G20 Stock Market Reaction to the G20 New Delhi Summit, 2023

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Abstract. The purpose of this study is to examine the impact of the G20 New Delhi Summit on the stock markets of the G20 member countries. In this study, we calculated the abnormal return and the average abnormal return using the event study approach. The sample in this study consists of 43 G20 member countries. This study observes stock data of G20 member stock markets for 10 trading days around the event date. The analysis of the difference in the average abnormal return (AAR) before and after the G20 New Delhi Summit on September 9– 10, 2023 revealed the impact of significant differences in the average abnormal return. This study also categorizes the data based on developed and developing countries. The analysis based on average abnormal returns shows that there are significant differences in developed countries on the day before and the day after the event. However, stock markets in developing countries do not show significant AAR differences. Finally, the regional analysis shows that the European region was affected by a positive and significant average abnormal return due to this event. Whereas, the Asian and American regions show no difference in average abnormal returns.

Keywords: *efficient market, abnormal return, event study, G20 Stock Exchange.*

1   INTRODUCTION

In realizing global and national commitments, from September 9 to September 10, 2023, the G20 New Delhi Summit 2023 was held. The Group of Twenty represents 85 percent of the world's GDP, 75 percent of world trade, and 2/3 of the world's population. This shows how important this group is in determining the direction of world economic policy. The Group of Twenty (G20) comprises 19 countries with large economic potential in the world and the European Union. The G20 forum is expected to help the economy recover in three main ways: by working together with other countries, taking real actions to make things better, and deciding on future economic plans.

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The declaration also agreed with the EU's requests to change the multilateral development bank and do something about climate change, like increasing renewable energy by three times by 2030. Four trillion dollars or equivalent to Rp 61.4 quadrillion is needed per year to pay for this green energy. This agreement will impact G20 member countries with conventional energy producers such as China, India, and Indonesia as one of the largest coal-producing countries in the world. U.S. President Joe Biden and Indian Prime Minister Narendra Modi worked together with a group of G20 leaders to increase investments in building high-quality infrastructure projects and the development of economic corridors through the Partnership for Global Infrastructure and Investment (PGII). This partnership aims to create better economic pathways and was started last year by the EU, the US, and Indonesia during the G20 summit in Bali. A plan for the India-Middle East-Europe Economic Corridor was agreed on by the United States, India, Saudi Arabia, United Arab Emirates, France, Germany, Italy and the European Union. It is seen as another option to the Chinese Belt and Road Initiative. The new corridor will connect India, Saudi Arabia, the United Arab Emirates, Jordan, Israel and the European Union. It is designed to help trade and make the economy grow. Also, the EU and the US agreed to work together to support the Trans-African Corridor that links southern Democratic Republic of Congo and northwestern Zambia to trade markets around the world through the Port of Lobito in Angola.

Indian capital markets responded to the outcome of the G20 summit as a positive signal, as evidenced by the day after the G20 summit, Indian stock indices rose on positive market sentiment and continued buying by global investors. Indian stock indices started Monday's trading well, responding to the result of the G20 summit in New Delhi. The Sensex and Nifty were up 0.3–0.4 percent from their Friday close at 66,861.16 points and 19,910.10 points, with all sectoral indices in the green (source: Hindustantimes.com)[11]. The positive reaction was not only seen in India. In Indonesia, the JCI also increased from the closing price on Friday September 8, 2023, of 6924.78 to 6963.39 on Monday, September 11, 2023. In the United States, the Dow Jones Index was also observed to have increased with a closing price on Friday, September 8, 2023, of 34577.28 to 34664 on Monday, September 11, 2023.

More proof of how the market reacted was seen in the railway and shipping companies' stocks. They increased on Monday, September 11, 2023. Stock prices increased after leaders from different countries agreed to build a railroad and port that will connect the Middle East and South Asia. Participants made this announcement on September 9, 2023, during the G20 Summit in New Delhi. At the end of the day, Rail Vikas Nigam (RVNL) shares were priced at Rs 189.50, an increase of Rs 16.40. The stock reached its highest price ever at Rs 191.40 on the BSE during morning trading. Shares of Titagarh Rail Systems increased by 1.71 percent to reach Rs820.20. BEML closed at Rs2,610.00, which is 0.66 percent higher than before (source: zeebis.com). In the stock market, Chochin Shipyard's value decreased by 0.65 percent to Rs 1,201.50 after increasing earlier, while Garden Reach Shipbuilders & Engineers increased by 1.32 percent to Rs 896.80. Mazagon Dock, a company that builds ships, saw its stock price increase by 2.79 percent to Rs 2271.15 on the BSE. (source: zeebis.com)[15].

