, 2024).

This study brings novelty by providing empirical evidence on the transmission of geopolitical risk from China to the South Asian equity markets. The findings have insights for academics, policymakers, portfolio managers, and investors as well. Understanding of these volatility spillovers is also crucial for making the strategies of portfolio diversification and risk management. Secondly, the study has used the latest estimation of the Regime-dependent Markov-Switching GARCH model along with DCC GARCH models for capturing the short and long-run volatility among the geopolitical risk of China and South Asian stock markets. The findings contribute to the literature by showing the regime-dependent nature of volatility spillover and the implications of political uncertainties in major countries of the world on a long-term basis.

Literature Review

Political instability is a part of the crisis many nations of the world have faced. Different studies have been done to check the volatility spillover in the financial markets during political uncertainties. Diebold and Yilmaz (2009) have proposed the VAR model for studying volatility spillover in the financial markets, and different studies have used this methodology (Chang et al., 2022; Choi, 2022). Then, Baruník and Křehlík (2018) developed

the BK model for studying spillover during periods of frequent shocks, and this method has been used in various studies for exploring the risk spillover in financial markets (Gao et al., 2022). The political crisis increases the spillover of volatility from the developed nations of the world to the developing nations (Onyeama, 2021). As the international crisis are affecting the whole world, similarly the global crisis of COVID-19 and political crisis of the Russia-Ukraine war affects the financial markets of the whole world that includes the oil and stock markets (Shaik et al., 2023).

The globalisation of the international financial markets has increased their sensitivity to external shocks, especially related to geopolitical risk. China is a major economic power in the world, and it has grabbed the attention of research scholars for its power to impact the financial markets of the whole world. Efficient market hypothesis posits that stock prices include all the information, including the political risk of the countries. However, the current literature contradicts this hypothesis, especially during the time of political crises, where markets started showing heightened volatility.

On the other hand, the contagion and volatility spillover theory explains the complex nature of the financial markets, that how shocks in one market can propagate to other markets through the channels of investors' sentiments, trade, and other financial linkages (Sever, 2019). These theories explained the reasons for heightened volatility, especially during the time of political uncertainty in the financial markets. The political risk of China is of a complex nature due to its economic policies, governance structure, international trade policies and relationship with its neighbouring countries (Zhang, Tsang & Fuschi, 2020; Whitten, et al., 2020). The asset pricing models remain incapable of addressing the challenges of non-linearity and of capturing the regime shifts nature of volatility and its clustering (Tirkishova, 2023; Mthengi, 2020).

Recent studies have used the Markov-Switching Models to check the impact of the political risk of China on the stock market of India (NIFTY-50) and the Nepal Stock Exchange (NEPSE). The findings have shown that the spillover effects from the political risk of China negatively affect the stock markets of India, Nepal, and Dhaka (Iqbal et al., 2024). The regime-dependent behaviour of these markets shows that different markets behave differently to the underlying risk (Cevik & Bugan, 2018; Dua & Tuteja, 2021).

Literature has supported the premise that the geopolitical risk of China has significantly affected the equity markets of South Asia, and different studies have been done on it. Pan et

al. (2023) have studied the regime-dependent volatility spillover within the different sectors of China and found significant results. However, their study didn't investigate their impact on the equity markets of the other world. Similarly. Shafique and Bhutta (2023) have focused on the role of trade wars in creating the volatility shocks for the financial markets of Asia. However, they didn't look at the long-term effects of these shocks on the equity markets of Asia.

Different scholars have studied the cross-assets insights that include South Asia, but none of the studies have made use of the aggregated data or the latest proxy of Geopolitical Risk. Limited work is available that has made use of the latest proxy of Geopolitical Risk. Then, Gala et al. (2023) have found a positive and weak correlation between the Global political risk and returns of the South Asian equity markets without studying their volatilities and their patterns and clustering. All of these works advance the understanding of geopolitical risk and spillovers, but collectively, there exists a gap in studying the transmission mechanisms of volatility, temporal analysis, and geopolitical focus.

