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EFFECTS OF GEOPOLITICAL RISKS AND POLITICAL UNCERTAINTIES ON STOCK MARKETS: COUNTRY SPECIFIC NEW GENERATION PANEL DATA ANALYSIS FOR DEVELOPING ASIAN COUNTRIES

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Abstract: *In general, there are strong and meaningful relationships between risks and uncertainties, and economic activities. In this context, geopolitical risks (GPR) and global economic and political uncertainties (WUI) can significantly affect financial markets and investor behavior. In this study, the effects of GPR and WUI on stock markets for 10 developing Asian countries were investigated for 2001:M07-2020:M12 period. Cross-section dependency was examined with LM,* LM_S, CD *and* LM_{BC} *tests, series stationarity with Hadri and Kurozumi (2012) test, cointegration relations with Westerlund (2006) cointegration with multiple structural breaks method, and regression analyzes with Eberhardt and Bond (2009) method. It was determined that high GPR decreases the stock market index in Turkey, Korea, Russia, Indonesia and Malaysia, whereas it increases in India, Thailand and Philippines. It was found that high WUI decreases the stock market index in Korea, China, Indonesia and Thailand, whereas it increases in Turkey, India and Malaysia. On the other hand, while the stock market returns of the change in GPR decreases the stock market returns in Turkey, Korea, Russia, Indonesia and Malaysia, it increases in India, Thailand and Philippines. It has been determined that change in WUI decreases the stock return in Korea, China, Indonesia and Thailand, and it increases in Turkey, India and Malaysia. It was also observed that changes in GPR increases the volatility of the stock markets in India, Thailand and Philippines, and it decreases in Turkey, S. Korea, Russia, Indonesia and Malaysia. While the effects of change in WUI increases stock market volatility in Turkey and Malaysia, it decreases in Korea, China, Indonesia and Thailand. As the results achieved are heterogeneous, investors should avoid a basket trading strategy in these countries. Country-specific causality test was carried out with the Konya (2006) method, and it was observed that there are causal relationships between high WUI and stock market index, high WUI and stock market return in Turkey. Similarly, causal relationships were determined between high WUI and stock market index in India, between change in WUI and stock market index volatility in Philippines, between high GPR and stock market index, change in GPR and stock market return in Hong Kong. Causal relationships for all countries in the panel were examined using the Dumitrescu and Hurlin (2012) method, and causality was only found between high WUI and stock market index.*

Keywords: *Geopolitical Risk, Uncertainty, Stock Market, Volatility, New Generation Panel Data Analysis*

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1. Introduction

Geopolitical risks and economic and political uncertainties have significant effects on financial markets and macroeconomic indicators. Knight (1921) stated that risks and uncertainties have the potential to affect economic activities significantly. Drawing attention to the destructions of uncertainties, Keynes stated that one of the most important reasons for the long duration of the 1929 Great Depression was the decrease in the investment motivation of companies due to the uncertainty in the economy. Keynes also stated that psychological factors play an important role in irrational events observed in financial markets (Schettkat, 2018). Behavioral Finance Theory, which was developed based on Keynesian discussions with the studies of Friedman (1957), Langer (1975) and Fama (1991), also revealed that uncertainty and risks in the economy are important determinants of investor behavior. In this framework, it is argued that price changes in stock exchanges cannot be fully explained in a rational way, there are many irrational phenomena that affect these prices, and prices in financial markets can only be explained with the help of models that include such irrational behavior, expectations, risks and uncertainties (Muradoglu & Harvey, 2008).

In this context, geopolitical risks and political uncertainties may cause economic activities to slow down or even come to a standstill (stagnation in tourism and many sectors due to the risks and uncertainties caused by Covid-19 can be given as an example), by reducing the confidence of both local and foreign investors (Apergis et al., 2017). Uncertainties in the economy will also limit the activities of companies and even lead them to bankruptcy (UNCTAD, 2021). Geopolitical risks are an important source of uncertainty and risk in the economy and can significantly affect both financial markets and other macroeconomic indicators (Balcilar et al., 2018). Geopolitical risks also include persistent geopolitical tensions such as local terrorist attacks, war risks, military threats, political conflicts in Middle East, political instability, political regime changes, financial collapse, natural disasters, wars, military conflicts and terrorist threats. In countries where geopolitical tensions are relatively stronger and persistent, there is an evidence that the impact of these risks on investment decisions and performance of key financial assets is more severe (Ucler & Ozsahin, 2020: 170).

On the other hand, economic and political uncertainties play an important role in the portfolio and location choices of local and foreign investors. Dash et al. (2019) stated that uncertainties in economic policies significantly affect the liquidity and profitability of stock markets. Gilal (2019) stated that uncertainties in economic policies are an important determinant (negative factor) on stock returns. Alqahtani and Martinez (2020) determined that economic policy uncertainty has long-term negative effects on stock prices. As can be understood from these expressions, geopolitical risks and policy uncertainties have the potential to affect stock markets significantly. Therefore, analyzing these effects frequently will be beneficial for policy makers and investors for developing the necessary strategies.

In addition, the credit ratings given by international credit rating agencies such as S&P, Fitch and Moody's are also influential on country economies. Yıldırım, Üre and Karaköy (2021), in their study on the subject, concluded that the scores given by credit rating agencies have an effect on real growth. According to the study, since the ratings given by these institutions are a guide for foreign investors, low ratings affect growth negatively by causing less foreign investment. On the other hand, geopolitical risks and political uncertainties have an effective power on the income of individuals as well as on the country's economy. According to the study of Wu et al. (2022) on this subject, risks and uncertainties, especially in developing economies, have the quality of increasing income distribution. The presence of political uncertainty and risks for countries increases the injustice in the income distribution of individuals.

The aim of this study is to analyze the effects of the geopolitical risk index (GPRI) developed by Caldara and Iacoviello (2019) and the World Uncertainty Index (WUI) prepared by Ahir, Bloom and Furceri (2018) on the stock markets of 10 emerging Asian countries between 2001:M07 and 2020:M12 by using new generation panel data analysis methods that also produce country-specific results. In the second part of the study, a summary of the literature is presented. In the third part, analysis has been performed. In the conclusion parts, findings were summarized. The study aims to reveal not only the effects of both GPRI and WUI but also their effects on stock market indices, stock market returns and stock market volatility. In addition, it is expected that it will contribute to the literature and country economies, and guide investors with the new generation analysis method used in the study.

2. Literature Review

Previous studies provide evidence that geopolitical uncertainties tend to affect stock returns and volatility (Balcilar et al., 2016; Rawat & Arif, 2018; Balcilar et al., 2018; Ucler & Ozsahin, 2020; Sekmen 2020). However, these impacts are heterogeneous among countries (Rawat & Arif, 2018; Das et al., 2019) and have an asymmetrical structure (Kannadhasan & Das, 2019). One of the studies conducted on this subject is Sum (2012) which examined the effects of economic political uncertainty (EPU) in the US on stock market performances in Asian countries for the period of 1985:M02-2012:M02. In this study, it was determined that high EPU decreases stock market returns in 5 ASEAN countries and there was a causality relationship from EPU to stock market returns in Singapore and Malaysia. Liu and Zhang (2015) detected a similar effect for the S&P 500 in the USA for the period of 1996:M01-2013:M01. Asteriou and Sarantidis (2016), in their analysis using the 1993-2013 data of 18 OECD countries, found that political instability negatively affected the returns of the stock market, and this effect was greater in the banking sector stocks. Baker et al. (2016) determined that high EPU increases the price volatility in the stock exchange of US between 1985:M01 and 2014:M12 period. Li et al. (2019) found similar results for China and G7 countries. Alqahtani and Martinez (2020) also examined the effects of economic policy uncertainty in the US on the stock markets of the Gulf Cooperation Countries and determined that these uncertainties have long-term negative effects on stock prices in Bahrain and Kuwait.