According to the efficient market hypothesis (Fama, 1970)[8], the market will respond fast to news. Any news or event can be seen as important, so people in the market can respond by guessing how it will affect things. The response shows up as unusual profits or losses. The first event study research was done by Ball and Brown in 1968[4]. They discovered that there is a connection between news about a company's earnings and its stock prices going up or down. So far, researchers are still studying some events, like Yousaf et al. In 2022 [14], someone discovered that military action had a significant negative impact on most stock markets in Asia and Europe. Andreas and his team studied how the Asian Games being held in Indonesia affected the stock market there. It was determined that it had minimal impact. Zhao Yuhao and others In 2022[16] , a study looked at how the market reacted to the Paris summit of world leaders. According to the study, the summit had minimal impact on the market.

These different results indicate an opportunity in event study research to analyze the impact of other events including the G20 New Delhi Summit 2023 as an international event. We would like to conduct research on the capital market reaction to new information generated from the implementation of the G20 Summit. This research is expected to answer whether there are significant abnormal return differences in the capital markets of G20 members due to the implementation of the 2023 New Delhi G20 Summit.

2 LITERATURE REVIEW

2.1 Efficient Market Hypothesis

The concept of efficient market hypothesis was initially discussed by Fama in 1970[8]. Fama argues that a market is considered efficient when stock prices reflect all available information. Fama and other researchers. In 1970[8], the efficient market hypothesis was defined in three types: Weak Form, Semi-Strong Form, and Strong Form. Sarkar (2019)[10] In simple terms, a market is considered efficient in a weak form if stock prices already include all previous information. This means that no investor can generate significant profits or losses by using old information, because stock prices quickly change when new information is released.

1.1 Signaling Theory

The beginning of signaling theory comes from the theoretical work of George A. Akerlof in 1970[1] who conducted research on the phenomenon of information imbalance regarding product quality between buyers and sellers in the used car market. Akerlof[1] created a concept in 1970 that was later elaborated on by Spence in 1973[17]. Spence's theory revolves around how a company communicates information to investors to accurately represent its state. According to signaling theory, a company's disclosure of information to investors should accurately depict its current status; moreover, signaling theory examines how a company provides investors with information that accurately reflects its situation. This helps the investors make good decisions.

2.1 **Event Study**

Event study research is usually associated with the semi-strong form efficient market hypothesis theory proposed by Fama in 1970[8], which was later clarified by Fama in 1991[9] such that the semi-strong market form is an event study that states that current stock prices are not only a reflection of past stock prices but also reflect all relevant public information and include financial reports and other additional information. Sorescu, Warren, and Ertekin (2017)[18] suggest that the event study is employed to assess the potential for investors to gain extra returns from a new event with important information.The purpose of event studies is to see if investors can make extra return from an event that brings new information. Hartono (2019)[19] explains that event study looks at how the market reacts to an event when information about it is announced. Bodie, Kane, and Marcus (2018)[20] explain that an event study is a way to look at how an event affects the price of a stock.

2.2 **Hypothesis Development**

Singh et al. (2024)[21] did research to see how the COVID-19 outbreak affected the stock markets of G20 countries. They found that there were statistically significant abnormal returns in stock prices for 58 days during four specific times. Studies by Yousaf and his team in 2022[14], as well as Buigut and Kappar in 2020[22], discovered that there was a statistically significant abnormal return in stock prices because of some event or news. In contrast, a study by Zhao and his team. In 2022[16], Andreas and others. In 2020[2], Konak and Turkoglu (2023)[23] discovered that there wasn't a big reaction to unusual returns because of an event or information.

Previous studies have indicated that news or events have the potential to disrupt the normal movements of the stock market. This study is based on earlier research and the idea of studying events. The hypotheses in this study are as follows:

H1 : There is a significant difference in average abnormal return in the capital market of G20 members before and after the G20 New Delhi Summit 2023.

