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Article

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IMPACT OF COVID-19 ON THE BEHAVIOUR OF ISLAMIC AND CONVENTIONAL INVESTORS: EVIDENCE FROM THE INDONESIA STOCK MARKET CRASH 2020

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ABSTRACT

Purpose — The aim of this paper is to investigate the influence of the COVID-19 outbreak on Indonesia's conventional and Islamic stock markets through the lens of behavioural finance in the digital age.

Design/Methodology/Approach — The analysis in this paper is focused on the short-run and long-run impact of variables associated with COVID-19—such as the number of COVID-19 cases and mortality, the Google Search Volume (GSV) for the search query associated with COVID-19, and the panic index related to COVID-19—on the returns of the LQ45 Conventional Index and Jakarta Islamic Index (JII), using the Autoregressive Distributed Lag (ARDL) model.

Findings — In the short run, increasing mortality and GSV significantly decreases the returns on LQ45 and JII. By contrast, the returns of LQ45 and JII are unaffected by an increase in the number of cases or the panic index. In the long run, only the panic index affects the LQ45 returns.

Originality/Value — This article makes three contributions to the literature. First, it compares the COVID-19 outbreak's impact on conventional and Islamic stock markets. Second, it discusses the short-run dynamics and long-run impact of the COVID-19 outbreak on stock returns. Third, it provides an explanation of the empirical relationship between the COVID-19 outbreak and the stock market using a behavioural finance viewpoint.

Practical Implications — Digital behavioural science-based policies are needed to prevent or lessen financial market crashes during future crises.

Keywords — Autoregressive Distributed Lag (ARDL), Behavioural finance, COVID-19, Islamic capital market, Stock market crash

Article Classification — Research paper

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INTRODUCTION

The World Health Organisation declared COVID-19 a worldwide pandemic on 11 March 2020 (WHO, 2020). The first reported case of COVID-19 in Indonesia occurred on 2 March 2020. The stock market was affected due to the massive changes in people's economic behaviour because of the COVID-19 outbreak. The abnormal changes in the stock market are reflected in **Figure 1**, which shows how consequential the decline in the Jakarta Stock Exchange Composite Index (JKSE) was from February to April 2020. As the COVID-19 pandemic spread across all regions, equities underwent a fall and stock market volatility increased across the globe (Baker *et al.*, 2020).

Figure 1: JKSE Drastic Decline during Indonesia Stock Market Crash in 2020

Source: Indonesia Stock Exchange (2020)

The phenomenon of excessive volatility that happened during the COVID-19 crisis cannot be explained by traditional market theories (Putri *et al.*, 2020). Behavioural finance theory explains that markets and investors are sometimes irrational because investors are affected by cognitive errors and biases (Barberis & Thaler, 2003). The 2020 stock market crash highlights the role played by investor sentiments. The research results of O'Donnell *et al.* (2021) indicate that investor sentiments affect market prices before a real market decline occurs.

The COVID-19 pandemic has fostered several uncommon economic behaviours in the society, such as panic buying of various types of wholesale goods in many countries. This phenomenon caused store shelves to be depleted in a short time and prices to rise (Kuruppu & De Zoysa, 2020). In behavioural theory, high uncertainty will make a person rely on heuristics, which are thought processes used to form judgements and decisions quickly to solve complex problems (Newell *et al.*, 2003; Hogarth & Karelaia, 2006). The pandemic crisis prompted people to take quick decisions and actions to assuage negative emotions such as fear and anxiety. Lack of accurate and reliable information led them to rely on heuristics, which sometimes led to behavioural biases or irrational decisions (Kuruppu & De Zoysa, 2020).

These behavioural biases or irrational decisions are seen in the stock market. Research by Putri *et al.* (2020) and Riaz *et al.* (2020) show the presence of cognitive errors such as herding behaviour, risk aversion, overconfidence bias, representation bias, availability heuristic, and loss

aversion in the equity market during the 2020 crisis. The stock market in Indonesia also showed conformity with the prospect theory, namely risk aversion (Budiarso *et al.*, 2020).