Consequently, an empirical study is required by making use of innovative methodological estimations like regime-switching regressions and estimation methods for studying the complex nature of the financial markets. Therefore, this study aims to make use of the latest methodologies and check the impact of the Geopolitical risk of China on the volatility dynamics of South Asian equity markets. Literature has found the impact of political events on the stock markets of Pakistan by utilizing the methodology of event study. Different political events have been chosen for this study and they have significant impact on the Pakistani stock markets. Based on the literature the following hypothesis have been developed:

$\boldsymbol{H_1}$**:** The geopolitical uncertainties of the China have significant volatility spillover to the equity markets of South Asia.

Methodology

Firstly, all the series have been checked for stationarity and they were non-stationary at the level; therefore, the most recommendable model for such series is the GARCH family. Therefore, the study has used the Markov-Switching Regression Model to find the non-linear association among the geopolitical risk of China and South Asian equity markets. These models are perfect for finding the relationship among the non-linear series and asymmetry in the financial markets. The model helps in checking the impact of exogenous actions as well.

Moreover, the study has also used the DCC-GARCH model for studying the short-and long-run volatility spillover among the variables under study.

Results and Discussion

The results of the spillover among the geopolitical risk of China and South Asian equity markets have discussed below:

Volatility Spillover among Global Political Risk of China and South Asian Stock Markets

The Markov Switching Model has been employed for investigating the volatility spillover from the Global Political Risk of China to the South Asian Stock markets and its results are presented in Table 4. The results show that in the first regime, the Global Political Risk of China has negatively and significantly affected the National Stock Exchange of India Limited (NIFTY-50), and the Nepal Stock Exchange (NEPSE). Its impact is positive and significant at a 5% level on the Dhaka Stock Exchange (DSEX), The Royal Securities Exchange of Bhutan (BSI), and the Colombo Stock Exchange (CSE-All Share). The Karachi Stock Exchange (KSE-100) remain unaffected and its effect is significant at a 10% level for the Royal Securities Exchange of Bhutan (BSI). On the contrary, during the second regime, the Global Political Risk of China has negatively and significantly impacted the Karachi Stock Exchange (KSE-100). This shows that the political uncertainties of China are negatively affecting the stock markets of Pakistan only in the second regime.

Moreover, the standard error of regression coefficients has lower values in the second regime for the majority of the South Asian stock markets, which means the volatility has decreased for these stock markets during the political uncertainties in China. The Karachi Stock Exchange (KSE-100) and the Nepal Stock Exchange (NEPSE) have a lower standard error of their regression coefficients during the second regime. The lower values of standard errors bring more accuracy for the model estimation. Overall, the values of standard errors are low for the second regime, and both values are closer to zero, which indicates the absence of random error in the model. It also confirms the data adequacy and low difference between the real and predicted values by the model.

Table 4. Bi-Variate Markov Switching Model

Stock Markets	Regimes	Variable	Coefficient	St. Error	Z-Statistics	Probability
KSE-100	Regime 1	GPRCHN	0.005	0.006	0.926	0.355
	Regime 2	GPRCHN	-0.002	0.001	-3.167	0.002
NIFTY-50	Regime 1	GPRCHN	-0.001	0.001	-1.945	0.052
	Regime 2	GPRCHN	-0.013	0.008	-1.535	0.125
NEPSE	Regime 1	GPRCHN	-0.003	0.001	-3.816	0.000
	Regime 2	GPRCHN	-0.001	0.004	-0.191	0.848
DSEX	Regime 1	GPRCHN	0.029	0.008	3.425	0.001
	Regime 2	GPRCHN	0.000	0.000	-0.400	0.689
MASIX	Regime 1	GPRCHN	0.069	0.016	4.340	0.000
	Regime 2	GPRCHN	-0.001	0.001	-1.496	0.135
BSI	Regime 1	GPRCHN	0.009	0.005	1.812	0.070
	Regime 2	GPRCHN	0.000	0.000	-0.644	0.520
CSE-All Share	Regime 1	GPRCHN	0.007	0.002	3.358	0.001
	Regime 2	GPRCHN	0.000	0.000	0.194	0.846