3 **RESEARCH METHOD**
3.1 **Research Model**

This research uses an event study approach and is quantitative research. The information used comes from the main index in the capital markets of the G20 member countries. This study uses the last price of the main stock market index for G20 countries. We will look at the 10 days surrounding the G20 New Delhi Summit 2023, five days before and five days after. The G20 Summit in New Delhi is scheduled to take place September 9th and 10th in 2023.

3.2 Population and Sample

The research population is the main index of the capital market of 43 G20 member countries. The technique used in sampling is nonprobability sampling, where all the population in this study is used as samples. According to Sugiyono (2019)[24] the sample selection technique when all members of the population are used as samples is referred to as nonprobability sampling. The data used consists of the closing prices of the main indices of the countries listed as members of the G20 for 10 trading days. Data obtained from website sources id.investing.com and www.finance.yahoo.com

3.3 Data Analysis Method

Abnormal return is calculated by deducting the expected return from the actual return on a daily basis. Individual actual stock return is calculated using the following formula:

Actual return:
$Rit = Ln (PitPit-1)$

Where R is return of stock i at time t, P is closing price of stock i at time t −1.

Expected returns are calculated using the market-adjusted model to calculate the expected   returns.   This   model says that   the   market   return   is   the best way to estimate returns (Brown & Warner, 1985)[25].

Expected return:
$RM = ACWIt-ACWIt-1ACWIt-1$

Where Rm is the return of the benchmark index ACWI (All Country World Index) on day t.
Abnormal returns are calculated using the following equation:

Abnormal return:
$ARi,t = Ri,t - E[Ri,t]$

Average abnormal return using the market adjusted model (Brown and Warner, 1985)[25]:

$AAR = t=ikARN$

Where AAR shows the average abnormal returns. N is the number of indices.

4   RESULT AND DISCUSSION

4.1   Description of Research Variables

This study analyzes the difference in average abnormal returns before and after the G20 New Delhi Summit 2023 event. First, we examine all major indices of G20 member countries together. To augment the average abnormal return analysis, we separate the sample based on developed and developing country members. We also classify the sample based on Europe, America, and Asia-Africa regions. Figure 1 shows the average abnormal return data of G20 countries before and after the event. Table 1 shows the Statistical Description of the average abnormal return data five trading days before and after the event from each sample group.
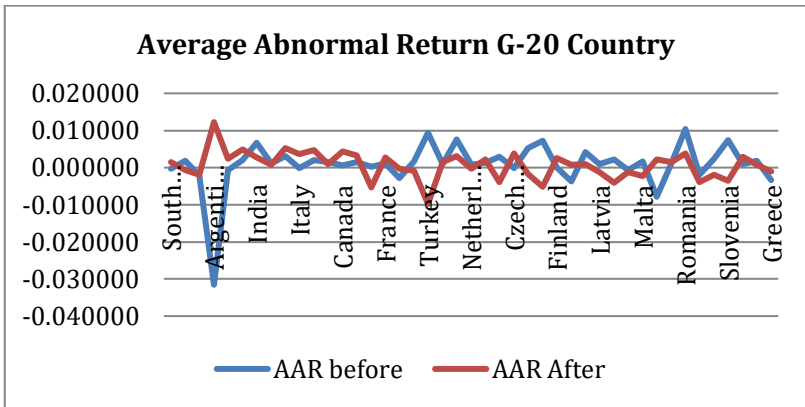

Figure 1. Average Abnormal Return G20 Country

Figure 1 shows the average abnormal return data of all G20 members with 43 countries. The G20 has 29 developed countries and 14 developing countries. We also categorize the G20 members by region, the Asian and African regions include 9 countries, the European region includes 29 countries, and the American region includes 5 countries. In Table 1, we can see that the lowest AAR value before the event is -0.31572, which is the loss to Argentina and the highest AAR value before the event is 0.01039, which is to Romania. The lowest AAR value after the event is -0.00979, which is the highest loss of Turkey. The highest AAR value after the event is 0.01225, which is owned by Argentina. In Table 1, we can also see from the mean value of AAR, before the event and after the G20 New Delhi Summit 2023 decreased by 0.0005. This indicates that the G20 member exchanges reacted negatively to the G20 New Delhi Summit.