A number of quantitative studies have been carried out to identify the extent to which the COVID-19 pandemic has impacted the capital market following the economy's and stock market's collapse. The research by O'Donnell *et al.* (2021) found the increase of COVID-19 had a significant negative effect on market prices in different parts of the world, including Spain, Italy, the United States and the United Kingdom (UK). Albulescu (2020) and Onali (2020) also measured the impact of the increase of COVID-19 cases and mortality on equity market volatility in the United States. Erdem (2020) and Salisu and Vo (2020) conducted a panel study looking at the COVID-19 impact in several countries.

Various research has investigated the impact of other COVID-19-related variables such as panic index, sentiments, Google searches on stock returns, and volatility (Baig *et al.*, 2020; Dey *et al.*, 2020; Haroon & Rizvi, 2020; Sharif *et al.*, 2020). Sherif (2020) not only examined the stock market in general but also compared the COVID-19 impact on the Islamic and conventional stock markets in the UK. Research conducted by Topcu and Gulal (2020) analysed different timeframes to see the short- and long-run impacts.

Although the stock market in Indonesia also crashed during the early days of the outbreak, there has not been enough research done on the influence of the pandemic on the capital market's behaviour in Indonesia and how the conventional market compares to the Islamic capital market. Studying the COVID-19 impact on a single country is important because the culture in a country can influence investors' behaviour in responding to COVID-19 in a way that is different from other countries (Fernandez-Perez *et al.*, 2021). Moreover, few studies have explored the influence of COVID-19 and sentiment variables on the capital market in Indonesia. Some of the research, notably by Budiarso *et al.* (2020) and Rahmayani and Oktavilia (2020), analysed the influence of total COVID-19 cases on the JKSE index price. However, a fundamental aspect that is lacking in the literature is the interpretation of these results in the light of behavioural finance theory. Therefore, the authors argue that more research is necessary to answer the following research questions:

1. Does the number of cases, deaths, the Google search volume, and COVID-19 panic index influence conventional stock market behaviour in Indonesia?
2. Does the number of cases, deaths, Google search volume, and COVID-19 panic index influence the behaviour of the Islamic stock market in Indonesia?
3. In the short- and long-term, are there differences in the COVID-19 impact on the conventional market as compared to the Islamic market?

This work has four potential contributions to the literature. To begin with, this article adds to the stock market literature related to the COVID-19 impact on the Indonesian equity market. Unlike the studies by Budiarso *et al.* (2020) and Rahmayani and Oktavilia (2020) that are limited to the analysis of the composite index, this paper goes further by comparing Islamic and conventional stock markets. Second, the research analyses the relationship between online sentiments and COVID-19 news on the collapse of the capital market. This paper follows the works of Baig *et al.* (2020), Dey *et al.* (2020) and Haroon and Rizvi (2020), which examine the COVID-19 attention and sentiment impacts on the United States' conventional capital market. Third, this study adds to the literature that has analysed the short-run dynamics and long-run impact of COVID-19 using autoregressive distributed lag (ARDL), such as Gherghina *et al.* (2020), which

studied the stock markets in China, the United States and several European countries. Fourth, this study provides a perspective for understanding the empirical association between the early pandemic outbreak and the equity market in the light of behavioural finance theory. This paper expands on the works of Putri *et al.* (2020) and Kuruppu and De Zoysa (2020), which only undertook a theoretical and qualitative discussion. In addition, it provides further theoretical explanations from quantitative empirical findings such as Baig *et al.* (2020), Rahmayani and Oktavilia (2020), and Haroon and Rizvi (2020).

This paper is organised as follows: the next section reviews the literature. It is followed by an explanation of the research methodology adopted in the paper. The results are then presented and discussed in the ensuing section. The last section concludes the paper and discusses the research implications.

LITERATURE REVIEW

According to Baker *et al.* (2020), the significant impact of the pandemic on the stock market collapse in 2020 is a first in history. The Influenza Pandemic of 1918–1920, which led to the death of about two per cent of the world's population, had only a modest influence on the United States' economy and the capital market. This modest impact of the Influenza Pandemic to the capital market was also more or less the same as other infectious diseases such as SARS that happened in 2003, H1N1 flu that took place in 2009 and the Ebola virus that took place in 2014–2015. According to the observations of Baker *et al.* (2020), there is no satisfactory explanation regarding why the stock market's volatility soared during the early COVID-19 outbreak period. Meanwhile, various studies have attempted to explain the relationship between the news of COVID-19 and the causes of the capital market's anomaly in the early outbreak. According to Putri *et al.* (2020), this phenomenon cannot be explained based on traditional theories. The findings of O'Donnell *et al.* (2021) show that investor sentiments have contributed to the fall of the capital market. Studies such as those conducted by Budiarso *et al.* (2020), Riaz *et al.* (2020) and Putri *et al.* (2020) investigated such phenomenon from the perspective of behavioural finance and found that the cognitive bias played a role in the collapse of the stock market in 2020.