Transition Probabilities and Expected Durations from Markov Switching Model

The study has reported the estimates of probabilities for transition along with the forecasted duration in each Regime during Political Uncertainties of China in Table 5. The transition probabilities from the first regime to the second regime (P_{12}) are higher for the majority of the South Asian Stock markets than the transition probabilities from the second to first regime(P_{21}). This shows that the second regime is relatively permanent, and the transition process is comparatively slow from the second regime to the first regime. However, the National Stock Exchange of India Limited (NIFTY-50) and The Nepal Stock Exchange (NEPSE) have high values of transition from second to first regime. The expected duration of the second regime is 2 days for most stocks, while the expected duration of being in the second regime has higher values; this confirms that the second regime is more stable than the first one. The National Stock Exchange of India Limited (NIFTY-50) has maximum values of expected duration in the second regime. Additionally, the one-step ahead regime switching

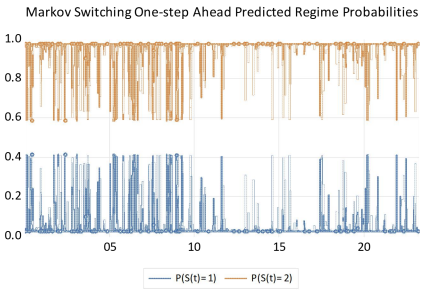
probabilities for all the stock markets are shown in Figure 3.

Table 5. Transition Probabilities and Expected Durations

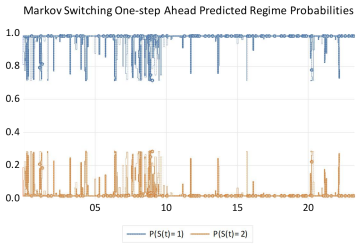
Stock Markets	Transition Probabilities				Expected Duration	
	P_{11}	P_{12}	P_{21}	P_{22}	DU_1	DU_2
KSE-100	0.412	0.588	0.023	0.977	1.701	42.728
NIFTY-50	0.985	0.015	0.717	0.283	67.067	1.396
NEPSE	0.961	0.039	0.748	0.252	25.391	1.336
DSEX	0.000	1.000	0.007	0.993	1.000	142.414
MASIX	0.017	0.983	0.008	0.992	1.017	127.280
BSI	0.242	0.758	0.024	0.976	1.319	42.514
CSE-All Share	0.371	0.629	0.008	0.992	1.589	122.498

Figure 4. Regime Switching Probabilities for all the South Asian Stock Markets

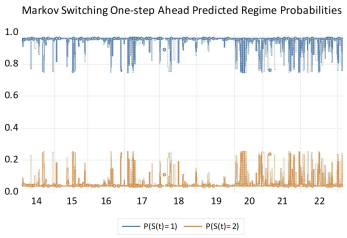
Regime Probabilities for KSE-100



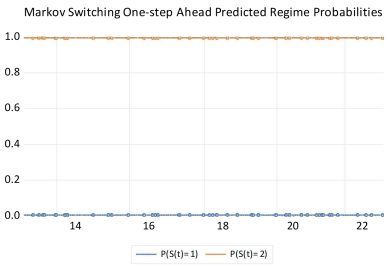
Regime Probabilities for NIFTY-50



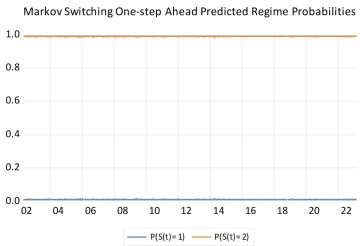
Regime Probabilities for NEPSE



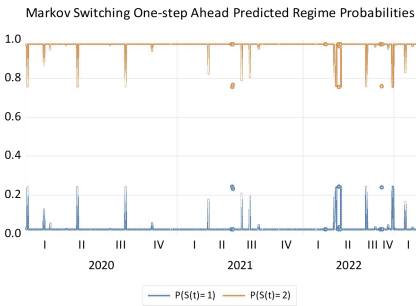
Regime Probabilities for DSEX



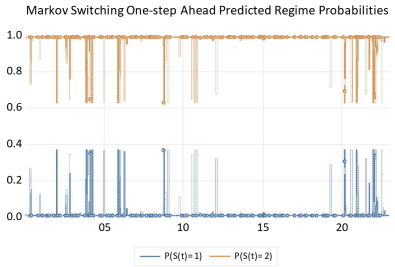
Regime Probabilities for MASIX



Regime Probabilities for BSI



Regime Probabilities for CSE-All Share



Short and Long Run Volatility Spillover among Global Political Risk of China and South Asian Stock Markets

