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DOES COVID-19 CAUSE STRUCTURAL CHANGES IN THE INDONESIAN STOCK MARKET BEHAVIOR? A COMPARISON OF ISLAMIC AND CONVENTIONAL STOCK

Indri Supriani[a]
Nayaka Artha Wicesa[b]
Yunice Karina Tumewang[c]
[a,b] Department of Economics, Faculty of Economics and Business, Universitas Brawijaya, Indonesia
[c] Business Studies and Management, University of Southampton, United Kingdom
Email: indri.supriani@ub.ac.id[a] ; nayakaarthawicesa@ub.ac.id[b]; yuni.karina@gmail.com[c]

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*Correspondence:
Name: Indri Supriani
E-mail: indri.supriani@ub.ac.id

ABSTRACT

Introduction: Islamic stock is believed to be more stable and less risky than conventional stock due to specific screening based on Sharia principles, particularly during economic downturns. This research aims to investigate whether the Covid-19 outbreak caused a structural break in Indonesia's Islamic and conventional stock markets.
Methods: This study covers the period from January 2007 to June 2022, divided into sub-periods before Covid-19 (January 2007 to February 2020) and during COVID-19 (March 2020 to June 2022). The study adopts the time series regression method to examine the predicting factors of Islamic and conventional stock indexes, followed by the application of the Chow Breakpoint Test method to determine whether there are structural changes in the Islamic and conventional stock markets due to Covid-19.
Results: The results of this study suggest that, in comparison to the period preceding Covid-19, the Islamic stock index demonstrates heightened sensitivity to fluctuations in predicting factors during the pandemic. Additionally, there is an absence of any structural break observed in conventional indices. Consequently, Islamic stocks exhibit lower resistance during crisis periods than conventional stocks.
Conclusion and suggestion: This finding prompts a comprehensive evaluation of the Sharia screening standards by policymakers to enhance the resilience of Islamic stocks during economic turmoil. Moreover, based on the results, it is suggested that investors cannot consider the Islamic stock index as a 'safe-haven' instrument during financial turmoil. The result of this research assist investors in adjusting their investment strategies more effectively, particularly in bearish market conditions.

INTRODUCTION

Islamic finance has enchanted a massive intention from the academicians and practitioners. This attraction is demonstrated by the multiple numbers of Islamic finance publications in internationally reputable journals (Khan et al., 2020) and the development of various research and academic institutions in Islamic finance (Ahmid & Ondes, 2019). Islamic finance is a substitute for conventional ones because of its stronger resilience in times of crisis. In a bibliometrics study, Ahmid & Ondes (2019) revealed that Islamic finance proved more resilient than its conventional counterparts during the Global Financial Crisis in 2008, which led to unprecedented growth of the Islamic finance industry and is believed to become the best alternative financial service. Islamic finance can be divided into three industry sectors: Islamic banking, Islamic capital markets, and Islamic insurance (Islamic Financial Services Board, 2018).

The establishment of Islamic banking in the early 1960s in Egypt became the pioneer of the Islamic finance industry (Hussain et al., 2015). The faster resilience of Islamic finance in the turmoil period led to the recognition and creation of other financial services, including the Islamic capital market and its products (Tuna, 2019). Thus, the Malaysian government's successful issuance of a Government Investment Certificate in 1983 and the release of the Dow Jones Islamic Market (DJIM) (IOSCO, 2004) as the first Islamic stock index in Bahrain in 1999 both served as indicators of the existence of the Islamic capital market (Nurrachmi, 2019). According to Guyot (2011), the Islamic capital market exists as a venue to cater to the demands of investors who intend to invest based on sharia principles. Moreover, Erdoğan et al. (2020) underlined that the Islamic capital market is a viable alternative financial intermediary for businesses and investors.

In early 2020, the announcement of Covid-19 as the global pandemic virus by the World Health Organization abruptly caused an economic downturn due to the restrictions on community activities, lockdown, and immobilization of business activities. This recent outbreak has also impacted the stock market in developed and emerging markets, conventional stocks, and sharia-compliant stocks. However, the Islamic Financial Service Board (2022) reported an increasing percentage of Islamic capital market share in the Islamic financial services industry (IFSI), which is 30.9% of IFSI in 2022. Moreover, Islamic funds grew by 31.9% in 2020 compared to the previous year despite the pandemic period (Islamic Financial Service Board, 2022). Jawadi et al. (2021), in their research, captured the significant losses of most international stock markets ranging from 23% losses in the Dow Jones Industrial Average in March 2020 and 16.6% losses for the Dow Jones Islamic world.

Furthermore, Islamic Financial Service Board (2022) also stated that Islamic and conventional indices presented by S&P Global 1200 and S&P Global 1200 Shariah behave similarly; however, the Islamic index continued to outperform the conventional ones during

the time of Covid-19's crisis. The data indicates the optimistic forecast for the Islamic capital market to grow exponentially and contribute to escalating business and economic activity.

The resistance of sharia-compliant stock during the outbreak period is associated with the sharia screening standards that are applied in sharia-compliant, which exclude companies that are receiving and paying interest, have a high level of debt, and are related to uncertain and speculative income (Shear & Ashraf, 2022). Several previous studies conducted by Shamsuddin (2014), Alotaibi et al. (2020), and Arfaoui & Raggad (2023) also ascertained that the screening requirements in sharia-compliant stock strengthen the stock's immunity to volatility by reducing the risk and instability impact of the financial crisis. In short, the prior findings provide further evidence that Islamic indices are not subject to speculative impact and demonstrate that Islamic indices are consistent with Sharia-compliant regulations. Hence, Islamic stock is expected to perform better than conventional stocks during Covid-19.

Indonesia, as the country with the largest Muslim population, is expected to optimize its market potential to boost economic growth. The Indonesia Capital Market Roadmap, published by Otoritas Jasa Keuangan (2023), declared that the Indonesian stock market is experiencing unprecedented growth in terms of market capitalization, which reached 10% per year over the past five years despite the pandemic and numerous other global phenomena that impacted the negative economic trend in several countries. Moreover, this report also announces that the stock market is projected to become a new growth engine for the national economy, particularly in achieving the Indonesian vision of becoming the fifth-largest economic powerhouse globally by 2045. Evidence from Islamic stock indices, Otoritas Jasa Keuangan (2021), announced that Indonesian Islamic stock indices presented by JII experienced positive growth to 36.09% of market capitalization in June 2021 compared to the previous year. Moreover, as of the end of June 2021, the number of Shariah Online Trading System (SOTS) investors was 99.383, with a growth of 15.71% compared to the end of 2020 (Otoritas et al., 2021). Otoritas Jasa Keuangan (2023) reported that the number and value of sharia stocks are reaching their highest point in 2022, which is 552 from 495 in 2021 and 4,786.02 from 3,983.65 (IDR trillion) in 2021, respectively. Furthermore, Indonesian capital market assets became significant contributors to the Islamic financial assets in Indonesia, which reached approximately USD 400 billion after Islamic banking, with total assets of about USD 2 trillion (Ministry of Finance Republic of Indonesia, 2021). Another interesting fact is that Indonesia is also listed as the top 20 worldwide in terms of Islamic financial assets (Hambali & Adhariani, 2022). In addition, In sum, the data portrayed that the development of Islamic stock market in Indonesia is promising.