Table 1. Statistic Variables

Variable	N	Min	Max	Mean	Stdv.
G20 Stock Index					
AAR_{before}	43	-0,31572	0,010393	0,000847	0,006138
AAR_{after}	43	-0,00979	0,01225	0,00059	0,003711
Developed Country					
AAR_{before}	29	-0,007897	0,007249	0,000720	0,002786
AAR_{after}	29	-0,005200	0,0052	0,000969	0,002588
Developing Country					
AAR_{before}	14	-0,03157	0,01039	0,00111	0,0102423
AAR_{after}	14	-0,00979	0,01225	-0,00017	0,0053962
Asia and Africa					
AAR_{before}	9	-0,0021405	0,0093370	0,0021420	0,0036336
AAR_{after}	9	-0,0097854	0,0046498	0,0002986	0,00429453
Europe					
AAR_{before}	29	-0,007897	0,010393	0,001516	0,003756
AAR_{after}	29	-0,005200	0,00518	0,000264	0,0028
America					
AAR_{before}	5	-0,03157	0,002008	-0,00537	0,014669
AAR_{after}	5	-0,00542	0,01225	0,003088	0,006635

Table 1 shows that the standard deviation of the AAR of the G20 index before and after the event has a greater value than the mean value. Where, the standard deviation value of AAR before and after is 0.006138 and 0.003711 while the mean value of AAR before and after is 0.000847 and 0.00059. In developed countries, the standard deviation value of AAR before and after the event is greater than the mean value. The standard deviation value of AAR before and after the event is 0.002786 and 0.002588, while the mean value of AAR before and after the event is 0.000720 and 0.000969. Descriptive statistics in developing countries also show that the standard deviation value of AAR before and after the event is greater than the mean value. Where the standard deviation value of AAR before and after is 0.0102423 and 0.0053962, the mean value of AAR before and after is 0.00111 and -0.00017. In the Asia and Africa region, the standard deviation value of AAR before and after the event is greater than the mean value. The standard deviation values of AAR before and after the event are 0.0036336 and 0.00429453, while the mean values of AAR before and after the event are 0.0021420 and 0.0002986. In the European region, the standard deviation value of AAR before and after the event is greater than the mean value. The standard deviation values of AAR before and after the event are 0.003756 and 0.0028, while the mean values of AAR before and after the event are 0.001516 and 0.000264. In the U.S. region, the standard deviation value of AAR before and after the event is greater than the mean value. The standard deviation value of AAR before and after the event is 0.014669 and 0.006635, while the mean value of AAR before and after the event is 0.003088 and 0.006635. The descriptive analysis results show that the standard deviation value is greater than the average value (mean), this means that the data is heterogeneous, because the data

distribution varies, which means that the average average abnormal return has a high level of deviation.

Table 2. Abnormal Return before and After G20 New Delhi Summit 2023

date	*N*	α	*Sig.*	Results
t-5 vs t+5	43	0,05	0,001	Significant
t-4 vs t+4	43	0,05	0,004	Significant
t-3 vs t+3	43	0,05	0,001	Significant
t-2 vs t+2	43	0,05	0,011	Significant
t-1 vs t+1	43	0,05	0,006	Significant

Table 2 shows the comparison of abnormal returns on the observation days around the event. The hypothesis test results on all observation days show a significant value smaller than the predetermined significance level, which is 0.05. If the p-value $< α$, it can be concluded that the null hypothesis (H0) is rejected or it can be concluded that there is a significant difference in abnormal returns in the capital markets of G20 members before and after the organization of the G20 New Delhi Summit 2023.