For checking the short and long-run volatility spillover in the South Asia stock markets, the study has employed the DCC-GARCH model, and its results have been reported in Table 6. The results show that α is significant for all the stock markets except the Royal Securities Commission of Bhutan (BS), confirming the dependence on the lagged squared residuals. Then, the β values are also significant for all the stock markets, showing the persistence of volatility. It also confirms that volatility can be estimated by looking at its lagged values. Moreover, the sum of α and β is less than for all the series, which signifies the deterioration in the persistence of volatility with time, and it further confirms that conditional correlation does not remain constant and keeps changing with time. Overall, it confirms the diffusion of information from the Political uncertainties of China to the stock markets of South Asia.

The value of DCCα shows significant values for the Karachi Stock Exchange (KSE-100) and the National Stock Exchange of India (NIFTY-50), while the remaining stock markets remain unaffected. This confirms that the transmission of volatility spillover from the political uncertainties to all the South Asian stock markets did not exist in the short run. On the contrary, the value of DCCβ shows significant values for all the stock markets at a 5% level, which means volatility spillover does exist from the political uncertainties of China to South Asian stock markets in the long run. This means investors need to look for alternate options for the diversification of their portfolios because all the South Asian markets are being affected by the political uncertainties of China in the long run.

Table 6. DCC Approach for Finding Volatility Spillover among Global Political Risk of China and South Asian Stock Markets

Stock Markets	Estimates	μ	ω	α	β	DCC α	DCC β	Elapsed Time
KSE-100	Coefficients	0.0009	0.000	0.000	0.807	0.127	0.699	48.074
	Sig-Value	0.000	0.000	0.000	0.000	0.000	0.000	
NIFTY-50	Coefficients	0.000	0.000	0.110	0.878	0.192	0.670	48.765
	Sig-Value	0.000	0.045	0.000	0.000	0.000	0.000	
NEPSE	Coefficients	0.000	0.000	0.216	0.735	0.003	0.808	11.519
	Sig-Value	0.010	0.000	0.000	0.000	0.840	0.002	
DSEX	Coefficients	0.000	0.000	0.247	0.740	0.120	0.828	10.200
	Sig-Value	0.100	0.068	0.000	0.000	0.106	0.000	
MASIX	Coefficients	0.000	0.000	0.021	0.973	0.035	0.820	53.688
	Sig-Value	0.626	0.462	0.000	0.000	0.566	0.000	
BSI	Coefficients	0.000	0.000	0.032	0.953	0.015	0.974	44.166
	Sig-Value	0.626	0.822	0.153	0.000	0.465	0.000	
CSE-All Share	Coefficients	0.000	0.000	0.280	0.718	0.073	0.734	25.678
	Sig-Value	0.141	0.344	0.000	0.000	0.192	0.000	

DCC GARCH Forecasts

The forecasts for the Conditional Correlation Matrices are shown in Table 7. The forecasted conditional correlation between all the series is almost close to zero, which suggests that no significant relationship exists among the forecasted returns of both series. The National Stock Exchange of India (NIFTY-50), the Nepal Stock Exchange (NEPSE), the Maldives Stock Exchange (MASIX), and The Colombo Stock Exchange (CSE-All Share) have the negative correlation forecasts with the Global Political Risk of China. The conditional correlation remains constant over 5 periods, suggesting that the model expects a constant and stable relationship between both series in the near future.