Amid the rapid growth of the Islamic stock market in Indonesia, Covid-19 has also had a tremendous impact. With empirical evidence from Islamic and conventional market indices, Ali et al. (2021) proved that the price volatility of the Islamic stock market and conventional

market behave differently in responding to Covid-19's crisis. This study shows that Covid-19 has affected Islamic stock return volatility more than conventional ones. Additionally, studies, including Bahloul et al. (2022) and Hambali & Adhariani (2022), ascertained that the Islamic stock market did not present diversification benefits during the time of Covid-19's turmoil. In contrast, Shear & Ashraf (2022), Adekoya et al. (2022), Dharani et al. (2022), and Hasan et al. (2021) documented that the Islamic stock market is more stable and less volatile than the conventional stock market during times of economic downturn.

A comprehensive literature review study conducted by Kashyap (2023) revealed that the stock market is sensitive to various financial crises, such as the collapse of Lehman Brothers (2008), the Greek debt crisis (2010), and Covid-19 (2020), resulting in high stock volatility caused by structural breaks. Importantly, Mongi (2019) also illustrated that energy volatility impacted a structural break in the Dow Jones Islamic equity indices (DJIMI). Empirical evidence from Pakistan's stock market, presented by Ghouse et al. (2023), demonstrated that each wave of Covid-19 has significantly caused a structural break, negatively affecting Islamic stock market performance and leading to a structural change in the Karachi Meezan index (KMI 30). Various existing studies have also shown that Islamic stock indices experienced a structural break due to sudden changes in economic and political situations, including the subprime mortgage crisis in 2008-2009 on DJIM indices (Ben Rejeb & Arfaoui, 2019), the global financial crisis on the Turkish and Indian stock markets (Rejeb & Arfaoui, 2017). In the context of Covid-19, Saleem & Sagi (2020) discovered that Islamic stock indexes of Qatar, UAE, ASEAN, MENA, MENASA, and Bahrain were significantly affected by the outbreak. Similarly, Hasan et al. (2021) revealed that Islamic stock indices, represented by Dow Jones Islamic Market Index (DJIMI) and FTSE All-World Shariah Index (FAWSI), do not offer a superior investment alternative for investors, particularly in times of crisis.

Prior studies comparing Islamic and conventional stock performance have yielded inconclusive results regarding whether Islamic stocks outperform their conventional counterparts. Furthermore, various research on structural breaks due to Covid-19 has demonstrated its immense impact on a structural change in the stock market. Hence, this current research fills the research gap by assessing the existence of a structural break in the Indonesian stock market, comparing Islamic and conventional stock markets to identify their behavior in responding to the Covid-19 pandemic. Based on the analysis of prior studies, it can be concluded that research focusing on structural breaks caused by COVID-19 in the Indonesian stock market is still limited. Thus, this research will assist investors in building an effective portfolio to mitigate investment risk, particularly during a bearish period, requiring an understanding of the long-term association between the investment instruments.

Various previous studies have suggested that macroeconomic variables have a prominent role in shaping the stock price. Including the consumer price index (Chang & Rajput, 2018), the exchange rate (Wahyudi & Sani, 2014), oil price (Mishra et al., 2019; Wei et al.,

2019), and gold price (Godil et al., 2020; Han et al., 2020). Thus, this paper aims to investigate whether the Covid-19 crisis caused a structural break in Indonesian Islamic stock indices, which was measured by the changing reaction of several macroeconomic variables towards Islamic stock prices in two periods: before and during the pandemic. Moreover, this study carried out the exact estimation for conventional ones to test whether there are differences between the two types of markets.

The rest of this paper is organized as follows. In section 2, we present a brief literature review. In Section 3, we describe the research methods and the variables, and in Section 4, we discuss some empirical results. Section 5 summarizes the study's main findings and provides some policy recommendations for policymakers and investors.

LITERATURE REVIEW

Islamic Stock Index in Indonesian Context

As the world's most populous Muslim country, Indonesia has a considerably high demand for Sharia-compliant products and services, including Shariah-compliant financial assets. Jakarta Islamic Index (JII), is the first stock market index for Sharia-compliant companies in Indonesia. To be included in this index, a stock needs to be screened against both qualitative and quantitative criteria (Shear & Ashraf, 2022). As a qualitative criterion, the business operations should be in line with Sharia principles, which means that they should not be involved in interest-based and gambling transactions, let alone the production/sale of haram products such as liquor, pork, or haram meat (Indonesian Stock Exchange, 2022).

Meanwhile, for the quantitative screening, there are two main requirements to be fulfilled which are the ratio of interest-based debt to total asset should not be more than 45% and the ratio of interest and other non-halal revenue to total revenue should not be more than 10% (Indonesian Stock Exchange, 2022). Further, JII will only select the best 30 Islamic stocks in terms of their market capitalization and average daily transactions (Indonesian Stock Exchange, 2022). It will then be reviewed semi-annually, which is every May and November.

Islamic Stock Index and Economic Downturn

Historically, Islamic capital market has been well-known to be less susceptible to shocks during a period of crisis (Dewandaru et al., 2014). Moreover, previous studies Shamsuddin (2014) and Alotaibi et al. (2020) ascertained that the screening requirements in sharia-compliant stocks strengthen the stock's immunity to volatility by reducing the risk and instability impact of the financial crisis. Furthermore, Al-Khazali & Mirzaei (2017) and Ouatik El-Alaoui et al. (2018) found that sharia-compliant stocks outperformed conventional stock during the bear market period, thereby acting as safe-haven assets. In general, looking at the condition of the capital market during Covid-19 outbreak, it clearly shows that the global stock

market suffers a significant negative return, particularly in the first quarter of 2020 (Jawadi et al., 2022). Within the last week of February, the global stock market's capitalization declined by US$6 trillion (Ozili & Arun, 2020). This global condition is also applied without exception to Indonesia's capital market.