Balcilar et al. (2016), which is a study concerning the effects of geopolitical risks, examined the effects of terrorist attacks on stock market returns and volatility in G7 countries. It has been determined that terrorist attacks have significant effects on stock market returns and that these attacks have an effect on stock market volatility in Japan and the UK. Balcilar et al. (2018) analyzed the effects of geopolitical risks on stock returns and volatility with nonparametric causality-in-quantiles tests for BRICS countries, and found that the impact of geopolitical risks on stock market volatility is greater than the effect on stock market returns. Rawat and Arif (2018), in their quantile regression analysis on BRIC countries for the period of 1985-2017, stated that the Brazilian and Russian stock markets were more sensitive and negatively response to geopolitical shocks, India and China were more resistant to these shocks. Therefore, they stated that India and China could be a safe harbor for investors. Ucler and Ozsahin (2020) reiterated the effects of GPR on stock market returns with Konya (2006) panel causality test using data of 9 developing countries for the period 1987:M12-2018:M08. They found that there are unidirectional causality relationships from geopolitical risk to stock market index in Argentina, Brazil, Mexico and Thailand. Sekmen (2020) analyzed the effects of geopolitical risks on the stock market in 14 developing countries with time-varying causality analysis for the period 1998:M01-2019:M09, and determined that the returns and volatility of stock exchanges were driven by geopolitical risks during periods of rising geopolitical risks.

Kannadhasan and Das (2019) analyzed the effects of economic policy uncertainties (EPU) and geopolitical risks (GPR) on stock markets in developing Asian countries by quantile regression method for the period of 1997-2018, and found that the effect of the EPU was negative in all quantiles. On the other hand, they found that the effect of GPR was negative in lower quantiles and positive in middle and upper quantiles. The researchers, who determined that the negative effect of EPU is stronger than the negative effect caused by GPR, also stated that the relationships between both variables and stock returns are asymmetrical. Das et al (2019), which deals with the subject within the framework of EPU, GPR and financial pressure, states that the impact of US-centered macroeconomic shocks in developing countries in the period of 1997-2018 is heterogeneous in terms of causality relationship among developing countries and that the effect of EPU is more important and meaningful than the other two shock indicators.

On the other hand, Enamul Hoque et al. (2019) analyzed the effect of global economic policy uncertainty (WUI) and geopolitical risk (GPR) on stock prices using Malaysia's 2009-2017 data, using SVAR method. In their findings, they concluded that geopolitical risk does not have a significant effect on the stock market and that EPU has a negative and statistically significant effect on the stock market. Similarly, Karacaer et al. (2019) analyzed data from 21 countries for the period of 2005:M03-2019:M03 and revealed that there is no causality relationship between EPU and stock market returns in most developed markets. Addressing the issue in terms of the returns and yield volatility of GPR's stocks in the tourism industry, Hasan et al. (2020) determined that GPR has a statistically significant effect on these variables under normal market conditions in 13 developing countries however they found that this effect disappeared under abnormal market conditions. On the other hand, Enamul Hoque and Zaidi (2020) revealed that the effects of global risks and country-specific geopolitical risks on stock market returns in countries defined as fragile quintiles can be observed in the non-linear Markov-switching method, but cannot be determined in linear methods.

Based on the literature review, current studies generally reveal effects of the Economic Policy Uncertainty (EPU) on stock markets (Baker et al., 2016; Asteriou & Sarantidis, 2016; Hardouvelis et al., 2018) and effects of Geopolitical Risk (GPR) on stock markets (Balcilar et al., 2016; Balcilar et al., 2018; Ucler and Ozsahin, 2020; Sekmen, 2020), while a limited number of studies examining these two factors together (Enamul Hoque et al., 2019; Kannadhasan & Das, 2019). It is noteworthy that there is no study about the relationship between EPU and the Stock Exchange conducted for Turkey, since a current and continuous EPU index is not calculated for Turkey. In this study, the EPU index from Enamul Hoque et al. (2019) with uncertainty data calculated separately for countries in the scope of the World Uncertainty Index (WUI). In addition to WUI, Geopolitical Risk Index (GPRI) was also included in the analyzes. Therefore, this study will fill the gap in the literature. Finally, it was seen that mostly studies were conducted for the panel as a whole in the literature, therefore it is thought that the production of country-specific results for countries in this study will add a separate depth to the subject in the literature.

3. Econometric Analysis

3.1. Model and Data Description

In this study, 10 developing Asian countries, whose geopolitical risk index (GPRI) data can be accessed, are considered. These countries are China, Hong Kong, South Korea, Russia, India, Indonesia, Malaysia, Philippines, Thailand and Turkey. Data was collected between 2001:M07 and 2020:M12. New generation panel data analyzes, which can work under cross-sectional dependency and capable of producing country-specific results were applied. Thus, the relationships between the average geopolitical risk level and uncertainties of countries, and stock exchanges are tried to be revealed. The reason for addressing geopolitical risks in this study is that both country-specific developments and global problems such as Covid-19 which increase the geopolitical risks of countries and put pressure on stock exchanges. The reason for including economic and political uncertainties (WUI) in the models is because behavioral finance models accept that uncertainties have a significant effect on investment, saving and consumption behaviors of individuals and companies.

The geopolitical risk index (GPRI) used in this study was developed by Caldara and Iacoviello (2019). This index is obtained by turning it into an index as a result of counting the concepts of "risk associated with wars, terrorist acts, and tensions between states that affect the normal and peaceful course of international relations" which evoke geopolitical risk and mentioned in 11 leading newspapers (These newspapers are: Boston Globe; Chicago Tribune; Los Angeles Times; NYT; WSJ; WaPo; Daily Telegraph; FT; Guardian; Times; The Globe and Mail). The authors calculated this index for 19 countries with the greatest tensions. The updated version of this data set by the same authors on April 13, 2021 was taken from (https://www.matteoiacoviello.com) and used in this study.

The Economic and Political Uncertainty Index (WUI) was prepared by Ahir et al. (2018) and represents policy uncertainties around the world. The authors obtained this index by counting the number of the word "uncertainty" and its different derivatives which evoke uncertainty and mentioned in the Economist Intelligence Unit (The Economist Intelligence Unit is the research and analysis department of the Economist Group, which provides consultancy services with forecasts made through research and analysis such as monthly country reports, five-year country economic forecasts, country risk service reports and industry reports. The company, headquartered in England, has been serving since 1946. EIU prepares continuous reports that are published regularly for 189 countries around the world and contain information about the economic policies of the countries, developments in their foreign trade and country risks. For this purpose, the company sends experts to each country and these people can start preparing reports about that country after they have lived in that country for at least 5-7 years. In addition, analysts deployed at the company headquarters regularly visit countries and make on-site observations and evaluations (Ahir et al., 2018: 4)) (EUI) reports published quarterly for 143 countries (Ahir et al. (2018) states that countries with a population of at least 2 million are included in this index. In the preparation of the index, 12,868 country reports were scanned. Of the countries included in the index, 37 are in Africa, 22 in the Asia and Pacific region, 35 in Europe, 27 in the Middle East, and 22 in the Western hemisphere (North and South America) and these countries make up 99% of the world GDP). The authors obtained the WUI index by weighting these numbers with the GDP of each country (Ahir et al., 2018: 2). In this study, country-specific values (T4), which were included in the WUI index obtained from (https://www.policyuncertainty.com), were used. The graphs of the logarithmic forms of the GPRI and WUI indices are presented in Appendix 1.