Table 7. DCC GARCH Forecasts

Stock Markets	1	2	3	4	5
KSE-100	0.002	0.000	-0.001	-0.002	-0.002
NIFTY-50	-0.080	-0.070	-0.060	-0.053	-0.046

NEPSE	-0.003	-0.003	-0.003	-0.003	-0.003
DSEX	0.061	0.058	0.056	0.053	0.051
MASIX	-0.010	-0.009	-0.009	-0.009	-0.008
BSI	0.063	0.062	0.062	0.062	0.062
CSE-All Share	-0.005	-0.011	-0.016	-0.020	-0.023

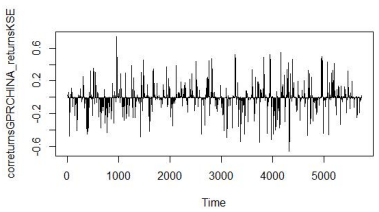
Correlation Between Global Political Risk of China and South Asian Stock Markets

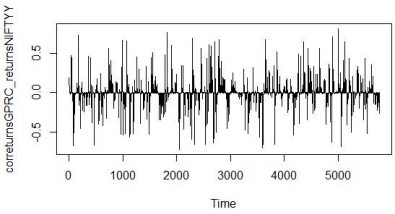
The association between the Global Political Risk of China and South Asian stock markets during is checked, and its results are shown in Table 8 and graphically in Figure 3. Overall, the findings show a positive and weak relationship between the majority of South Asia and political uncertainties in China. This shows that these series show some dependence on each other. On the contrary, the Nepal Stock Exchange (NEPSE) has a negative Correlation with the political uncertainties of China. Figure 4 also shows that patterns of their correlation are not constant. Instead, it keeps changing with time and returns to its mean position that exists in the long term.

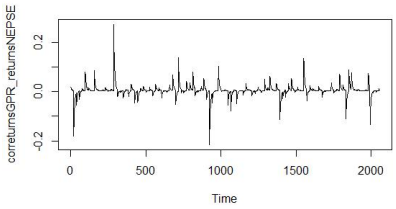
Table 8. Correlation among Global Political Risk of China and South Asian Stock Markets

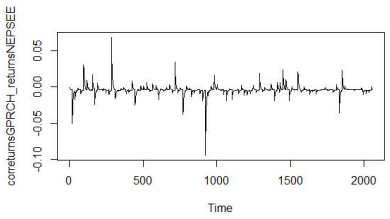
Stock Markets	Correlation
KSE-100	0.018
NIFTY-50	0.112
NEPSE	-0.001
DSEX	0.118
MASIX	0.017
BSI	0.074
CSE	0.023

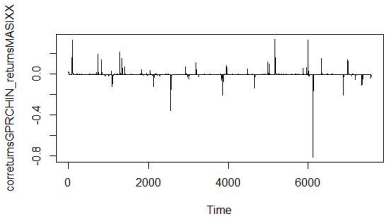
Figure 4. Correlation among Global Political Risk of China and South Asian Stock Markets