Structural Break

A structural break refers to significant changes in economic activities resulting from various sources, such as economic crises and changes in economic policy. Consequently, these changes in economic activities result in substantial variations in the time series economic dataset (Davis et al., 2006). Therefore, when examining the relationship between variables, it is strongly recommended to detect the presence of a structural break in order to prevent biases and inaccuracies in the study model. various previous studies have established that economic crises lead to a significant change in structure. For example, Kalsie & Arora (2019) presented evidence that the Global Financial Crisis in 1997 affected changes in macroeconomic conditions of Brazil, Russia, India, China, and South Africa (BRICS) countries. Hewage et al. (2023) found more empirical data indicating that the 2008 financial crisis played a significant role in causing a structural change in financial development and economic growth in ASEAN countries. Cró & Martins (2017) discovered that natural disasters have emerged as the predominant driver influencing substantial changes in international tourism demand across 25 nations within the tourism industry. In short, it is important to take into account significant occurrences while estimating the research model, since such events are the result of fundamental changes in economic phenomena.

Time series regression analysis often assumes that economic variables demonstrate consistent patterns throughout time. Structural alterations denote a distinct point in time when there is a discernible modification in the behavior of economic variables. These changes can be initiated by various circumstances, including a crisis, policy changes or natural calamities. Hence, any instances that lead to changes in economic behavior are termed as structural shifts (Davis et al., 2006). Structural breaks can be detected using three methods: (1) the Chow test, (2) the Zivot and Andrews test, and (3) the Bai and Perron test. The Chow test is employed in cases where there is a single, identifiable point at which a structural change occurs. The Zivot and Andrews test is employed in cases where there is a single, unanticipated change in the structure of the data and the exact point at which this change occurs is unknown. The Bai Perron test is employed in situations where several structural breaks occur and the specific location of the breakpoints is unknown (Jatarona & Ismail. Mohd Tahir, 2010).

Hypothesis Development

Islamic Stock and Structural Break due to Covid-19

The resilience of Islamic capital market is still relevant to be discussed today, in particular during COVID-19 outbreak, which has brought unanticipated changes in the social,

economics, and financial outlook of society. In a short run, Saleem & Sagi (2020) revealed a different effect brought by this pandemic to Islamic capital index in several jurisdictions. In Australia and GCC, there is a relatively steady performance during the first 15 days of the pandemic. Meanwhile, there is a significant effect toward the performance of Islamic stock index in GCC stock index. On another hand, there was a substantial amplification in terms of the volatility of Islamic stock indices after WHO declared the global health crisis and this volatility tends to persist longer in the post Covid-19 period. In the same vein, Bahloul & Khemakhem (2021) which examined the correlation between returns and volatility of commodities and Islamic stock index, suggests that the degree of return and volatility spill over varied over time, but a strong transmission from commodities to Islamic indices is predicted after the outbreak. Another study by Ghouse et al. (2023) ascertained that Covid-19 caused a structural change in Pakistan's stock market.

There are inconsistent results of how the behavior of Islamic capital market changes in response to Covid-19 outbreak, particularly towards several macroeconomic variables such as Consumer Price Index (CPI), exchange rate, crude oil price, and gold price. A positive correlation is found between CPI and Islamic stock market, Mawardi et al. (2019) suggesting an effective value protection offered by Islamic capital market from the threat of losing value due to inflation. Meanwhile, a negative correlation is found between exchange rate and Islamic stock market (Antonio et al., 2013), as it would reduce investor's confidence in the domestic economy due to the decreased exports (negative balance of payment). These correlations remain the same before and during Covid-19, however a structural change is found in the correlation of Islamic capital market toward oil price and gold price.

Mishra et al. (2019) suggests that oil price variations might have a positive influence on the Islamic stock index in the short run, but on achieving firmness, the oil prices have a negative impact on this index. Arshad (2017) has found the simultaneous volatility in both oil prices as well as Islamic stock markets is due to the dependence of Islamic stocks on the real economy. On another hand, Tursoy & Faisal (2018) confirm a negative association of stock prices with the gold prices in Turkish stock markets. However, during Covid-19, there is a change in behavior of Islamic capital market to be aligned with the findings of Bekiros et al. (2017) which shown that diversifying potential of gold tends to decrease in the long-run, and they did not find gold as a safe haven and good hedge for stocks in the BRICS countries.

In the context of Islamic finance, extensive research has been undertaken to investigate the presence of structural breaks resulting from various events. According to Majdoub & Mansour (2014), the Islamic stock market in France, the United Kingdom, the United States, and Indonesia had similar behavior to their conventional counterparts amid several economic crises from September 8, 2008, to September 6, 2013. The findings suggest that Islamic stock and conventional stock exhibit comparable patterns of interaction over time. Similarly, Ben

Rejeb & Arfaoui (2019) also found that Islamic indexes are not immune to economic downturns, suggesting the presence of a structural break during periods of financial instability. Erdoğan et al. (2020) conducted a comprehensive study on the impact of abrupt shifts in economic and political circumstances on the Turkish and Indian stock markets, revealing the existence of a structural break. Additionally, Rejeb & Arfaoui (2017) also mentioned that the identified structural break in the DJIM aligns with the period of the subprime crisis. Therefore, the performance of Islamic stocks is still affected by the overall economic situation because they are relied upon and connected to the real sector. This remains true even though Islamic stocks are considered hedging assets during downward markets due to their adherence to Islamic screening criteria and Sharia compliance principles, which prohibit uncertainty and gambling. Conforming to the aforementioned theoretical framework, a hypothesis is deduced as follows:

H1: There is a structural change in behavior of Jakarta Islamic Index (JII) due to COVID-19

Conventional Stock and Structural Break due to Covid-19

The existing studies showed a decline in return and an increase in volatility of stock market during the first Quarter of 2020, as a reaction to the Covid-19 confirmed cases and related government social distancing policies (Al-Awadhi et al., 2020; Matos et al., 2021; Zhang et al., 2020). Furthermore, the declines in the stock market are usually found to be different and subject to the risks of underlying assets. Ramelli & Wagner (2020) explore that stock prices of US companies with higher exposure to China dropped more initially with the Covid-19 outbreak in China, but later recovered when the outbreak shifted to Europe and the US. In line with that, Ding et al. (2021) also found a milder negative reaction from stocks with lower leverage, higher profits, and more liquid assets. Similarly, Heyden & Heyden (2021) also found a large dependence of stock price reaction to this outbreak on firm-specific characteristics such as the assets tangibility, liquidity, and institutional holdings.