Developing Asian countries with access to GPRI data were included in the study. The analyzes were carried out for the period of 2000:M07-2020:M12, which is the largest period whose data set can be accessed (However, as the rationale will be explained in the future, 12 observations were lost from the beginning due to the volatility calculation and the analyzes were carried out for the period 2001: M07-2020: M12.). The models used in the study are listed below.

$$\textbf{Model 1}: LogSE_{it} = \varphi_0 + \varphi_1 LogGPRI_{it} + \varphi_2 LnWUI_{it} + \varepsilon_{it} \quad (1)$$

$$\textbf{Model 2}: SER_{it} = \delta_0 + \delta_1 CGPRI_{it} + \delta_2 CWDI_{it} + \epsilon_{it} \quad (2)$$

$$\textbf{Model 3}: VOLSE_{it} = \gamma_0 + \gamma_1 CGPRI_{it} + \gamma_2 CWDI_{it} + \omega_{it} \quad (3)$$

Here $LogSE_{it}$, $LogGPRI_{it}$, SER_{it}, $CGPRI_{it}$, $CWDI_{it}$, $VOLSE_{it}$ and ϵ_{it} *and* ω_{it} shows the logarithm of the value of the stock exchange (Stock Exchange) of country i in period t, the logarithm of the value of the geopolitical risk index (Geopolitical Risk Index) of country i in period t, $LogWUI_{it}$; the logarithm of the value of the global uncertainty index (World Uncertainty Index) of country i in period t, the return of the stock exchange of country i in period t (Stock Exchange Return, %, relative to the previous month), the change in the geopolitical risk level of country i in the period t (Change in Geopolitical Risk Index, %, compared to the previous month), the change in the global uncertainty level of country i in the period t (Change in World Uncertainty Index, %, compared to the previous month), the volatility of the stock exchange of country i in the period t (Volatility of Stock Exchange, %, relative to the previous 12 months) and a series of error terms with a White Noise process, respectively. Stock market index data were taken as end of month values from (https://www.investing.com). By following Sum (2012), Asteriou and Sarantidis (2016) and Balcilar et al. (2018) for stock market returns, Baker et al. (2016) and Hoque and Zaidi (2019) for volatility, and Enamul Hoque et al. (2019) for WUI were included in the analysis.

The $VOLSE_t$ (stock market return volatility) series in Equation (3) was created with the help of Equation (4) using Chowdhury (1993: 701) method:

$$VOLSE_t = \left[m^{-1} \sum_{i=1}^{m} (SE_{t+i-1} - SE_{t+i-2})^2 \right]^{1/2} \tag{4}$$

The moving average of the stock market index for the past m periods by using Equation (4) is calculated. Here, the value to be taken for m may varies according to the preference of the authors, the relevant data and the frequency of the data. In the literature, it is usually taken as 4, 8 or 12 (Sun et al. 2002: 11). In this study, it was taken as m = 12 because it was studied with monthly data. For this reason, the 12 observations at the top of the data set were lost. Therefore, the final analysis period of the study has become 2001:M07-2020:M12. The reason why the analyzes were carried out until the end of 2020 is that the WUI indices of the countries were published until this date.

Countries included in the analysis are among the developing Asian countries in United Nations Conference on Trade and Development (UNCTAD) with geopolitical risk index data available; (Turkey, S. Korea, India, China, Indonesia, Malaysia, Thailand, Philippines and Hong Kong, Russia, which has a similar geographic location with Turkey (some lands in Asia and some lands in Europe), was also included in the analysis. Although Saudi Arabia has geopolitical risk index data and is classified among the developing Asian countries by UNCTAD, its financial markets are not included in the analysis because they do not have a fully liberal structure. Thus, the prepared balanced panel was formed from N = 10, T = 237 and a total of 2370 observations.

3.2. Methods

In this study, the presence of cross-sectional dependency among countries was examined with the LM, 〖LM〗_S, CD and 〖LM〗_BC tests, and the Hadri and Kurozumi (2012) panel unit root test was used to determine the stationarity degrees of the series. Cointegration relationships were analyzed using the panel cointegration with multiple structural breaks method developed by Westerlund (2006). Panel regression analyzes were performed using the Panel AMG (Augmented Mean Group Estimator) method developed by Eberhardt and Bond (2009). While the country-specific causality test results of the countries were examined with the Konya (2006) panel causality test, the causality relationships for the whole panel were analyzed with the help of the Dumitrescu and Hurlin (2012) panel causality test.

3.3. Cross Section Dependency Test

Cross-section dependency refers that the effect of an economic or political shock on a country is affecting other members of the group (Baltagi & Pesaran, 2007). Since the financial markets that are the subject of this study are globally integrated to each other to a great extent, there is a high probability of dependency between countries. It is of great importance that this situation is tested and considered in subsequent analysis methods. If cross-section dependency is detected among the countries that make up the panel, it is of great importance to use Next Generation panel data analysis methods that consider the cross-section dependency. The first study to test cross-section dependence belongs to Breusch and Pagan (1980), and these two authors developed the Lagrange Multiplier (LM) test based on a panel data analysis model as in Equation (5):

$$y_{it} = \alpha_i + \beta_i x'_{it} + u_{it} \tag{5}$$

Here y_{it}, α_i; x'_{it}, β_i and u_{it} are the dependent variable, constant term, arguments vector, slope coefficient and a series of error terms with a white noise process, respectively. Equation (6) is obtained when the series of error terms is expanded according to the AR (p) process:

$$u_{it} = \rho_1 u_{it-1} + \rho_2 u_{it-2} + \cdots + \rho_p u_{it-p} \tag{6}$$

The correlation coefficient starting from Equation (6) is calculated with the help of Equation (7):

$$\hat{\rho}_{ij} = \frac{\sum_{t\in(i,j)}^{T_{kj}} \hat{u}_{it}\hat{u}_{jt}}{\left(\sum_{t\in(i,j)}^{T_{kj}} \hat{u}_{it}^2\right)^{1/2} \left(\sum_{t\in(i,j)}^{T_{kj}} \hat{u}_{jt}^2\right)^{1/2}} \tag{7}$$

Then, the LM test statistic is obtained using Equation (8):

$$LM = \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} T_i \hat{\rho}_{ij}^2 \tag{8}$$

Here, T is the time dimension of the panel and N is the cross-sectional dimension. The null hypothesis of this test is "Corr(u_it,u_jt)=0,i≠j, that means there is no cross-sectional dependency between the countries that make up the panel."

Pesaran (2004) developed the scaled LM (〖LM〗 _S) test, which gives more effective results than the LM test in cases where the number of cross sections (N) is very large. The LM test statistic in this test is obtained with the help of Equation (9):

$$LM_S = \sqrt{\frac{1}{N(N-1)}} \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} (T_i \hat{\rho}_{ij}^2 - 1) \tag{9}$$

Pesaran (2004) also solved the size distortion problem in the LM test, and developed the CD test statistics to be used when the time size is greater than or equal to the cross-section size ($T \geq N$). This process can be performed with the help of Equation (10):

$$CD = \sqrt{\frac{2}{N(N-1)}} \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} T_i \hat{\rho}_{ij}^2 \tag{10}$$

Baltagi, Feng and Kao (2012) obtained the LMBC (Bias Corrected LM: Deviation corrected LM) test statistics by correcting the asymptotic deviations in the LM test. This process can be performed with the help of Equation (11):

$$LM_{BC} = \sqrt{\frac{1}{N(N-1)}} \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \left[(T_i \hat{\rho}_{ij}^2 - 1) - \frac{1}{2(T-1)}\right] \tag{11}$$

The null hypotheses of LM_S, CD and LM_{BC} tests are also the same as the null hypothesis of the LM test. In this study, the above cross-section dependency tests were conducted using the Eviews 10 program and the findings obtained are presented in Table 1.