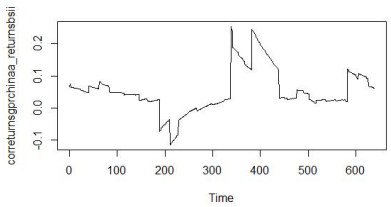


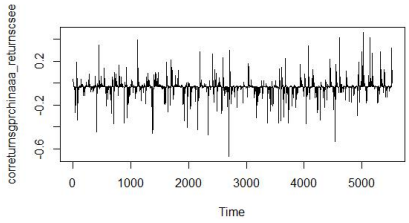












Covariance among Global Political Risk of China and South Asian Stock Markets

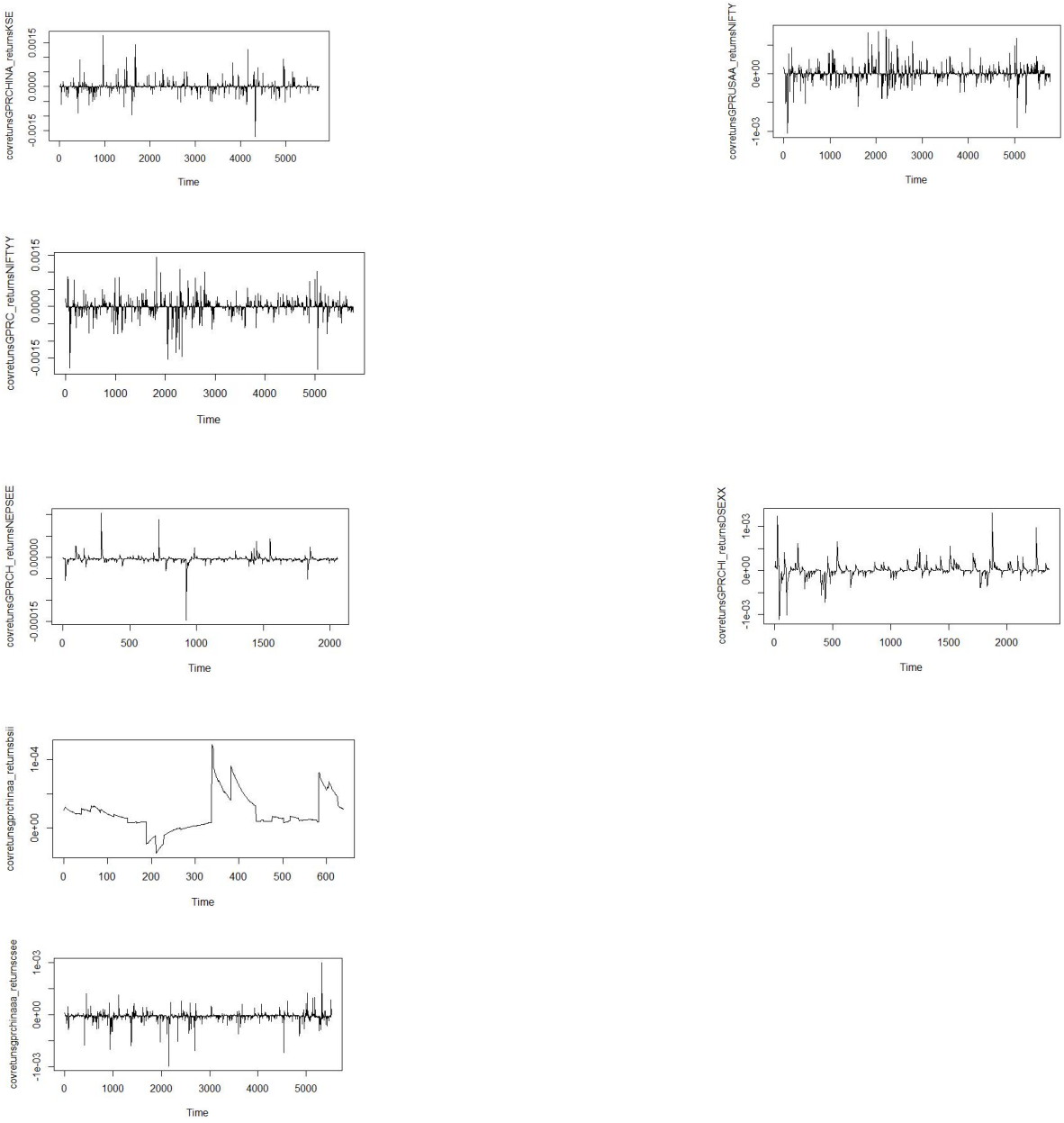
The covariance among the Political uncertainties of China and South Asian stock markets during is shown in Table 9 and graphically in Figure 5. The results show that covariance between both the series is low and propose that fluctuations in the political conditions of China cannot predict the volatility in the South Asian' stock markets. A negative covariance exists between the Nepal Stock Exchange (NEPSE) and the Global political risk of China.