The performance of the capital market has frequently been linked to several macroeconomic variables such as Consumer Price Index (CPI), Nominal Exchange Rate (NER), Crude Oil Price (COP), and World Gold Price (WGP). Previous studies advocated a positive correlation of CPI & COP, but an inverse direction of NER & WGP. Sheikh et al. (2020) investigated whether macroeconomic indicators such as money supply, interest rates, and consumer price index have a direct impact on Karachi stock market. Likewise, Tursoy & Faisal (2018) also confirms a positive effect of crude oil price on stock prices, highlighting an important role played by commodity prices toward the behavior of investors, or financial markets at large. On another hand, Uddin et al. (2013) and Tsen et al. (2018) found a negative correlation between exchange rate and performance of conventional capital markets. Exchange rate might become volatile due to the dynamics of demand and supply in foreign exchange market. In line with that, Tursoy & Faisal (2018) also found a negative direction between gold prices and stock prices in the Turkish capital market.

Numerous articles examine the existence of structural breaks in the context of the stock market as a result of a variety of events that influence the volatility of stock index returns. During the period from January 3 to September 25, 2020, Karavias et al. (2023) examines the behavior of stock markets in 61 countries amidst the Covid-19 pandemic. The research reveals a notable shift in the Islamic stock market during the initial week of April 2020, which coincides with the peak of the global Covid-19 outbreak. Moreover, between the final week of February 2020 and the third week of March 2020**,** a study Chahuán-Jiménez et al., (2021) revealed that the Islamic stock market experienced a structural collapse. The findings of this study may be explicable under the influence of the change that transpired during the early COVID-19 period. Covid-19, according to a synthesis of prior research, precipitated substantial alterations in the behavior of the stock market. Conforming to the aforementioned theoretical framework, a hypothesis is deduced as follows:

H2: There is a structural change in behavior of Indonesia's conventional stock index (IHSG) due to Covid-19

RESEARCH METHODS

This study aims to explore the impact of Covid-19 on Islamic and conventional stock prices in Indonesia. The method selection involved testing the stationary level of the variables. The research utilized the Levin, Lin & Chu approach, Im, Pesaran and Shin W-Stat, Augmented Dickey Fuller (ADF), and Philips Perron (PP) tests to identify the stationary level. If the data is stationary at the first difference, dynamic models such as Error Correction Model (ECM), Autoregressive Distributed Lag (ARDL), Vector Autoregressive (VAR), Vector Error Correction Model (VECM), and others are employed (Asteriou & Hall, 2011). Conversely, if the data exhibits stationarity at the level, Ordinary Least Squares (OLS) estimation can be applied (Asteriou & Hall, 2011).

This study covers the period from January 2007 to June 2022, which consists of 186 data observations. This study uses four macroeconomic variables as the predicting factors of stock price, which were selected based on the previous studies' results. The variables are explained in Table 1.

Table 1
The Variables' Measurement

No	Variable	Symbol	Definition	Position	Estimated Treatment	Source
1	Jakarta Islamic Index	JII	Jakarta Islamic Index is a stock index that calculates the average share price for types of shares that meet sharia criteria	Dependent Variable	Natural Logarithm	Indonesia Stock Exchange

2	Jakarta Composite Index	JCI	Jakarta Composite Index is an index that measures the price performance of all shares listed on the Indonesia Stock Exchange	Independent Variable	Natural Logarithm	Investing.com
3	Consumer Price Index	CPI	Consumer Price Index is an index that calculates the average change in the price of a package of goods and services consumed by households within a certain period of time. CPI is an indicator used to measure the level of inflation	Independent Variable	Natural Logarithm	International Monetary Fund
4	Nominal Exchange Rate (Rp/USD)	NER	Nominal Exchange Rate is the relative price of the currencies of two countries	Independent Variable	Natural Logarithm	Bank Indonesia
5	Crude Oil Price	COP	World Oil Prices are oil prices which generally refer to the spot price of one barrel of oil, a reference price for oil buyers and sellers	Independent Variable	Natural Logarithm	U.S. Energy Information Administration
6	World Gold Price	WGP	World Gold Price is the average price of gold at the world level	Independent Variable	Natural Logarithm	Macrotrends

This study hypothesizes that the Covid-19 epidemic has caused structural alterations. The data is partitioned into two distinct time periods: pre-pandemic (2007m1 – 2020m2) and pandemic (2020m3 – 2022m6) in order to assess the presence of a structural disruption caused by Covid-19. The initial occurrence of Covid-19 in Indonesia was officially reported in March 2022, according to the Indonesia Information Portal (2020). Therefore, this analysis considers this date as the beginning of the pandemic and utilizes the data from that point onwards.

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The existence of this structural change means that the estimated parameters will not be the same during the study period. Structural changes cause differences in intercept, slope, or both. This study uses the Chow Breakpoint Test method to determine whether there are structural changes in the regression (Chow, 1960). The Chow Breakpoint Test, first proposed by Gregory C. Chow in 1960, was chosen for its capability to examine whether structural breaks were present in the identified or known data (Jatarona & Ismail. Mohd Tahir, 2010). Therefore, the Chow Breakpoint Test was employed in this research to assess the influence of COVID-19 on the performance of both the conventional and Islamic stock markets in Indonesia, where data pertaining to the date of COVID-19 is already available (Jatarona & Ismail. Mohd Tahir, 2010). Importantly, the Chow Breakpoint Test was utilized in this study as it enables the researcher to examine a one-time structural break (Eviews, 2018). Aligning with this current research's purpose to explore the existence of structural breaks in the Indonesian stock market during the COVID-19 period.

In comparison to the other two structural break methods, Zivot and Andrews (1992) and Bai and Perron (1998), which are used to discover multiple breakpoints with an unknown date for structural breaks (Altinay & Karagol, 2004; Geweke & Jiang, 2011; Jatarona & Ismail. Mohd Tahir, 2010). Hence the Chow Breakpoint Test is the most suitable approach for this research, as demonstrated by several previous researchers, namely Karavias et al. (2023), Bhatia (2022), and Zhao & Wen (2022). There are two models that will be estimated and compared, namely the Islamic stock model and the conventional stock model.