Table 1. Cross Section Dependency Test

	LM stat.	LMs stat.	CD stat.	LMBC stat.
SE	7808.543*** (0.000)	818.349*** (0.000)	87.305*** (0.000)	818.327*** (0.000)
SER	2642.066*** (0.000)	273.754*** (0.000)	49.887*** (0.000)	273.733*** (0.000)
VOL	3970.894*** (0.000)	413.825*** (0.000)	59.212*** (0.000)	413.804*** (0.000)
GPRI	867.103*** (0.000)	86.657*** (0.000)	20.288*** (0.000)	86.635*** (0.000)
WUI	3932.418*** (0.000)	409.769*** (0.000)	61.341*** (0.000)	409.748*** (0.000)
CGPRI	458.278*** (0.000)	43.653*** (0.000)	17.545*** (0.000)	43.541*** (0.000)
CWUI	1204.851*** (0.000)	122.259*** (0.000)	28.917*** (0.000)	122.237*** (0.000)

Note: Items in parentheses are probability values. The *** sign indicates the presence of cross-section dependency between countries at the 1% significance level.

According to the results in Table 1, there is a cross-sectional dependency among the countries included in this study. For this reason, in the next stages of the study, it is necessary to use new generation panel data analysis methods that consider the cross-sectional dependency between countries.

3.4. Panel Unit Root Test

In this study, the stationarities of the series were examined with the HK panel unit root test developed by Hadri and Kurozumi (2012). In addition to considering the cross-sectional dependency between countries, this test also tries to solve the autocorrelation problem in series. HK panel unit root test also allows the presence of common factors in the series. In addition, the stationarity for some of the cross sections can also be detected by the HK test (Hadri & Kurozumi, 2012). In this test, two different test statistics are produced:

$$Z_A^{SPC} = \frac{1}{\hat{\sigma}_{iSPC}^2 T^2} \sum_{t=1}^{T} (S_{it}^w)^2 \quad (12)$$

$$Z_A^{LA} = \frac{1}{\tilde{\sigma}_{iLA}^2 T^2} \sum_{t=1}^{T} (S_{it}^w)^2 \quad (13)$$

Here, SPC shows the statistics produced by Sul, Phillips and Choi (2005) and LA shows the Lag-Augmented: additive lag model. While the null hypothesis of the HK panel unit root test is "the series is stationary for all horizontal sections", the alternative hypothesis is "the series is not stationary for some horizontal sections". The critical values required to test these hypotheses are given by Hadri and Kurozumi (2012: 33). In the study, the stationarity degrees of the series were tested with the HK method using the Gauss 16 program and the findings obtained are presented in Table 2.

Table 2. Panel Unit Root Test

	Level		First Difference	
	Z_A^{SPC}	Z_A^{LA}	Z_A^{SPC}	Z_A^{LA}
SE	2.147 (0.015)	3.159 (0.00)	2.147 (0.015)	3.159 (0.00)
SER	2.900 (0.012)	3.450 (0.00)	2.900 (0.012)	3.450 (0.00)
VOL	9.709 (0.000)	10.496 (0.00)	9.709 (0.000)	10.496 (0.00)

GPRI	3.629 (0.000)	4.395 (0.000)	3.629 (0.000)	4.395 (0.000)
WUI	8.587 (0.000)	9.779 (0.000)	8.587 (0.000)	9.779 (0.000)
CGPRI	2.276 (0.005)	2.188 (0.012)	2.276 (0.005)	2.188 (0.012)
CWUI	2.973 (0.000)	3.045 (0.000)	2.973 (0.000)	3.045 (0.000)

Note: The *** sign indicates stationary at the 1% significance level.

Looking at the results in Table 2, the series are not stationary in level values, but are stationary at the first difference. According to Granger and Newbold (1974), a spurious regression problem may arise in analyzes to be made with such series. In such cases, Engle and Granger (1987) suggest that the existence of cointegration relationship between series should be tested first, and they state that when the series are cointegrated, the spurious regression problem will also disappear.

3.5. Panel Cointegration Test

In this study, the existence of a cointegration relationship between series was analyzed using the panel cointegration with multiple structural breaks method developed by Westerlund (2006). This test can consider the cross-sectional dependency and common factors, and determine internally the dates of up to 5 structural breaks in the cointegration vector. The null hypothesis of the test is that "There is cointegration". Westerlund (2006) developed the following test statistics to test these hypotheses:

$$Z(M) = \sum_{i=1}^{N} \sum_{j=1}^{M_i+1} \sum_{t=T_{ij-1}+1}^{T_{ij}} \left(T_{ij} - T_{ij-1}\right)^{-2} \widehat{W}_{i1.2}^{-2} S_{it.}^{2} \quad (14)$$

Here, $M = (M_1, \dots, M_N)'$, the function representing the structural breaks in a panel with N countries and S_{it} expresses the partial sum of the error terms obtained as a result of the estimation made by DOLS or FMOLS methods. By using DOLS or FMOLS methods, autocorrelation and changing variance problems are solved by Newey-West method (Westerlund, 2006: 106). In the study, the existence of cointegration between the series was tested using the Gauss 16 program and the findings obtained are presented in Table 3.

Table 3. Cointegration Test

	LM stat.	Prob.
Model 1	7.741***	0.287
Model 2	11.053***	0.146
Model 3	12.193***	0.189

Note: The *** sign indicates the existence of a cointegration relationship at 1% significance levels. Values of probability are shown in parentheses.

According to the findings in Table 3, there is a cointegration relationship between the series in the models. In other words, these series move together in the long run and thus, no spurious regression problem will be encountered in predictions made with these series. Structural break dates determined by the panel cointegration with multiple structural breaks method developed by Westerlund (2006) are presented in Table 4.

Table 4. Structural Break Dates

	Model 1	Model 2	Model 3
Turkey	2003:M03; 2008:M10; 2015:M11	2002:11; 2008:M10; 2020:M03	2007:M12; 2013:M05; 2020:M10
S. Korea	2003:M08; 2008:M09; 2020:M02	2008:M10; 2020:M03	2007:M10; 2009:M12; 2020:M02
Russia	2003:M08; 2008:M08; 2020:M03	2008:M09; 2014:M04	2005:M10; 2007:M12; 2020:M02
India	2003:M08; 2008:M10; 2020:M02	2008:M09	2007:M12; 2010:M03; 2020:M02
China	2008:M10; 2019:M12	2008:M10; 2020:M02	2007:M03; 2020:M05
Indonesia	2004:M05; 2008:M10; 2020:M02	2008:M09; 2013:M05; 2020:M02	2013:M06; 2020:M03
Malaysia	2008:M09; 2020:M03	2008:M10; 2013:M06; 2020:M02	2007:M12; 2020:M03
Thailand	2004:M01; 2008:M12; 2020:M02	2008:M10; 2020:M03	2004:M12; 2007:M02; 2020:M03
Philippines	2004:M06; 2008:M08; 2020:M03	2008:M10; 2020:M03	2006:M11; 2020:M06
Hong Kong	2003:M09; 2008:M06; 2019:M09	2014:M04; 2019:M02	2007:M07; 2020:M10

Looking at the structural break dates in Table 4, it is seen that the 2008 global economic crisis and Covid19 affected countries significantly in general. Turkey's elections on 3 November 2002 and the period of AK Party governments, the FED's statements (it has been also appeared that these announcements affect Indonesia and Malaysia's economies) which claim it would end QE policies in May 2013, and the downing of a Russian fighter plane by Turkish military units in November 2015 significantly affected Turkey's geopolitical risks, uncertainty level and stock market. Russia's problems with Ukraine and China's with Hong Kong in 2014 also affected these economies significantly. These structural break dates were included in the panel regression analysis with dummy variables.