Table 9. Covariance among Global Political Risks of China and Stock Markets of South Asia

Stock Markets	Variance of NYSE Returns	Variance of Stock Market Returns	Covariance
KSE-100	6.25E-03	1.78E-02	1.87E-05

NIFTY-50	6.90E-03	2.67E-04	1.53E-04
NEPSE	8.25E-03	1.57E-04	-1.62E-06
DSEX	7.95E-03	6.05E-05	8.20E-05
MASIX	4.83E-03	5.10E-04	2.68E-05
BSI	6.56E-03	2.14E-05	2.78E-05
CSE-All Share	7.18E-03	2.67E-04	2.05E-05

Figure 5. Covariance among Global Political Risk of China and Stock markets in South Asia



Discussion of Results

The Markov Switching Model has shown that in the first regime, the Global Political Risk of China has negatively and significantly affected the National Stock Exchange of India Limited (NIFTY-50), and the Nepal Stock Exchange (NEPSE) only, which means an increase in the political uncertainties of China reduce the returns of stock markets of India and Nepal. Moreover, during periods of low volatility, the Karachi Stock Exchange (KSE-100) remains unaffected. On the contrary, during the second regime, the Global Political Risk of China has negatively and significantly impacted the Karachi Stock Exchange (KSE-100) and this is due to the close trading relationships and mutual dependencies between both the countries. Moreover, the standard error of regression coefficients has lower values in the second regime for the majority of the South Asian stock markets, which means the volatility has decreased for these stock markets during the political uncertainties in China during the regime of high volatility. The transition probabilities from the first regime to the second regime (P_{12}) are higher for the majority of the South Asian Stock markets than the transition probabilities from the second to first regime(P_{21}). This shows that the second regime is relatively permanent, and the transition process is comparatively slow from the second regime to the first regime. The National Stock Exchange of India Limited (NIFTY-50) has maximum values of expected duration in the second regime, which means it is the most stable stock market during the period of high volatility.

The DCC-GARCH model, confirms the dependence on the lagged squared residuals and the persistence of volatility. Overall, it confirms the diffusion of information from the Political uncertainties of China to the stock markets of South Asia. Results also confirm that transmission of volatility spillover from the political uncertainties to all the South Asian stock markets did not exist in the short run. On the contrary, the volatility spillover does exist in the long run. This means investors need to look for alternate options for the diversification of their portfolios. Overall, the findings show a positive and weak relationship between the majority of South Asia and political uncertainties in China. On the contrary, the Nepal Stock Exchange (NEPSE) has a negative Correlation with the political uncertainties of China. The negative correlation and variance exist between the Nepal Stock Exchange (NEPSE) and the Global political risk of China, that increased volatilities in China decrease the returns of stocks in Nepal.

Conclusion & Implications of the Study

Conclusion

The study provides evidence on the impact of the Geopolitical Risk of China on the South Asian equity markets. The study has used Markov-Switching GARCH and DCC-GARCH models, and findings have shown that Chinese Geopolitical Risk have both time-varying and regime-dependent impact on the equity markets of South Asia. The findings have further shown that during the first regime, the geopolitical risk of China has negatively affected the stock markets of Nepal and India, while during Pakistani market has been significantly affected during the second regime. Moreover, GARCH parameters have shown the persistence of volatility and confirm that shocks from the geopolitical risk of China are transmitted to the South Asian markets in the long run. Results also show that the short-run impact is not significant, but long-run covariance and correlations are overall weak. This confirms the presence of low interconnectedness among these markets. Moreover, the findings have also shown that the stock market of Nepal has a negative correlation and covariance with the Chinese Geopolitical risk as compared to the other equity markets of South Asia, from which diversification opportunities can be grabbed by the investors and portfolio managers.

Implications of the Study

- The study has important implications for investors and portfolio managers because they should monitor geopolitical tensions in the international markets and their impact on other markets of the world.
- Secondly, the policymakers of South Asian equity markets should check the vulnerability of their markets to the external political shocks of the international markets, especially with their strong trading partners like China. They should develop the regulations and contingency plans for addressing these issues and saving their equity markets from external shocks.
- Lastly, the study has implications for researchers and academics because it has shown the complex nature of financial markets that necessitates the usage of regime-switching and DCC GARCH models for studying the behaviour of these markets and their relationship with the global markets.

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