Islamic Stock Model:

$$LnJII_t = \alpha_0 + \alpha_1 LnCPI_t + \alpha_2 LnNER_t + \alpha_3 LnCOP_t + \alpha_4 LnWGP_t + \varepsilon_t \quad (1.1)$$

- Period Before the Covid-19 Pandemic (2007m1 – 2020m2)

$$LnJII_t = \lambda_0 + \lambda_1 LnCPI_t + \lambda_2 LnNER_t + \lambda_3 LnCOP_t + \lambda_4 LnWGP_t + \varepsilon_{1t} \quad (1.2)$$

- Period During the Covid-19 Pandemic (2020m3 – 2022m6)

$$LnJII_t = \delta_0 + \delta_1 LnCPI_t + \delta_2 LnNER_t + \delta_3 LnCOP_t + \delta_4 LnWGP_t + \varepsilon_{2t} \quad (1.3)$$

Conventional Stock Model:

$$LnJCI_t = \beta_0 + \beta_1 LnCPI_t + \beta_2 LnNER_t + \beta_3 LnCOP_t + \beta_4 LnWGP_t + \mu_t \quad (1.4)$$

- Period Before the Covid-19 Pandemic (2007m1 – 2020m2)

$$LnJCI_t = \theta_0 + \theta_1 LnCPI_t + \theta_2 LnNER_t + \theta_3 LnCOP_t + \theta_4 LnWGP_t + \mu_{1t} \quad (1.5)$$

- Period During the Covid-19 Pandemic (2020m3 – 2022m6)

$$LnJCI_t = \gamma_0 + \gamma_1 LnCPI_t + \gamma_2 LnNER_t + \gamma_3 LnCOP_t + \gamma_4 LnWGP_t + \mu_{2t} \quad (1.6)$$

The chow test procedure is as follows:

1) Estimate the equations (1.1) ; (1.4) and get SSR_1 (sum of squared residual) for the Islamic stock model and SSR_1 for the conventional stock model with df = ($n_1 + n_2 - k$) where k is the number of estimation parameters including constant. The obtained SSR_1 is called the restricted sum of squared residual (SSR_R) because it is assumed that $\lambda_0 = \delta_0$; $\lambda_1 = \delta_1$; $\lambda_2 = \delta_2$; $\lambda_3 = \delta_3$; $\lambda_4 = \delta_4$ dan $\theta_0 = \gamma_0$; $\theta_1 = \gamma_1$; $\theta_2 = \gamma_2$; $\theta_3 = \gamma_3$; $\theta_4 = \gamma_4$. In other words, there is no structural change.
2) Estimate the equations (1.2) ; (1.3) ; (1.5) ; (1.6) separately and get SSR_2 for the Islamic stock model and SSR_2 for the conventional stock model with df = ($n_1 - k$) and SSR_3 for the Islamic stock model and SSR_3 for the conventional stock model with df = ($n_2 - k$). Next, calculate the unrestricted sum of squared residual (SSR_U) with df = ($n_1 + n_2 - 2k$) by adding up SSR_2 and SSR_3.
3) Structural change test can be done by going through the F statistical test with the following formula:

$$F = \frac{(SSR_R - SSR_U)/k}{(SSR_U)/(n_1 + n_2 - 2k)} \sim F_{[k,(n_1+n_2-2k)]}$$

According to Chow (1960), if there is no structural change in the regression equation, then the SSRR and SSRU should be statistically the same. If the calculated F value is greater than the critical F value, it rejects the hypothesis of no structural change and vice versa. In contrast, if the calculated F is smaller than the critical F value, it fails to reject the null hypothesis; hence, there is no structural change. Furthermore, the Recursive Residual test was carried out to determine the stability of the parameters. The first step is to do a regression on the sub-sample of a certain research period, namely the period 2007m1–2007m6, which will produce an estimate for each parameter. The selection of sub samples was carried out subjectively by the researcher by regressing from small sub samples to large sub samples (Gujarati & Porter, 2009 ; Widarjono, 2013). Then, perform a regression with a larger sub-sample, namely 2007m1 – 2007m7, and generate new parameters. This process will be carried out until the last period. If the parameter values are plotted in each process, it will be seen at the time when the parameters start to stabilize.

RESULT AND ANALYSIS

The initial phase of the analysis involves determining the most precise approach to address the research question by examining the stationarity of all variables.

Table 2
Estimation Results of Data Stationarity

Method	Statistic	Prob	Cross Section	Obs
Levin, Lin & Chu t	-4.08687***	0.0000	6	1105
Im, Pesaran and Shin W-stat	-2.22812**	0.0129	6	1105
ADF - Fisher Chi-square	24.5741**	0.0170	6	1105
PP - Fisher Chi-square	21.0758**	0.0493	6	1110

Source: Data Processed by Author (2023)

The outcomes of the data stationarity test, as presented in Table 2, utilize methods such as Levin, Lin & Chu; Im, Pesaran, and Shin W-Stat; Augmented Dickey Fuller (ADF); and Philips Perron (PP). The results of this test reveal that all variables exhibit stationarity at the level, as indicated by probabilities falling below the 5% significance level. Consequently, the Ordinary Least Squares (OLS) method is deemed the most appropriate approach for this research.

This study aims to investigate the presence of a structural break, as proposed by Chow (1960), attributed to the impact of Covid-19 on Islamic stocks in comparison with their conventional counterparts. The results of the structural break estimation in the Islamic stock model reveal substantial alterations, supported by the Chi-Square probability falling below the 5% significance level. In contrast, the conventional stock model shows no significant structural changes. This outcome indicates that Covid-19 caused a substantial change in Islamic indices returns. In contrast, it did not lead to any structural changes in conventional indices. This finding suggests that conventional stocks demonstrate a greater resilience and immunity to financial turmoil compared to Islamic stocks.

Table 3
Estimation Results of Structural Break, Autocorrelation, and Heteroscedasticity

	Islamic Stock Model Chow Breakpoint Test Prob Chi-Square = 0.0000***		**Conventional Stock Model** Chow Breakpoint Test Prob Chi-Square = 0.0970*
	2007m1 – 2020m2 (Before the Covid-19)	2020m 3 – 2022m6 (During the Covid-19)	2007m1 – 2022m6 (All Period)
Autocorrelation (LM Test)	0.0000***	0.1796	0.0000***
Heteroscedasticity (Breusch-Pagan)	0.0000***	0.0585	0.0000***

Note: *** significant at 1%; ** significant at 5%; * significant at 10%

Source: Data Processed by Author (2023)

The LM test and Breusch-Pagan test highlight the existence of issues related to autocorrelation and heteroscedasticity. Consequently, this study employs the Newey-West Standard Error, as formulated by Newey & West (1987), to address the problems. Moreover, upon examination of Table 3, autocorrelation and heteroscedasticity issues were identified in both the Islamic stock model (before Covid-19) and the conventional stock model, as evidenced by the probability values falling below the 5% significance level. Notably, the Islamic stock model (during Covid-19) did not manifest autocorrelation and heteroscedasticity problems, indicated by the probability value surpassing the 5% significance level.

Islamic Stock Market: A Structural Break Analysis

Based on Table 3, the estimation results for the Islamic stock model indicate a structural change. Subsequently, Table 4 elucidates the correlation between the Consumer Price Index (CPI), exchange rate, crude oil price, and world gold price before and during the Covid-19 pandemic. According to Table 4, it reveals that the CPI and exchange rate exerted a similar influence on the Jakarta Islamic Index (JII) both before and during the Covid-19 period. However, the impact of crude oil prices became more significant in shaping the JII's return, while the influence of world gold prices weakened during the Covid-19 pandemic.