3.6. Panel Regression Analysis

Panel regression analyzes in the study were performed using the Panel AMG (Augmented Mean Group Estimator) method developed by Eberhardt and Bond (2009). This method considers the dependence between horizontal sections and calculates the overall result of the panel by weighting the coefficients. Panel AMG method can also take into account common factors and common dynamic effects in series, and produce robust predictions against autocorrelation and variance problems (Eberhardt & Bond, 2009: 4). In the study, the long-term cointegration coefficients were estimated with the Panel AMG method using the Stata 14 program and the results obtained are presented in Table 5.

Table 5. Panel Regression Analysis (Model 1: Dependent Var: LogSE)

Country	LogGPRI	LogWUI	D_1	D_2	D_3	Constant
Turkey	**-0.057** (0.019)**	**0.19*** (0.000)**	-0.0006 (0.996)	0.178 (0.118)	0.008 (0.941)	**3.241*** (0.000)**
S. Korea	**-0.047*** (0.000)**	**-0.083*** (0.000)**	0.017 (0.798)	0.056 (0.393)	**-0.119* (0.071)**	**7.373*** (0.000)**
Russia	**-0.735*** (0.000)**	-0.081 (0.273)	0.018 (0.949)	**0.796*** (0.006)**	0.118 (0.681)	**10.149*** (0.000)**
India	**0.244*** (0.000)**	**0.058* (0.067)**	0.035 (0.764)	**0.266** (0.026)**	**0.206* (0.082)**	**5.205*** (0.000)**
China	0.40 (0.521)	**-0.180*** (0.000)**	-0.149 (0.536)	-0.011 (0.961)	-	**8.529*** (0.000)**
Indonesia	**-0.078*** (0.005)**	**-0.168*** (0.000)**	0.026 (0.821)	0.023 (0.845)	0.042 (0.714)	**7.792*** (0.000)**
Malaysia	**-0.155*** (0.000)**	**0.224*** (0.000)**	-0.094 (0.564)	-0.137 (0.395)	-	**4.611*** (0.000)**
Thailand	**0.046*** (0.004)**	**-0.151*** (0.000)**	0.051 (0.552)	-0.109 (0.201)	**-0.140* (0.099)**	**5.578*** (0.000)**
Philippines	**0.173*** (0.000)**	0.027 (0.529)	0.046 (0.750)	-0.223 (0.123)	0.047 (0.741)	**3.330*** (0.000)**
Hong Kong	-0.007 (0.622)	-0.011 (0.667)	-0.023 (0.765)	0.128 (0.103)	-0.004 (0.958)	**9.329*** (0.000)**
Panel	-0.057 (0.494)	-0.017 (0.699)	-0.007 (0.725)	0.096 (0.288)	0.015 (0.620)	**6.514*** (0.000)**

Number of obs = 2340 **Wald chi2(5)** = 1.64 **Prob > chi2** = 0.896 **Root Mean Squared Error (sigma)** = 0.153

Note: *, ** and *** signs indicate significance at 10%, 5% and 1% levels, respectively. Values in parentheses are the values of probability.

According to the findings in Table 5, high geopolitical risk level (GPRI) decreased the stock market index (SE) in Turkey, S. Korea, Russia, Indonesia and Malaysia in line with the a priori expectations, while it increased in India, Thailand and Philippines. High economic and political uncertainties (WUI) have also decreased the stock market index in line with a priori expectations in S. Korea, China, Indonesia and Thailand, while increased in Turkey, India and Malaysia. Panel AMG estimation results for Model 2 are presented in Table 6.

Table 6. Panel Regression Analysis (Model 2: Dependent Var: SER)

Country	CGPRI	CWUI	D_1	D_2	D_3	Constant
Turkey	**-0.060** (0.011)**	**0.183*** (0.000)**	0.170 (0.134)	**0.197* (0.081)**	0.151 (0.180)	**3.306*** (0.000)**
S. Korea	**-0.046*** (0.000)**	**-0.083*** (0.000)**	0.019 (0.771)	-0.097 (0.143)	-	**7.371*** (0.000)**
Russia	**-0.730*** (0.000)**	-0.082 (0.267)	0.463 (0.109)	0.306 (0.293)	-	**10.139*** (0.000)**
India	**0.243*** (0.000)**	**0.053* (0.097)**	0.144 (0.231)	-	-	**5.252*** (0.000)**
China	0.040 (0.522)	**-0.180*** (0.001)**	-0.142 (0.557)	0.004 (0.985)	-	**8.531*** (0.000)**
Indonesia	**-0.080*** (0.004)**	**-0.171*** (0.000)**	-0.057 (0.621)	0.094 (0.416)	0.045 (0.696)	**7.827*** (0.000)**
Malaysia	**-0.151*** (0.000)**	**0.222*** (0.000)**	-0.206 (0.206)	0.155 (0.337)	-0.101 (0.530)	**4.617*** (0.000)**
Thailand	**0.043*** (0.006)**	**-0.149*** (0.000)**	-0.089 (0.299)	-0.116 (.173)	-	**5.574*** (0.000)**
Philippines	**0.174*** (0.000)**	0.038 (0.379)	0.150 (0.303)	0.047 (0.746)	-	**3.234*** (0.000)**
Hong Kong	-0.008 (0.528)	-0.018 (0.522)	-0.061 (0.430)	0.078 (0.317)	-	**9.390*** (0.000)**
Panel	-0.057 (0.491)	-0.018 (0.678)	0.039 (0.531)	0.067 (0.103)	0.009 (0.624)	**6.524*** (0.000)**

Number of obs = 2340 **Wald chi2(5)** = 7.01 **Prob > chi2** = 0.219 **Root Mean Squared Error (sigma)** = 0.154

Note: *, ** and *** signs indicate significance at 10%, 5% and 1% levels, respectively. Values in parentheses are the values of probability.

According to the findings in Table 6, while the change in the geopolitical risk level (CGPRI) decreased the returns (SER) of the stock markets in Turkey, S. Korea, Russia, Indonesia and Malaysia in line with the a priori expectations, it increased in India, Thailand and Philippines contrary to expectations. The change in economic and political uncertainties (CWUI) decreased the returns of the stock markets in line with the a priori expectations in S. Korea, China, Indonesia and Thailand, and increased in Turkey, India and Malaysia. The findings obtained from this analysis are in full consistency with the results in Table 5, and this situation constitutes an evidence for the robustness of the analyzes. Panel AMG estimation results for Model 3 are shown in Table 7.