Behavioural Finance, Heuristic and Cognitive Bias during the 2020 Pandemic Crisis

The theory of financial behaviour assumes that investors are not entirely rational because their demand for financial assets is also influenced by beliefs and emotions (Bouteska & Regaieg, 2020). The involvement of heuristics in decision-making causes cognitive bias, which leads to irrational decisions. Heuristics is the process of reducing complexity through superficial judgements to reach a conclusion or decision. In general, heuristics can be helpful within a particular time (Waweru *et al.*, 2008). However, several researchers have proved that the heuristic process often causes various biases (Kahneman & Tversky, 1979; Waweru *et al.*, 2008).

The discussion of cognitive constraints (Egeth & Kahneman, 1975) on the attention of investors become more significant in the era of the internet amidst an abundance of information about COVID-19. In general, 'investor attention' can be understood as the direction of focus or awareness of the existence of the information, while 'investor sentiment' is an interpretation of information related to an asset that is influenced by moods (Smales, 2021).

The phenomenon of unusual behaviour in the 2020 crisis was caused by 'affect heuristic' and 'availability heuristic' (Kuruppu & De Zoysa, 2020). Affect heuristic is where individuals

use mental shortcuts that are influenced by feelings to make quick and efficient decisions (Fischhoff *et al.*, 1978). Availability heuristic, on the other hand, is where the assessment is only based on the thing that comes to mind the quickest or appears first (Bansal, 2020).

The affect heuristic during a crisis can lead to biases because intense fear reactions can cause individuals to overlook important numerical information such as probability (Rottenstreich & Hsee, 2001), the scope of the problem (Hsee & Rottenstreich, 2004), and time effects (Peters *et al.*, 2012). Besides, the risk will be assessed as more significant than it should be when the risk has an impact on feelings (Zajonc, 1980; Finucane *et al.*, 2000).

Google Search Volume, News Sentiment, and Daily Pandemic Announcements as Proxies of the Heuristic Process in the Digital Age

During times of crisis such as a pandemic outbreak people usually focus on something that is easily accessible to obtain the minimal information required to adjust to the crisis (Bansal, 2020). Digital sources are the readily available reference for basic information. Several studies have shown that searches on Google and news coverage related to COVID-19 can generate significant fear sentiments (Chen *et al.*, 2020; Haroon & Rizvi, 2020).

The results of the Smales' (2021) study explain that searches on Google were not focused on potential stocks to be purchased. However, investors were searching for information to overcome uncertainty and concerns during the early COVID-19 outbreak. This is also confirmed by Salisu and Vo (2020) whose research reveals the significant influence of searching for 'health news' activity on stock prices in 20 countries at the time of the crisis. Therefore, Google Search Volume (GSV) related to COVID-19 can be used to investigate the heuristics in making stock market investment decisions during a crisis.

Previously, Lobão *et al.* (2017) used Google search traffic volume to estimate the investor recognition heuristic. Google trend data display aspects of the current condition of the economy and provide insights into future trends in the behaviour of economic agents (Preis *et al.*, 2013).

The increase in the number of COVID-19 cases and mortality creates fear, especially the fear of uncertainty (Kuruppu & De Zoysa, 2020). Vasileiou (2020) explains that the number of cases can be added to the loss estimation of the economy. This is because the increase in COVID-19 cases would be followed by a decrease in productivity. Also, the higher the investor's fear, the higher the likelihood of risk-aversion behaviour. Therefore, the surge of COVID-19 infections and death numbers can also be regarded as a heuristic.