Table 4

Estimation Results of Structural Changes in Islamic Stock Model

Method: HAC (Newey West)	Chow Breakpoint Test Prob Chi-Square = 0.0000***			
	Dependent Variable: LnJII			
	2007m1 – 2020m2 (Before the Covid-19)		2020m3 – 2022m6 (During the Covid-19)	
Independent Variable	**Coeff**	**Prob**	**Coeff**	**Prob**
Constant	11.2876***	0.0005	4.8425	0.4162
LnCPI	3.4419***	0.0000	4.1014**	0.0103
LnNER	-1.9599***	0.0003	-2.1382***	0.0020
LnCOP	0.1479*	0.0760	-0.1440**	0.0357
LnWGP	-0.5238***	0.0082	0.2452	0.2455
Goodness of Fit				
R-Squared	0.8131		0.5100	
Adjusted R-Squared	0.8082		0.4247	

*Note: *** significant at 1%; ** significant at 5%; * significant at 10%.*

Source: Data Processed by Author (2023)

Table 4 illustrates the correlation between the Islamic stock market, represented by JII, and the predictive factors across two data points: before and during the pandemic. Table 4 confirms that all variables, except the world gold price, exhibit similar behavior in shaping the JII's stock price during both non-crisis and crisis periods due to Covid-19. Furthermore, this research demonstrates that crude oil prices do not play a significantly crucial role in determining the Indonesian Islamic stock index price before and during Covid-19. However, various existing studies, including Mezghani & Boujelbène (2018), Ftiti & Hadhri (2019) and Zeinedini et al. (2022) have proved that oil prices tend to have a significant role in influencing the stock market price. Moreover, Arshad (2017) explained that Islamic and oil prices tend to move in the same direction because Islamic stocks rely on real economic activities.

Figure 1 shows the stability of parameters in the Islamic stock model before and during the Covid-19 pandemic. In the period before the Covid-19 Pandemic, the Parameter Constant (C1) began to appear stable in 2009, then slightly fluctuated and returned to stability in 2014. The Consumer Price Index (C2) parameter exhibits a similar trend, with CPI indicating its

stability in 2009, followed by a brief period of fluctuation, and then a return to stability in 2013. In 2010, the Nominal Exchange Rate (C3) parameter attained stability and remained constant. The Crude Oil Price (C4) parameter started to appear stable in 2010. After a brief period of fluctuation, it steadied once more in 2015. The World Gold Price (C5) parameter began to appear stable in 2009, then slightly volatile and then stabilized once more in 2015. In short, in the period During the Covid-19 Pandemic, all parameters began to appear stable in Q1 of 2021.

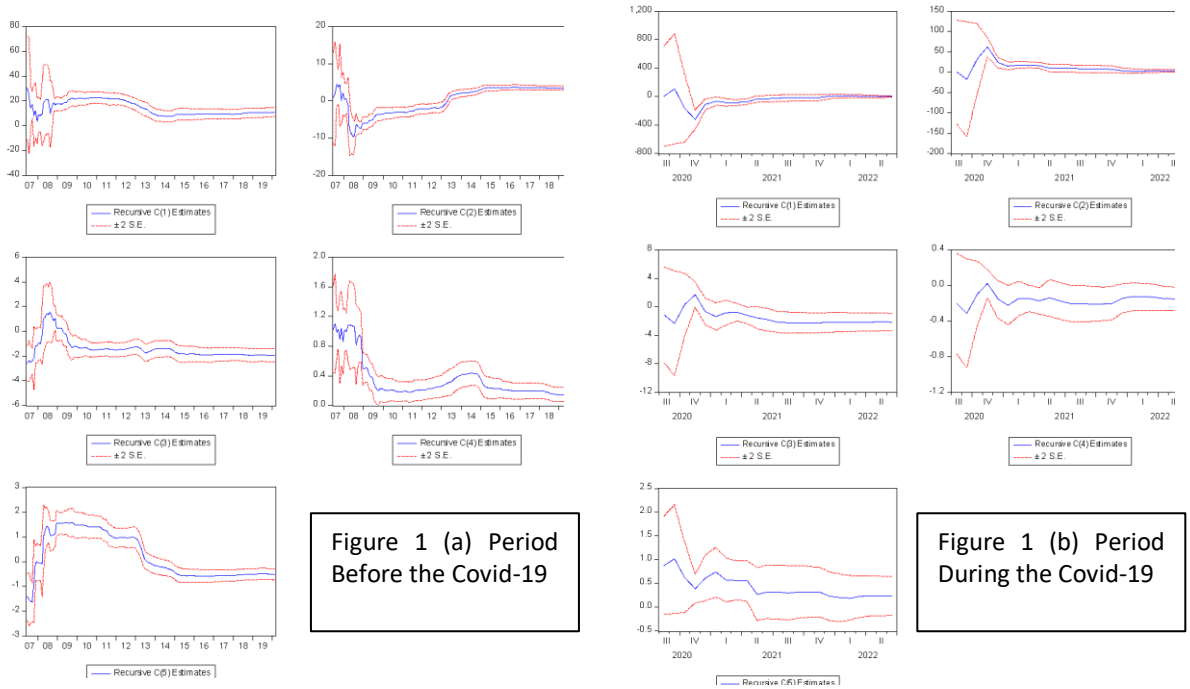


Figure 1 (a) Period Before the Covid-19

Figure 1 (b) Period During the Covid-19

Source: Data Processed by Author (2023)

Figure 1. Parameter Stability of Islamic Stock Model Before and During the Covid-19 Pandemic

The movement of the consumer price index positively correlates with the stock price of JII. This result indicates that during the observation period, the Indonesian government successfully maintained the percentage of inflation at a stable level by maintaining price stability and improving policy coordination with the federal and regional governments (Bank Indonesia, 2022). Consequently, the controlling of inflation significantly stimulates business activities, intensifies production, and boosts the company's financial performance. Hence, the stock price of the companies will move higher.

Interestingly, prior research observed a negative relationship between CPI and stock price. Chang and Rajput (2018), found that a higher percentage of CPI will degrade the company's performance and stock price in the Pakistan stock market. Moreover, empirical evidence by using various Islamic stock indexes in 15 countries, including Indonesia, Adediran et al. (2022) ascertained that inflation (presented by the CPI) negatively affected the stock

price in six regions during Covid-19. These studies imply that CPI is forecasted to behave negatively toward stock prices in both a bearish and bullish market.

This current research underlined an interesting finding, where CPI is documented to have a stronger impact during the economic downturn which shows by the differences in the CPI's coefficient (3.4419 before Covid-19, and 4.1014 during Covid-19). This can be explained by the higher instability of economic conditions in the time of Covid-19 due to the lockdown and public restriction activities. The crisis has caused the markets to move feverishly, Ramelli & Wagner (2020), hence, the stock price becomes more sensitive to the changes of consumer price index.