Table 3. Hypothesis Test

Variable	N	Normality Data	α	Sig.	Results
G20 Stock Index					
AAR$_{before-after}$	43	Not normal	0,05	0,007	Significant
Developed Country					
AAR$_{before-after}$	29	Not normal	0,05	0.037	Significant
Developing Country					
AAR$_{before-after}$	14	Not normal	0,05	0,083	Not Significant
Asia and Africa					
AAR$_{before-after}$	9	Not normal	0,05	0,139	Not Significant
Europe					
AAR$_{before-after}$	29	Normal	0,05	0,039	Significant
America					
AAR$_{before-after}$	5	Not normal	0,05	0,500	Not Significant

Table 3 provides information on the results of a study on the mean abnormal return of G20 countries. The significance value is 0.007, which is less than the predetermined level of 0.05. If the p-value is less than α, we can say that the null hypothesis (H0) is rejected or there is a significant difference in average abnormal returns before and after the G20 New Delhi Summit 2023. In the second test, we will see the outcomes of testing our idea about the average abnormal return in the group of developed countries. The significance value is 0.037, which is smaller than the significance level of 0.05. If the p-value is less than the alpha level, it means that we can reject the null hypothesis or say that there is a significant difference in average abnormal returns in developed countries before and after the G20 New Delhi Summit 2023. Experiments done in developing countries have a value of 0.083, which is higher than the usual level of 0.05. If the p-value is greater than the chosen

significance level (α), then we can say that the null hypothesis (H0) is true, or that there is no significant difference in average abnormal returns in developing countries before and after the G20 New Delhi Summit 2023.

Further analysis is carried out by grouping samples by region. Hypothesis testing conducted in the Asian and African regions shows a significance value of 0.139 or greater than the significance level of 0.05, so it can be concluded that hypothesis 0 (H0) is accepted or there is no significant difference in average abnormal returns in Asian and African countries before and after the G20 New Delhi Summit 2023. Tests conducted in the European region show that the resulting significance value is 0.039 or smaller than the predetermined significance level, which is 0.05. If the p-value < α, it can be concluded that the null hypothesis (H0) is rejected or there is a significant difference in average abnormal returns in European countries before and after the G20 New Delhi Summit 2023. Tests conducted in the American region show a significance value of 0.500 or greater than the significance level of 0.05, so it can be concluded that hypothesis 0 (H0) is accepted or there is no significant difference in average abnormal returns in the American region countries before and after the G20 New Delhi Summit 2023.

We conducted a detailed study by testing the non-event dates, specifically a month before the event and a month after the G20 New Delhi Summit. The purpose of this test is to prove whether the G20 Summit event is a unique event and is not similar to the same date in other months.

Table 4. Hypothesis Test Non-event

Variable	N	Normality Data	α	Sig.	Results
Non Event 1					
AAR$_{before-after}$	43	Abnormal	0,05	0,469	Not Significant
Non Event 2					
AAR$_{before-after}$	43	Abnormal	0,05	0,981	Not Significant

The first test for Non-event 1 was conducted one month before the G20 New Delhi Summit 2023. The test was conducted on the main index of G20 member countries. Observations were made on five trading days before and after August 9–10, 2023. The Wilcoxon Test results show a significance of 0.469 or greater than the specified significance level of 0.05. These results indicate that hypothesis 0 (H0) is accepted or there is no significant difference in average abnormal returns before and after Non-event 1. The next test was conducted on non-event date 2, which is one month after the G20 New Delhi Summit 2023. Tests were conducted on the main index of G20 member countries. Observations were made on five trading days before and after October 9–10, 2023. The t-test results show a significance of 0.981 or greater than the specified significance level of 0.05. These results indicate that hypothesis 0 (H0) is accepted or there is no significant difference in average abnormal returns before and after Non-event 2.

4.2   Discussion

Hypothesis testing in this study uses the Wilcoxon Paired Sample Test to compare the difference in AAR before and after the G20 New Delhi Summit 2023, September 9–10, 2023. As a comparison of the hypothesis results, a test was also conducted on the difference in AAR for the non-event period 1 dated August 9–10, 2023, or 1 (one) month before the G20 Summit and the non-event period 2 dated October 9–10, 2023, to see whether the G20 New Delhi Summit 2023 event was a unique event or not.

The test results for the G20 New Delhi Summit 2023 show that there is a significant difference in AAR before and after the summit. The test results showed that there was not a significant difference in AAR before and after the event for both events 1 and 2. The test results show that the G20 New Delhi Summit 2023 is a special event. This study is like other research done by Yunita et al. (2019)[26] about events and non-events. In 2019, this study showed that there is no difference in how much stocks go up or down in January compared to other months in the Indonesian stock market. This means there is no special effect in January on the stock market in Indonesia.