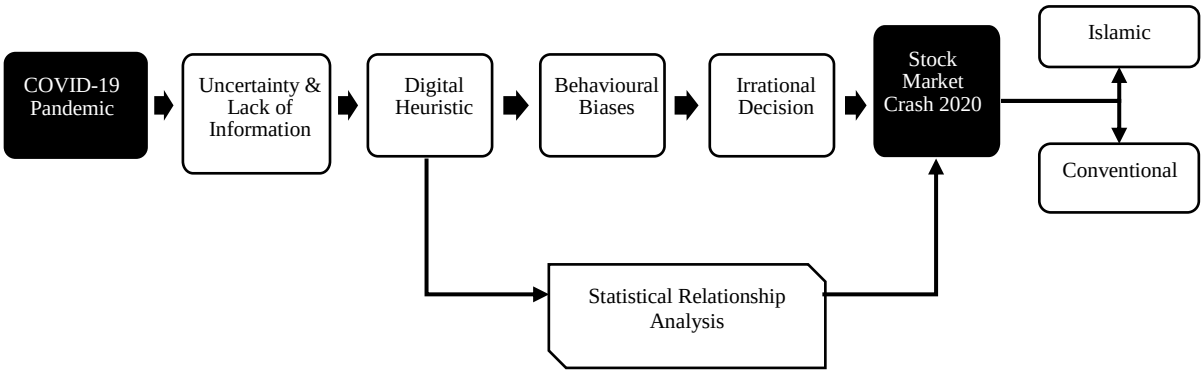
Impact of the Pandemic on Faith-based Investment

Sherif (2020) analysed the reaction of faith-based stocks to the COVID-19 pandemic and its comparison with the conventional FTSE100 index on the UK Stock Exchange in times of crises. The results show that the negative relationship of the pandemic outbreak was more significant to the conventional index than the Islamic index. This study proceeds from the theory that the Islamic stock index has differences from conventional stocks—at least, Islamic stocks are differentiated in terms of their company screening and financial characteristics (Sherif, 2020). The Islamic index is also characterised as having low leverage and receivables, which implies that it can reduce financial risk and vulnerability when a crisis occurs (Farooq & Alahkam, 2016).

Research Framework

Summarising the literature review, **Figure 2** provides a framework that explains how the COVID-19 outbreak affected the stock market's fall.

Figure 2: The Influence of COVID-19 on Investor Behaviour Research Framework



Source: Authors' own

According to the literature review, it can be understood that the early COVID-19 outbreak resulted in a significant level of uncertainty as well as a lack of accurate and reliable information for decision-making. This condition led people to rely on heuristics, including digital heuristics, to make judgements. This assessment can be biased because the affect heuristic and availability heuristic can lead to irrational decisions, and this could have led to the 2020 stock market crash. Thus, the existing research was pursued to analyse the statistical relationship of digital heuristic proxies on the stock market, whether based on religious or conventional paradigms.

Research by Budiarso *et al.* (2020) described that psychological factors play an influential role in the capital market and have a short-term effect. As people's feelings of fear and anxiety change over time, so does the ever-growing availability of information needed to make decisions. Therefore, it is important to examine how behaviour shifts in the short and long term. Along with the condition of non-stationary data during a crisis, quantitative methodologies, such as ARDL, can be helpful in analysing these problems and conditions. ARDL has been used by Gherghina *et al.* (2020) and Maroua and Slim (2020) to examine the impact of COVID-19.

METHODOLOGY

This research uses one of the time series analysis models, ARDL, to analyse the COVID-19 impact on the returns of Islamic and conventional stock indexes. This study's primary research focus is on the daily data of conventional and Islamic stock indices. The Jakarta Islamic Index (JII) was used to represent the Islamic stock index while the LQ45 was used for the conventional index. This study chose the start of the observation period to follow the majority of the reference research, which began on 20 January 2020 in the United States. The end of the initial phase of the pandemic in Indonesia, or 16 June 2020, was the end of the observation period. This observation period is similar to that used by Albulescu (2020), who considered the first relaxation of social restrictions as the end of observation. Thus, the observation of this study is the crash of the Indonesian stock market in 2020, which started from 20 January 2020 until 16 June 2020.

Data and Variables

The stock index returns are used as the dependent variable in this study to represent stock market conditions. Meanwhile, four independent variables represent COVID-19, namely the number of COVID-19 cases, the number of COVID-19 death cases, the GSV and the panic index. **Table 1** provides an explanation of these variables.