This study also documented that the exchange rate plays a substantial role in forming the stock price of JII. The depreciation of the Indonesian exchange rate significantly triggers a low stock price for the Indonesian Islamic stock index before and during the Covid-19 pandemic. Erdoğan et al. (2020) stated that the exchange rate is negatively associated with firm's financial performance due to the increasing of input cost, higher rate of capital cost and as it is reflects the uncertainty of economic condition. Hence, its impact financial balance of company, which most likely will follow by a significant drop of stock price. Depreciation of the nominal exchange rate will likely lead to the higher price of imported goods, thereby increasing production costs because most of Indonesia's imports are raw materials and capital goods (Widiyono et al., 2021). Thus, the depreciation of the rupiah will negatively affect the company's financial performance and trigger lower stock price indices.

The previous finding also corroborates the result of this study. According to research by Thaker et al. (2010) and Kumar (2019), when the value of the domestic currency declines, investors' decisions to sell their holdings are impacted, which lowers stock prices. Moreover, Antonio et al. (2013) also discovered a negative association between the exchange rate and the stock price. This condition would decrease investor confidence in the domestic market due to the reduced exports. From another perspective, the depreciation of the exchange rate implies a negative trend for economic conditions, which will lead to a speculative decision within the short-term period of investors to sell their stock to avoid more losses. Moreover, in emerging market countries such as Indonesia, the weakness of the domestic currency will lead foreign investors to leave the domestic financial market (Adekoya et al., 2021). Consequently, the stock price will move to a lower level.

Importantly, this study discovered that the magnitude of the effect of the nominal exchange rate on stock prices is different due to the Covid-19 pandemic. The impact of the nominal exchange rate on stock prices was higher in the pandemic period than before the pandemic. These results are presented by the exchange rate coefficient of 2.1382 during Covid-19 and 1.9599 before Covid-19, respectively. This result is consistent with the finding documented in the Japanese stock market by Narayan et al. (2020), which found that the depreciation of the Yen against the US dollar during the Covid-19 period caused a stronger

impact on stock returns compared to the period before Covid-19 (2020m1 – 2020m8, where the influence of the exchange rate increased from 0.588% to 71% on average returns of stock prices. Moreover, Kumeka et al. (2022) also revealed that the stock market experienced a higher sensitivity to the exchange rate volatility during the pandemic. Another research by Aslam et al. (2020) discovered that there were changes in the efficiency of currency before Covid-19, which became less efficient during Covid-19. In sum, this study concluded that the higher the economic policy uncertainty due to Covid-19, the more substantial the impact of the exchange rate on the Islamic stock index in Indonesia.

The volatility of the world gold price became one of the key factors in forming the JII's stock price in the period before economic turmoil Covid-19. The coefficient of WGP shows a negative sign, which indicates that WGP and the Islamic stock price index tend to move in the opposite direction. This result indicates an efficient hedging portfolio between those two instruments. Hence, the investor is suggested to diversify their investment products during the normal period. Prior research such as Tuna (2019) and Tursoy & Faisal (2018) demonstrated that gold and stock prices react negatively, which implies that gold acts as a hedger for Islamic stocks and vice versa.

In contrast, during the time of Covid-19, the impact of WGP became insignificant to the volatility of the Islamic stock index. Hence, the gold price does not correlate significantly during the economic downturn. An interesting finding also discovered by Han et al. (2020), is that the volatility of gold price does not become a universal predictor for stock return in all types of the stock market. This study emphasized that the Chinese stock market is insensitive to the instability of gold prices; hence, this research concludes that gold offers diversification benefits in the Chinese stock market. Empirical evidence using Covid-19 data, Mensi et al. (2021) revealed that the influence of gold price on stock price becomes insignificant during a high-volatility regime but has a significant effect in the low-volatility regime. In addition, by using the Covid-19 pandemic period, Zeinedini et al. (2022) also found that gold does not play a significant role in influencing the stock price in Iran's stock market. Importantly, this study underlined that the Indonesian Islamic stock index represented by JII offers a hedging benefit, as it tends to react weakly to the time variation of gold price in the bearish market period.

Conventional Stock Market: A Structural Break Analysis

The correlation between the conventional stock price index (JCI) and the predicting factors is reported in Table 5. This study reported there is no evidence of structural change in the conventional stock model due to Covid-19. The Chow Breakpoint Test indicates this result with a Chi-Square Prob value of 0.0970. Hence, this result indicates that Covid-19 does not cause any structural change in the Indonesian conventional stock index.

Furthermore, Table 5 describes that all independent variables significantly affect the Jakarta Composite Index. The Consumer Price Index and Crude Oil Price have a significant positive effect on the Jakarta Composite Index, while the Nominal Exchange Rate and World Gold Price have a significant and negative effect on the Jakarta Composite Index. By comparing the Indonesian conventional index and the Indonesian Islamic index and their reactions to the predicting factors, it can be concluded that all three variables, namely, consumer price index, exchange rate, and world gold price, behave similarly in affecting the stock price. Except for the oil price variable, this study documented that crude oil price has a different impact on Islamic and conventional ones. The Islamic stock index is insensitive to the fluctuation of crude oil price, whereas, in the conventional stock index, there is evidence regarding the correlation between JCI's stock price and crude oil price.

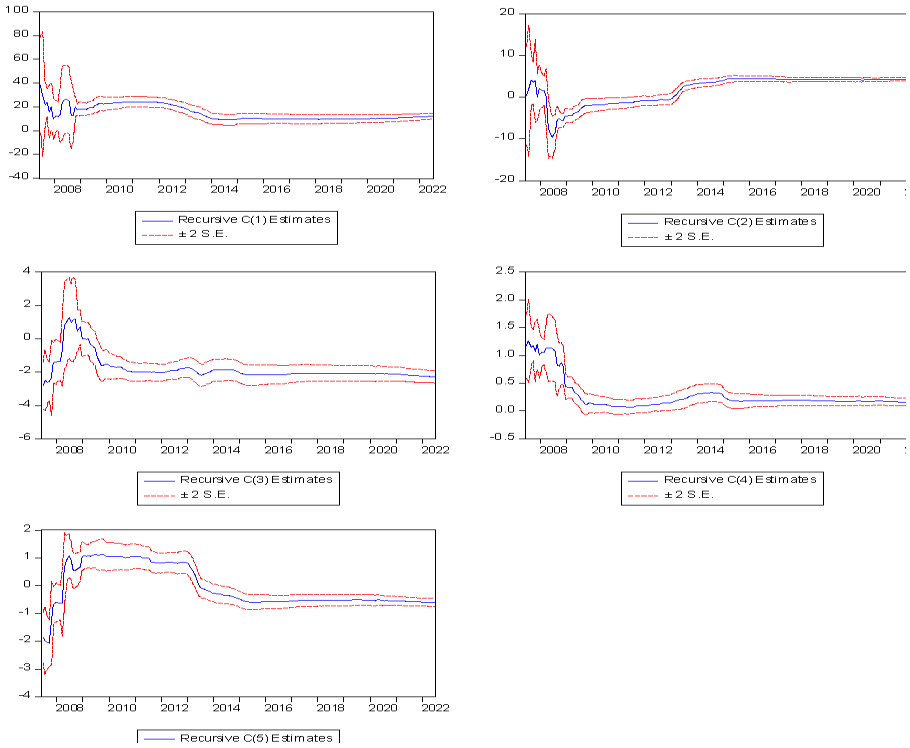
Table 5
Estimation Results of Structural Changes in Conventional Stock Model