The hypothesis test results state that there is a significant difference in abnormal returns before and after the G20 New Delhi Summit 2023. This means that the market responded positively to this event. The results of this study align with research conducted by Yousaf et al. (2022)[14]. They observed how the conflict between Russia and Ukraine is affecting the G20 and some stock markets using a special method called *event study*. The study looked at how stock prices changed before and after Russia's military operation began on February 24, 2022. It found that the military action had a negative effect on most stock markets, especially in Russia. The research on the stock market shows that the Russia-Ukraine conflict had a significant and negative effect on the stock market on the day of the conflict and the days after. The findings of this study are similar to a study done by Buigut and Kappar in 2019[22]. They looked at how the political and economic blockade of Qatar affected the stock market using a method called volatility event-study approach. They wanted to see if there were unusual and unpredictable changes in stock prices. They found that there was a significant reaction to abnormal returns due to the impact of an event or information.

The information obtained from the organization of the G20 Summit in New Delhi India is information obtained from external events of the company. According to the Semi-Strong Form efficient market hypothesis, the price of a stock is not only described by past stock prices. Stock prices are also created due to additional information and company financial information. In the research, additional information can be the results of the G20 New Delhi Summit 2023 agreement that has been approved and announced publicly.

Capital market players will carry out buying and selling and investment activities by looking at and considering the information circulating. Based on Signaling Theory, Wibowo et al. (2023)[27] discusses how signals (information) of success and failure should be conveyed to the market. Information received by investors can be good news or bad news. The G20 market participants responded to the results of the agreement at the G20 New Delhi Summit 2023 as good news.

The results of hypothesis testing conducted on developed countries show that there is a significant difference in AAR before and after the G20 New Delhi Summit 2023. But in contrast to the results carried out in developing countries, the results show that there is no significant difference in AAR before and after the G20 New Delhi Summit 2023. This indicates that emerging markets did not respond to the G20 New Delhi 2023 Summit. This is due to the doubts of developing countries about the commitment of developed countries. As expressed by President Joko Widodo, which refers to developing countries' concerns about developed countries' commitments to climate finance of USD 100 billion per year and loss and damage funding facilities for developing countries that have not yet been implemented (www.ekon.go.id)[28].

Furthermore, hypothesis testing was conducted by region. The hypothesis test results show that there is a significant difference in AAR in the European region before and after the G20 New Delhi Summit 2023. However, there is no significant difference in AAR in the Asian-African and American regions before and after the G20 New Delhi Summit 2023. This significant positive response is a sign that European countries in responding to the agreement on the transportation corridor development project will help the flow of trade and energy from the Gulf to Europe because it can cut shipping time, costs, and fuel use. The results of this study align with research conducted by Yousaf et al. (2022)[14]. The regional analysis indicates that the Europeans are significantly and adversely affected by "black-swan" events. Meanwhile, the Asian and American regions did not find significant differences due to the absence of Chinese President Xi Jinping. On September 4, 2023, U.S. President Joe Biden expressed disappointment that President Xi Jinping would not attend the G20 summit in India, as Washington seeks to improve relations with China. Given that the Chinese and American exchanges are among the largest exchanges in the world, market participants do not consider this meeting an important meeting so the market does not react.

5   CONCLUSION

5.1   Conclusion

The results of research on the market reaction of G20 members to the G20 New Delhi Summit 2023 showed that there was a significant difference in AAR before and after the G20 New Delhi Summit 2023 event. In testing the Non-event 1 and Non-event 2 periods, it was found that there was no significant difference in AAR. This study also found a reaction in developed markets, but the same reaction was not found in developing countries. Analysis by region found that the European region responded to the G20 New Delhi 2023 Summit but did not find the same results as the Americas and Asia-Africa.

5.2   Recommendation

The results of this study are expected to be taken into consideration for stock trading transactions when an international mega-event occurs. The stock market of G20 members has a positive response to the implementation of the G20 New Delhi Summit 2023. Future researchers are expected to be able to conduct research on other country groups, conduct research with many variables, a wider research area, a longer time period, and estimate abnormal returns based on other models.

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