Table 1: Variables Definition

Variable	Formula/Symbol	Explanation
Dependent		
Returns	$R_t = \ln(Price_t/Price_{t-1})$	Daily stock returns of the JII or LQ45 index
Independent		
COVID-19 case	$CASE_t = \ln(Case_t)$	Total of COVID-19 cases in Indonesia
COVID-19 death	$DEATH_t = \ln(Death_t)$	Total of COVID-19 mortality in Indonesia
Google search volume (GSV)	$SEARCH_t = \ln(Search_t)$	Number of daily searches on Google (Google search volume) for keywords 'covid', 'corona', 'COVID-19', 'korona', 'lockdown' and 'social restriction' in Indonesia
COVID-19 panic index	PANIC = The Panic Index on coronavirus compiled by RavenPack is available from its website	Values range from 0-100. If the score is 7, then 7% of the media talks about panic and COVID-19
Exchange rate	$EXRATE_t = \ln(EXRATE_t)$	The exchange rate of US dollars to Rupiah
World oil prices	$OIL_t = \ln(OIL_t)$	Price of Brent oil in dollars
Daily stock trading volume	$VOL_t = \ln(Vol_t)$	Daily stock trading volume of each index

Source: Authors' own

Stock returns (Rt) is the daily margin level of the stock index. The data is collected from Yahoo! Finance. R_t is calculated by the following formula:

$$R_t = \ln(\frac{Price_t}{Price_{t-1}}) \quad (1)$$

The index refers to the closing price of the stock market index. The COVID-19 data is collected from the Indonesian National Agency for Disaster Management. The COVID-19 case (CASE) variable denotes the increase in Indonesia's total number of COVID-19 cases. The COVID-19 death variable (DEATH) represents the increase in the total number of COVID-19 fatalities. As in Erdem's (2020) research, CASE and DEATH are calculated by the following formula:

$$\text{CASE}_t = \ln(TotalCase_t) \quad (2)$$

$$\text{DEATH}_t = \ln(TotalDeath_t) \quad (3)$$

The GSV (SEARCH) variable is the volume of daily searches for the search keywords 'covid', 'corona', 'COVID-19', 'korona', 'lockdown' and 'social restriction' on Google Trend Indonesia (https://trends.google.co.id). Search volume values range from 0–100. The data obtained is converted into growth form with the following formula:

$$SEARCH_t = \ln(SearchVolume) \quad (4)$$

The COVID-19 panic index is a number that shows the level of fear associated with COVID-19 as calculated by news sentiment linked to COVID-19. The index ranges from 1–100; the greater

the index, the higher the panic. This index was compiled by Ravenpack, a big data analytics company, and obtained from its website.

Table 2 summarises the descriptive statistics for the previously mentioned variables. R_JII and VOL_JII are the returns and trading volume of JII, respectively. R_LQ45 and VOL_LQ45 are the returns and trading volume of LQ45, respectively. The value in all variables is in the original state (not transformed with natural logarithms). The table shows that the LQ45 returns have a lower mean than the JII returns. The standard deviation of the JII stock returns is also lower than the LQ45 stock returns.

Table 2: Summary Statistics

Variable	Mean	Standard Deviation	Median	Minimum	Maximum
R_JII	-0.003382	0.020324	-0.002754	-0.062354	0.043465
R_LQ45	-0.003861	0.021948	-0.001377	-0.063101	0.04769
CASE	7440.97059	11180.43912	101.5	0	40400
DEATH	481.892157	663.2911776	4.5	0	2231
SEARCH	25.8235294	23.42521776	21	0	93
PANIC	6.047333	4.507716	5.52	0	32.48
EXRATE	14570.84	880.7504	14329.9	13213.2	16504.8
OIL	41.193	13.40634	38.64	19.33	64.85
VOL_JII	1.05E+09	5.30E+08	9.18E+08	3.84E+08	3.07E+09
VOL_LQ45	1.93E+09	1.05E+09	1.68E+09	7.08E+08	6.98E+09

Source: Authors' own

Empirical Specifications and Estimation Methods

The following linear model was developed to analyse the COVID-19 impact on the behaviour of the Indonesian stock market:

$$R_t = \alpha + \beta_1 CASE_t + \beta_2 DEATH_t + \beta_3 SEARCH_t + \beta_4 PANIC_t + \beta_5 EXRATE_t + \beta_6 OIL_t + \beta_7 VOL_t\, \varepsilon \quad (5)$$