Method: HAC (Newey West)	Chow Breakpoint Test Prob Chi-Square = 0.0970* Dependent Variable: LnJCI 2007m1 – 2022m6	
Independent Variable	**Coeff**	**Prob**
Constant	12.2522***	0.0000
LnCPI	4.4083***	0.0000
LnNER	-2.2884***	0.0000
LnCOP	0.1416***	0.0062
LnWGP	-0.5947***	0.0000
Goodness of Fit		
R-Squared	0.9295	
Adjusted R-Squared	0.9279	

*Note: *** significant at 1%; ** significant at 5%; * significant at 10%*

Source: Data Processed by Author (2023)

The stability of the parameters on the traditional stock model is shown in Figure 2. In 2014, the parameter constant (C1) appeared to stabilize once more after a brief period of mild fluctuation in 2009. Consumer Price Index (C2) appeared to settle in 2010 before becoming slightly volatile and then stabilizing once more in 2013. Crude Oil Price (C4) and Parameter Nominal Exchange Rate (C3) started to show signs of stability in 2010. In 2009, the World Gold Price (C5) parameter started to appear steady. After a brief period of fluctuation, it stabilized once more in 2014.



Source: Data Processed by Author (2022)

Figure 2. Parameter Stability of Conventional Stock Model

A Comparison Structural Break Analysis on Islamic and Conventional Stock

An interesting fact underlined by this study is the similar behavior of Islamic and conventional ones in responding to the consumer price index, exchange rate, and world gold price. A previous study by Mezghani & Boujelbène (2018) confirmed a strong contagion between the Islamic and conventional stock markets, strengthening the current study's finding that the shared variables influence Islamic and conventional stock behavior. This result suggests that applying the criteria has no significant impact on the performance of Islamic stocks. Similar findings were obtained by Ashraf & Khawaja (2016) and Umar et al. (2018), indicating that the screening criteria for Islamic stocks have no significant impact on the performance of Islamic stock returns. Hence, the sharia screening standard does not cause Islamic stock to be diverse from conventional ones.

Importantly, this research also revealed that Covid-19 had caused a different impact on those markets. In detail, Covid-19 caused a structural break in the stock price of the Islamic index, whereas there is no structural break for the conventional ones. The predicting factors behave differently in the time of Covid-19 for the Islamic stock. The influences of CPI and exchange rate are stronger during the economic turmoil of Covid-19.

Moreover, the volatility of WGP is found to be insignificant during Covid-19 period, while it is documented as one of the critical factors in predicting the Islamic stock price in the period before Covid-19. This result implies that the Islamic stock index is more sensitive in the bearish market than conventional stock. The finding aligns with the empirical studies by Bahloul et al. (2022), who demonstrated that Islamic stock is prone to bear market caused by the Covid-19 outbreak; thus, it does not serve as the hedger instrument for conventional ones. In the same vein, at the time of the Covid-19 pandemic, Ali et al. (2021) reported that the Indonesian Islamic stock market tended to be more volatile during the pandemic compared to conventional stock. In addition, Hambali & Adhariani (2022) emphasized that Islamic stock did not outperform the conventional ones during the pandemic period.

CONCLUSION AND RECOMMENDATION

This paper examines whether there is a structural change in Indonesian Islamic and conventional stock prices due to the Covid-19 outbreak. This study covers the observation data from January 2007 to June 2020. This study offered prominent findings for the financial market, such as the significant predicting factors that influenced Islamic and conventional stock markets before and during the pandemic. Thus, this result offers a more profound analysis for the investor in considering the critical influencer factors of stock price to decide on an effective investment strategy, particularly during market turbulence.

This study revealed that conventional stock does not experience any structural break due to Covid-19. Thus, conventional stock responds similarly to the predicting factors in the Covid-19 and non-Covid-19 periods. In contrast, Islamic stock becomes more sensitive to the volatility of the predicting factors during the pandemic because there is evidence of a structural break test. The result implies that the sharia screening standard does not benefit Islamic stock to be more resistant during the economic downturn. Therefore, based on the findings, this research suggests that Sharia screening standards should be evaluated to strengthen the resistance of Islamic indexes during bearish markets. Thus, the policymaker, specifically Indonesian Ulema Council and the Indonesia Stock Exchange (IDX) should evaluate the screening criteria that have been applied to improve Islamic stock immunity during uncertain conditions. Foremost, the company's performance should be improved as Islamic stock companies are running business activities similar to those listed in conventional stock. Hence, based on this result, it is suggested that the investor could not utilize Islamic stock as the hedging option from conventional ones, particularly during the bearish market, as is shown by the significant influence of the Covid-19 pandemic on Islamic stock performance influenced by the structural break.

The limitation of this study is that the Islamic and conventional stock price index variables are used at the aggregate level. The result might be different if the data were estimated at sectoral levels. Thus, this research suggested further analysis to compare the

structural break test for Islamic and conventional stocks at sectoral levels to obtain more effective investment decisions.

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AUTHOR CONTRIBUTIONS

Conceptualization: Indri Supriani, Nayaka Artha Wicesa & Yunice Karina Tumewang
Data Curation: Indri Supriani & Yunice Karina Tumewang
Data Analysis: Indri Supriani & Nayaka Artha Wicesa
Investigation: Indri Supriani, Nayaka Artha Wicesa & Yunice Karina Tumewang
Methodology: Nayaka Artha Wicesa
Project Administration: Nayaka Artha Wicesa & Yunice Karina Tumewang
Validation: Indri Supriani
Visualization: Indri Supriani & Nayaka Artha Wicesa
Writing – Original Draft: Indri Supriani, Nayaka Artha Wicesa & Yunice Karina Tumewang
Writing – Review & Editing: Indri Supriani, Nayaka Artha Wicesa & Yunice Karina Tumewang

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