Table 7. Panel Regression Analysis (Model 3: Dependent Var: VOLSE)

Country	CGPRI	CWUI	D_1	D_2	D_3	Constant
Turkey	**-0.061** (0.010)**	**0.182*** (0.000)**	**-0.221** (0.048)**	0.114 (0.310)	**0.209* (0.063)**	**3.325*** (0.000)**
S. Korea	**-0.047*** (0.000)**	**-0.084*** (0.000)**	0.053 (0.422)	-0.006 (0.921)	**-0.112* (0.089)**	**7.382*** (0.000)**
Russia	**-0.707*** (0.000)**	-0.085 (0.259)	0.100 (0.731)	**0.484* (0.095)**	-0.028 (0.923)	**10.054*** (0.000)**
India	**0.242*** (0.000)**	0.052 (0.106)	-0.099 (0.404)	0.064 (0.593)	**0.218* (0.068)**	**5.276*** (0.000)**
China	0.046 (0.460)	**-0.181*** (0.001)**	0.344 (0.152)	0.040 (0.868)	-	**8.505*** (0.000)**
Indonesia	**-0.077*** (0.006)**	**-0.168*** (0.000)**	0.109 (0.345)	0.163 (0.158)	-	**7.787*** (0.000)**
Malaysia	**-0.153*** (0.000)**	**0.226*** (0.000)**	-0.230 (0.154)	-0.132 (0.412)	-	**4.591*** (0.000)**
Thailand	**0.045*** (0.004)**	**-0.144*** (0.000)**	0.039 (0.646)	-0.010 (0.899)	-0.113 (0.188)	**5.521*** (0.000)**
Philippines	**0.170*** (0.000)**	0.037 (0.399)	-0.003 (0.982)	-0.040 (0.779)	-	**3.265*** (0.000)**
Hong Kong	-0.005 (0.706)	-0.019 (0.508)	0.076 (0.330)	-0.031 (0.691)	-	**9.380*** (0.000)**
Panel	-0.054 (0.502)	-0.018 (0.682)	0.016 (0.754)	0.064 (0.229)	0.017 (0.627)	**6.509*** (0.000)**

Number of obs = 2340 **Wald chi2(5)** = 1.78 **Prob > chi2** = 0.878 **Root Mean Squared Error (sigma)** = 0.154

Note: *, ** and *** signs indicate significance at 10%, 5% and 1% levels, respectively. Values in parentheses are the values of probability.

According to the findings in Table 7, change in the geopolitical risk level (CGPRI) increased the volatility of the stock markets (VOLSE) in India, Thailand and Philippines in line with a priori expectations, while reducing in Turkey, S. Korea, Russia, Indonesia and Malaysia contrary to a priori expectations. The change in economic and political uncertainties (CWUI), on the other hand, increased the volatility of the stock markets (VOLSE) in Turkey and Malaysia in line with the a priori expectations, and decreased in S. Korea, China, Indonesia and Thailand. In these analyzes, the results of the panel in general are not statistically significant, indicating that the direction and magnitude of the effects are heterogeneous among countries. This result is also important as it reveals that geopolitical risks and economic and political uncertainties are not as important determinants as expected for the financial markets of developing Asian countries.

3.7. Panel Causality Test

In the study, the causality relationships between the series were tested with the Konya (2006) panel causality method. This method can take the cross-sectional dependency into account and generate the causality test results separately for each cross-section that makes up the panel. In a panel consisting of N cross sections, the following simultaneous equation system is used to test the causality relations between two series of X and Y with the Konya (2006) method:

$$Y_{1,t} = \varphi_{1,1} + \sum_{i=1}^{p_{y_1}} \alpha_{1,1,i} Y_{1,t-i} + \sum_{i=1}^{p_{x_1}} \gamma_{1,1,i} X_{1,t-i} + \epsilon_{1,1,t} \qquad (15)$$

$$Y_{2,t} = \varphi_{1,2} + \sum_{i=1}^{p_{y_1}} \alpha_{1,2,i} Y_{2,t-i} + \sum_{i=1}^{p_{x_1}} \gamma_{1,2,i} X_{2,t-i} + \epsilon_{1,2,t} \qquad (16)$$

$$\cdots$$

$$Y_{N,t} = \varphi_{1,N} + \sum_{i=1}^{p_{y_1}} \alpha_{1,N,i} Y_{N,t-i} + \sum_{i=1}^{p_{x_1}} \gamma_{1,N,i} X_{N,t-i} + \epsilon_{1,N,t} \qquad (17)$$

While testing the causality relationships from X to Y in the models up to now, the following models are used to test the causality relationships from Y to X:

$$X_{1,t} = \varphi_{2,1} + \sum_{i=1}^{p_{y_2}} \alpha_{2,1,i} Y_{1,t-i} + \sum_{i=1}^{p_{x_2}} \gamma_{2,1,i} X_{1,t-i} + \epsilon_{2,1,t} \qquad (18)$$

$$X_{2,t} = \varphi_{2,2} + \sum_{i=1}^{p_{y_2}} \alpha_{2,2,i} Y_{2,t-i} + \sum_{i=1}^{p_{x_2}} \gamma_{2,2,i} X_{2,t-i} + \epsilon_{2,2,t} \qquad (19)$$

$$X_{N,t} = \varphi_{2,N} + \sum_{i=1}^{p_{y_2}} \alpha_{2,N,i} Y_{N,t-i} + \sum_{i=1}^{p_{x_2}} \gamma_{2,N,i} X_{N,t-i} + \epsilon_{2,N,t} \qquad (20)$$

Here, p_{y_1}, p_{y_2} and p_{x_1}, p_{x_2} are the optimum delay lengths determined for Y and X. In equations, the null hypothesis of the test is "There is no causality from X_1 to Y_1 for $\gamma_{1,1,i} = 0$ for each i." while the alternative hypothesis is "$\gamma_{1,1,i} \neq 0$, there is causality from X_1 to Y_1 for at least one i". To test these hypotheses, Wald statistics based on SUR (Seemingly Unrelated) method are obtained. The weakness of the Konya (2006) test is that it cannot produce results for the general panel. In this study, Dumitrescu and Hurlin (2012) panel causality test was used to close this gap. The simultaneous equation system, which is used to perform this test between two series in X and Y form, is given below:

$$Y_{1,t} = \delta_{1,i} + \sum_{k=1}^{K} \phi_{1,i}^{(k)} Y_{i,t-k} + \sum_{k=1}^{K} \psi_{1,i}^{(k)} X_{i,t-k} + \epsilon_{i,t} \qquad (21)$$

$$X_{1,t} = \delta_{2,i} + \sum_{k=1}^{K} \phi_{2,i}^{(k)} Y_{i,t-k} + \sum_{k=1}^{K} \psi_{2,i}^{(k)} X_{i,t-k} + \varepsilon_{i,t} \quad (22)$$

Here, K is the optimum lag length. The null hypothesis to be tested for Equation (21) is "$\phi_{1,i}^{(k)} = 0\ for\ all\ i$, there is no causality from X to Y", while the alternative hypothesis is "$\phi_{1,i}^{(k)} \neq 0$, $for\ some\ i$, there is causality from X to Y in some horizontal sections". One of the most important advantages of Dumitrescu and Hurlin (2012) panel causality test is that it can determine the causality relationships that exist in some part of the panel. In the study, Konya (2006) and Dumitrescu and Hurlin (2012) panel causality test was performed (The results of Dumitrescu and Hurlin (2012) for determining the optimum lag length required for the panel causality test are given in Appendix 2) and the findings obtained are presented in Table 8.

Table 8. Panel Causality Test Results

Countries	GPRI → SE	WUI → SE	CGPRI → SER	CWUI → SER	CGPRI → VOLSE	CWUI → VOLSE
	Wald stat.	Wald stat.	Wald stat.	Wald stat.	Wald stat.	Wald stat.
Turkey	0.051 (0.950)	**3.338** (0.037)**	0.116 (0.890)	**2.955* (0.054)**	0.326 (0.721)	0.117 (0.889)
S. Korea	0.909 (0.404)	1.283 (0.279)	0.099 (0.905)	0.871 (0.419)	1.265 (0.284)	2.163 (0.117)
Russia	1.938 (0.146)	0.099 (0.905)	0.535 (0.585)	0.235 (0.790)	0.025 (0.974)	0.355 (0.701)
India	1.350 (0.261)	**3.579** (0.029)**	1.756 (0.175)	0.382 (0.682)	0.306 (0.736)	1.499 (0.225)
China	0.340 (0.712)	1.588 (0.206)	0.637 (0.529)	0.133 (0.875)	0.073 (0.929)	0.181 (0.834)
Indonesia	0.206 (0.813)	3.078** (0.048)	0.144 (0.865)	1.977 (0.140)	0.747 (0.474)	0.241 (0.785)
Malaysia	0.428 (0.652)	1.035 (0.356)	0.015 (0.984)	0.081 (0.921)	0.669 (0.513)	0.433 (0.648)
Thailand	0.664 0.515)	0.365 (0.694)	0.771 (0.463)	0.175 (0.839)	0.176 (0.838)	1.597 (0.204)
Philippines	1.255 (0.286)	1.405 (0.247)	2.133 (0.120)	1.887 (0.153)	1.241 (0.290)	**3.715** (0.025)**
Hong Kong	**3.457** (0.033)**	1.158 (0.315)	**3.586** (0.029)**	1.370 (0.256)	0.057 (0.943)	1.329 (0.266)
Panel	2.748 (0.159)	**6.492*** (0.000)**	2.995 (0.255)	4.715 (0.458)	3.168 (0.342)	4.323 (0.753)