R_t is the index returns calculated by the natural logarithm of $price_t/price_{t-1}$ from JII or LQ45. $CASE_t$ and $DEATH_t$ are the natural logarithms of $Case_t$ and $Death_t$. $SEARCH_t$ is calculated by the natural logarithm of GSV_t. $PANIC_t$ is the daily COVID-19 Panic Index (0-100). $EXRATE_t$ is the dollar exchange rate to rupiah. OIL_t is the world price of Brent oil. Meanwhile, VOL_t is the trading volume of the JII or LQ45 index, and 'ε' is the error term.

Because the results of the stationarity test found the above variables to be stationary at various levels, the ARDL approach was used to avoid spurious regression as mentioned by Pesaran *et al.* (2001). Adopting Equation 5, the ARDL model is as follows:

$$\Delta R_t = \alpha_0 + \sum_{j=1}^{p} \beta_1 \Delta R_{t-j} + \sum_{j=1}^{q} \beta_2 \Delta CASE_{t-j} + \sum_{j=1}^{q} \beta_3 \Delta DEATH_{t-j} + \sum_{j=1}^{q} \beta_4 \Delta SEARCH_{t-j} + \sum_{j=1}^{q} \beta_5 \Delta PANIC_{t-j} + \sum_{j=1}^{q} \beta_6 \Delta EXRATE_{t-j} + \sum_{j=1}^{q} \beta_7 \Delta OIL_{t-j} + \sum_{j=1}^{q} \beta_8 \Delta VOL_{t-j} + \pi_1 R_{t-1} + \pi_2 CASE_t + \pi_3 DEATH_t + \pi_4 SEARCH_t + \pi_5 PANIC_t + \pi_6 EXRATE_t + \pi_7 OIL_t + \pi_8 VOL_t + \theta ECT_{t-i} + \varepsilon_t \quad (6)$$

The notation 'Δ' is the first differentiation of the variable, 'β' is the coefficient for short-term dynamics or Error Correction Form (ECM), while 'π' is the coefficient for long-run model

relationships. The notation 'I' represents the lag number, while 'θ' is the adjustment speed, and 'ε' is the error term.

RESULTS

Stationarity Test

To evaluate whether data are stationary or not, a unit root test was conducted with the Augmented Dicky Fuller (ADF) test. The findings of the unit root test are summarised in **Table 3**.

Table 3: Results of the ADF Test

Variable	Adj. t-Stat	Prob.	Stationary at
R_t JII	-7.137767	0.0000	l(0)
R_t LQ45	-7.492099	0.0000	l(0)
CASE	-6.174123	0.0000	l(1)
DEATH	-3.263505	0.0197	l(1)
SEARCH	-3.227383	0.0216	l(0)
PANIC	-7.310402	0.0000	l(0)
EXRATE	-11.64903	0.0001	l(1)
OIL	-7.241651	0.0000	l(1)
VOL	-13.80139	0.0001	l(1)

Source: Authors' own

Based on **Table 3**, the variables are stationary at different levels. SEARCH and PANIC are stationary at I(0) or at the first level, and others are stationary at I(1) or at the first differentiation level.

Residual Test and Stability Test

The equation model was split into four parts: Model 1 uses the total COVID-19 case variable (CASE) as the independent variable representing the COVID-19 pandemic, Model 2 uses the total COVID-19 death variable (DEATH), Model 3 uses the GSV of COVID-19 variable (SEARCH) and Model 4 uses the panic index variable (PANIC). The residual test results of all models have passed autocorrelation, heteroscedasticity and normality tests, either with the dependent variable Returns of JII or dependent variable Returns of LQ45. The probability value (p-value) of each test is shown in **Table 4**.

Because the eight models above have passed the residual test, they can be used for further analysis.

Long Run Analysis Results (ARDL)

Table 5 shows the results of the ARDL model analysis of the long-run impact of the COVID-19 pandemic on JII returns.

COVID-19's long-run impact on LQ45 returns is seen in **Table 6.**

Based on **Tables 5** and **6**, it can be seen that in the long run, there are no pandemic-related variables that affect stock returns, except for the PANIC variable, which affects LQ45 returns at the 10 per cent critical level.