Note: The signs ***, ** and * show that there is a causality relationship from X to Y (X → Y) at a significance level of 1%, 5% and 10%, respectively. Values in parentheses are values of probability. In the Dumitrescu and Hurlin (2012) panel causality test conducted for the panel, only W-stat values were given due to space constraints.

According to the results of the country-specific causality test determined by the Konya (2006) method in Table 8, it is seen that there are causality relationships in Turkey from economic and political uncertainties to the stock market index and from change in economic and political uncertainties to the return of the stock market. Similarly, it has been determined that there are causality relationships from economic and political uncertainties to stock market index in India, from changes in economic and political uncertainties to stock market index volatility in Philippines, from geopolitical risks to stock market index and from change in geopolitical risks to return of stock market index in Hong Kong. In Dumitrescu and Hurlin (2012) panel causality test, which was conducted to determine the causality relationships for all of the panel, it was determined that there was only a causality relationship from economic and political uncertainties to stock market indices. It can be said that geopolitical risks and economic and political risks are not important determinants for stock markets of developing Asian countries.

Conclusion

As a result of the analyzes carried out to test the cross-sectional dependence between countries, it was decided that there is cross-sectional dependence among the countries included in the study. Based on this result, two important inferences can be made: The first is that the financial markets of the countries studied are in close interaction (in the position of substitution of each other) and therefore countries should take this into account when developing policies for their financial markets. Secondly, in the later stages of the analysis, it is necessary to benefit from the new generation panel data analysis methods that consider the cross-sectional dependence between countries.

According to the results of the panel unit root test performed to determine the degree of stationarity of the series, the series are not stationary at the level values, but become stationary at the first difference. In such cases, it is possible to encounter a spurious regression problem in the analysis to be made with the level values of the series. For this reason, firstly, the existence of cointegration relationship between series should be tested. For this purpose, Westerlund's (2006) panel cointegration with multiple structural breaks method, which is one of the new generation panel cointegration tests, was used and it was determined that the series included in the models were cointegrated. In this test, structural break dates determined internally are included in panel regression analysis with dummy variables.

In the Panel AMG analysis performed taking the logarithms of the level values of the series, it was determined that high geopolitical risk level decreased the stock market index in Turkey, S. Korea, Russia, Indonesia and Malaysia. These results coincide with the findings they obtained from the studies conducted by Liu and Zhang (2015), Asteriou and Sarantidis (2016) and Alqahtani and Martinez (2020). It was determined that high geopolitical risk level increased the stock market index in India, Thailand and Philippines. It was also found that high economic and political uncertainties decreased the stock market index in S. Korea, China, Indonesia and Thailand, while increased in Turkey, India and Malaysia. In the analysis performed with values in terms of percentage changes in the series, it was observed that the change in the geopolitical risk level decreased the returns of the stock markets in Turkey, S. Korea, Russia, Indonesia and Malaysia, and in turn increased in India, Thailand and Philippines. Similarly, change in economic and political uncertainties was found to reduce the returns of the stock markets in S. Korea, China, Indonesia and Thailand and increase in Turkey, India and Malaysia. Findings obtained from this analysis are consistent with each other and robust.

In the analysis made between the values in terms of percentage changes in the series and the volatility in the stock market index, it was seen that the change in the geopolitical risk level increased the volatility of the stock markets in India, Thailand and Philippines and decreased in Turkey, S. Korea, Russia, Indonesia and Malaysia. These results showed that these results are consistent with the findings of studies of Baker et al. (2016) and Li et al. (2019) in the literature. On the other hand, it was determined that the change in economic and political uncertainties increased the volatility of the stock markets in Turkey and Malaysia and decreased in S. Korea, China, Indonesia and Thailand. In these analyzes, the results of the panel in general are not statistically significant, and indicate that this situation may have resulted from a heterogeneous structure between countries in the direction and magnitude of the effects. At this point, it shows that it is useful and necessary to use analysis methods that produce country-specific results. These heterogeneous results obtained from Das et al. (2019) is consistent with the findings of the study.

The country-specific causality test results were examined with the Konya (2006) panel causality test, while the causality relationships throughout the panel were analyzed with the help of Dumitrescu and Hurlin (2012) panel causality test. According to the results of the causality test of Konya (2006), it has been observed that there are causality relationships in Turkey from economic and political uncertainties to the stock market index and from change in economic and political uncertainties to the return of the stock market. Similarly, it has been determined that there are causality relationships from economic and political uncertainties to stock market index in India, from change in economic and political uncertainties in Philippines to volatility in stock market index and from geopolitical risks to stock market index and from change in geopolitical risks to return of stock market index in Hong Kong. These results are also consistent with the findings of the study conducted by Sum (2012) in the literature. In Dumitrescu and Hurlin (2012) panel causality test, which was conducted to determine the causality relationships for all of the panel, it was determined that there was only a causality relationship from economic and political uncertainties to stock market indices. When the results of this test are evaluated together with the panel regression results for the general panel being statistically insignificant, it can be said that geopolitical risks and economic and political risks are not important determinants of stock exchanges for developing Asian countries. However, stock exchanges of these countries continue to attract local and foreign investors because of high profits they offer and grow rapidly.

Based on the findings obtained from this study, it can be stated that geopolitical risks and economic and political uncertainties are not significant determinants for the financial markets of developing Asian countries and there are other internal and external dynamics affecting the stock markets of these countries. It can also be said that investors who will trade in these markets should avoid basket trading strategy, considering the heterogeneity between countries. When the effects of geopolitical risks and uncertainties are compared, it should be noted that economic and political uncertainties affect the stock markets of these countries more, and therefore, investors' acting accordingly may increase their portfolio management success.

It can be suggested that it may be beneficial to include other possible explanatory variables that may affect the returns and volatility of stock exchanges in future studies. In addition, due to the heterogeneity between countries, it can be argued that it would be a better choice for researchers to use analysis methods that also produce country-specific results, as in this study, rather than methods that produce results for the panel as a whole.

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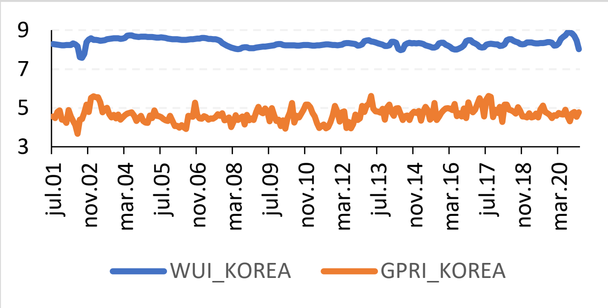
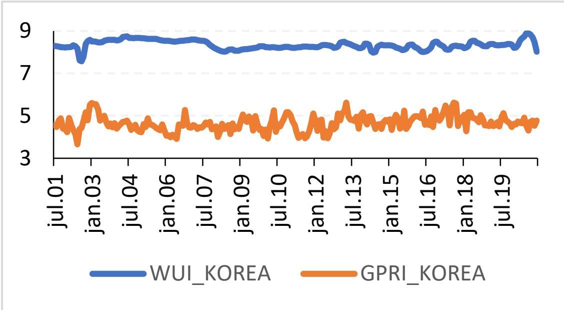
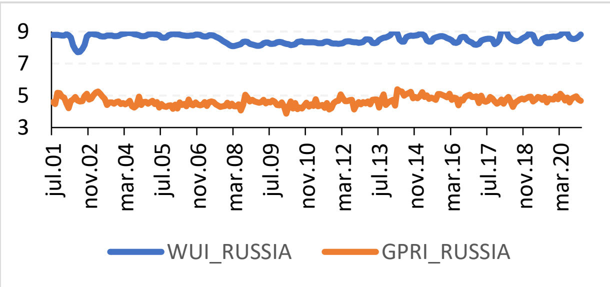
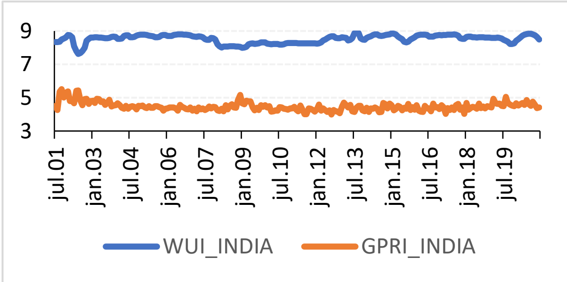
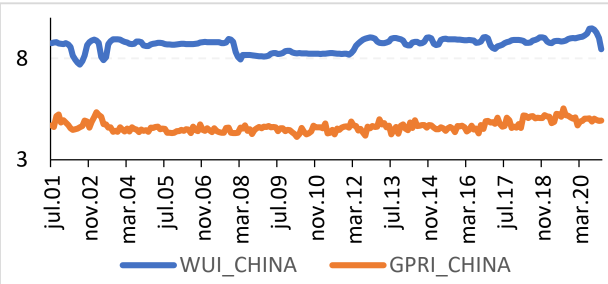
Appendix A: Logarithmic Graphs of Geopolitical Risk (GPRI) and Uncertainty Index (WUI) Data for Countries

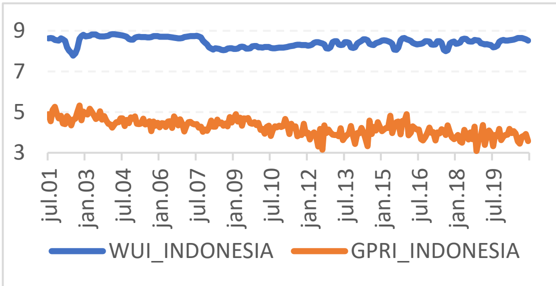


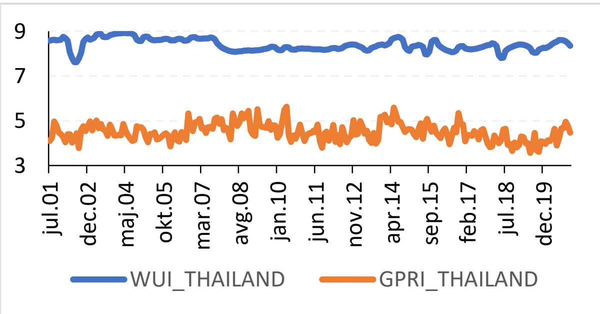


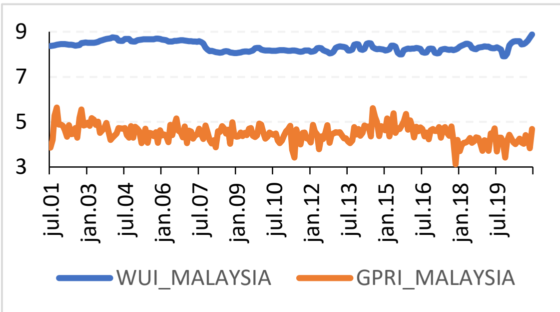


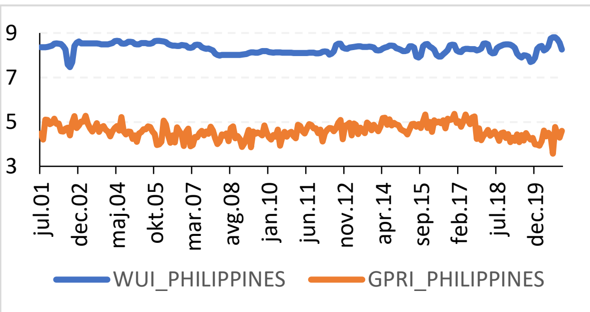


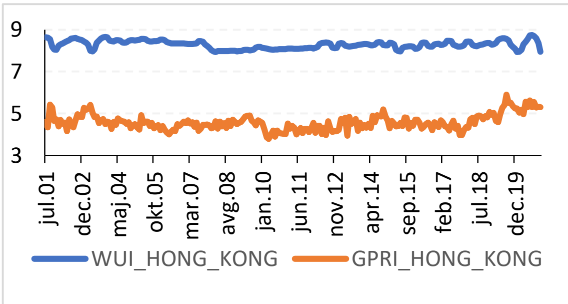








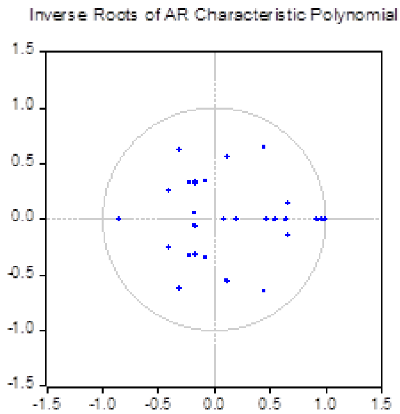




Appendix B: Dumitrescu and Hurlin (2012) Optimal Lag Length Determination Results for Panel Causality Test

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-48082.14	NA	4.93e+09	42.18345	42.20105	42.18987
1	-20907.02	54159.53	0.228430	18.38861	18.52940	18.43996
2	-20642.98	524.5927	0.189162	18.19999	18.46396*	18.29627
3	-20291.75	695.6845	0.145110	17.93487	18.32203	18.07609
4	**-19830.98**	**909.8201**	**0.101119***	**17.57367***	**18.08401**	**17.75982***
5	-19734.86	189.2110*	0.097025	17.53233	18.16586	17.76341
6	-19543.52	375.4703	0.085637	17.40747	18.16418	17.68348

Considering the findings in this table, the optimum delay length is 4 according to FPE, AIC and HQ criteria. In order to check the stability of the model with this lag length, the inverse roots of AR characteristic plynominal graph was obtained and presented below.



Since the points remain in the unit circle, the model to be established with 4 lags and the causality test to be made will be stable. In this model, the existence of autocorrelation and heteroskedasticity problems was also tested and the results are presented below.

Serial Correlation LM Tests

Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	182.4577	49	0.2586	3.745670	(49, 11467.9)	0.2894
2	195.2272	49	0.1254	4.010047	(49, 11467.9)	0.1654
3	727.3733	49	0.1059	15.29289	(49, 11467.9)	0.1087
4	259.6269	49	0.2047	5.347858	(49, 11467.9)	0.2487

Heteroskedasticity Tests (Includes Cross Terms)

Chi-sq	df	Prob.
24504.15	11900	0.5841

Null hypotheses regarding the probability values in these tables are accepted and it is decided that there are no autocorrelation and heteroskedasticity problems in the 4-lag model.