Table 4: Residual and Stability Test Results

	Model: CASE	Model: DEATH	Model: SEARCH	Model: PANIC
Dependent Variable: Stock Returns of JII				
Autocorrelation	0.3218	0.2228	0.2143	0.9872
Heteroscedasticity	0.1802	0.2602	0.5372	0.6265
Normality	0.556	0.876	0.655	0.747
Bound Test	Cointegration	Cointegration	Cointegration	Cointegration
Cumulative Sum (CUSUM) Test	Stable	Stable	Stable	Stable
CUSUMSQ Test	Stable	Stable	Stable	Stable
Dependent Variable: Stock Returns of LQ45				
Autocorrelation	0.793	0.3567	0.7312	0.7164
Heteroscedasticity	0.3607	0.2241	0.7076	0.7422
Normality	0.724	0.563	0.868	0.861
Bound Test	Cointegration	Cointegration	Cointegration	Cointegration
Cumulative Sum (CUSUM) Test	Stable	Stable	Stable	Stable
CUSUMSQ Test	Stable	Stable	Stable	Stable

Note: See Appendix for CUSUM test figures and bound test results table.
Source: Authors' own

Table 5: ARDL Model Results for Returns of JII

Variable	Model: CASE		Model: DEATH		Model: SEARCH		Model: PANIC	
	Coef.	T-stat	Coef.	T-stat	Coef.	T-stat	Coef.	T-stat
CASE	0.000	0.078	-	-	-	-	-	-
DEATH	-	-	-0.001	-0.438	-	-	-	-
SEARCH	-	-	-	-	-0.001	-0.281	-	-
PANIC	-	-	-	-	-	-	0.001	1.498
EXRATE	0.044	0.650	0.066	1.107	0.048	0.657	0.040	0.615
OIL	0.008	0.531	0.000	0.021	0.007	0.560	0.008	0.722
VOL	0.002	0.233	0.000	0.021	0.005	0.907	0.001	0.164
c	-0.504	-0.749	-0.751	-1.264	-0.586	-0.809	-0.444	-0.667

Note: The significance values at 1%, 5% and 10% are denoted by the symbols ***, **, and * respectively in the 'Coef.' column. The value of T-statistics is in the 'T-stat' column.
Source: Authors' own

Table 6: ARDL Model Results for Returns of LQ45

Variable	Model: CASE		Model: DEATH		Model: SEARCH		Model: PANIC	
	Coef.	T-stat	Coef.	T-stat	Coef.	T-stat	Coef.	T-stat
CASE	0.001	0.496	-	-	-	-	-	-
DEATH	-	-	0.001	0.384	-	-	-	-
SEARCH	-	-	-	-	-0.002	-0.397	-	-
PANIC	-	-	-	-	-	-	0.001*	1.937
EXRATE	0.037	0.607	0.032	0.514	0.046	0.721	-0.001	-0.024
OIL	0.018	1.217	0.009	0.611	0.013	1.263	0.009	0.855
VOL	0.002	0.213	0.004	0.556	0.006	1.328	0.003	0.719
c	-0.466	-0.752	-0.427	-0.679	-0.613	-0.955	-0.097	-0.159

Note: The significance values at 1%, 5% and 10% are denoted by the symbols ***, **, and * respectively in the 'Coef.' column. The value of T-statistics is in the 'T-stat' column.
Source: Authors' own

Short-Run Analysis Results (ECM)

Table 7 shows the findings of the ECM model analysis for the short-run dynamics of the pandemic outbreak impact on JII returns:

Table 7: Short-Run Analysis Results for Returns of JII

Variable	Model: CASE		Model: DEATH		Model: SEARCH		Model: PANIC	
	Coef.	T-stat	Coef.	T-stat	Coef.	T-stat	Coef.	T-stat
ΔR_JII_{t-1}	0.171*	1.763	0.244**	2.522	0.196*	2.020	0.170*	1.80
ΔCASE	-	-	-	-	-	-	-	-
ΔDEATH	-	-	-0.001	-0.114	-	-	-	-
$\Delta DEATH_{t-1}$	-	-	-0.034***	-3.515	-	-	-	-
ΔSEARCH	-	-	-	-	-0.015**	-2.499	-	-
ΔPANIC	-	-	-	-	-	-	-	-
Δln(EXRATE)	-0.247**	-2.244	-0.091	-0.856	-0.272**	-2.536	-0.290**	-2.615
$\Delta ln(EXRATE_{t-1})$	-0.170	-1.569	-	-	-0.155	-1.391	-0.287**	-2.467
$\Delta ln(EXRATE_{t-2})$	-	-	-	-	-0.107	-1.007	-0.171	-1.582
Δln(OIL)	0.125***	4.685	0.105***	4.036	0.106***	4.040	0.129***	4.828
Δln(VOL_JII)	0.021***	3.015	0.020***	2.950	0.026***	3.69)	0.023***	3.281
$\Delta ln(VOL\_JII_{t-1})$	-0.016**	-2.067	-0.017**	-2.365	-0.017**	-2.345	-0.015*	-1.948
ECT	-0.943***	-7.612	-1.032***	-8.020	-0.980***	-7.528	0.965***	-7.915

Note: The significance values at 1%, 5% and 10% are denoted by the symbols ***, **, and * respectively in the 'Coef.' column. The value of T-statistics is in the 'T-stat' column.
Source: Authors' own

The total COVID-19 death variable (DEATH) at t-1 has a significant negative effect on JII returns, according to the findings in **Table 7**. The GSV variable (SEARCH) also significantly and negatively influences the JII returns. The other variables such as Exchange rate (EXRATE), Brent oil (OIL) and trading volume of JII (VOL_JII) also significantly influence JII returns in the short run.

Table 8 shows the findings of the ECM model analysis for the short-run dynamics of the pandemic outbreak's impact on LQ45 Returns.

Table 8: Short-Run Analysis Results for Returns of LQ45

Variable	Model: CASE		Model: DEATH		Model: SEARCH		Model: PANIC	
	Coef.	T-stat	Coef.	T-stat	Coef.	T-stat	Coef.	T-stat
ΔR_LQ45_{t-1}	0.189*	1.951	0.198**	2.068	0.232**	2.433	0.208**	2.193
ΔCASE	-	-	-	-	-	-	-	-
ΔDEATH	-	-	-0.001	-0.071	-	-	-	-
$\Delta DEATH_{t-2}$	-	-	-0.03***	-3.147	-	-	-	-
ΔSEARCH	-	-	-	-	-0.018***	-2.829	-	-
ΔPANIC	-	-	-	-	-	-	-	-
Δln(EXRATE)	-0.290**	-2.339	-	-	-0.288**	-2.404	-0.34***	-2.796
Δln(EXRATEt-1)	-0.269**	-2.226	-	-	-0.266**	-2.251	-0.33***	-2.657
Δln(EXRATEt-2)	-	-	-	-	-0.198**	-1.780	-0.268**	-2.344
Δln(OIL)	-	-	-	-	0.088***	3.176	-	-
Δln(VOL_JII)	0.055*	1.848	0.055*	1.926	0.059**	2.058	0.049*	1.667
Δln(VOL_JIIt-1)	-	-	-	-	-	-	0.046	1.538
Δln(VOL_LQ45)	0.040***	5.206	0.034***	4.611	0.042***	5.590	0.041***	5.381
ECT	-1.14***	-8.293	-1.10***	-8.211	-1.192***	-8.820	-1.17***	-8.781

Note: The significance values at 1%, 5% and 10% are denoted by the symbols ***, **, and * respectively in the 'Coef.' column. The value of T-statistics is in the 'T-stat' column.
Source: Authors' own

Table 8 shows that at t-1, the total COVID-19 death variable (DEATH) has a significant negative impact on the LQ45 results. The GSV variable (SEARCH) also has a significantly negative influence on the LQ45 returns. The other variables such as Brent oil (OIL), the exchange rate (EXRATE) and trading volume of LQ45 (VOL_LQ45) also significantly affect returns in the short run.

DISCUSSION

Table 9 outlines the analysis findings of the COVID-19 impact comparison between Islamic and conventional indices.

Table 9: Summary of the Analysis

Variable	Significance Level – JII (Islamic)		Significance Level – LQ45 (Conventional)	
	Short-run	Long-run	Short-run	Long-run
CASE	-	-	-	-
DEATH	1%	-	1%	-
SEARCH	5%	-	1%	-
PANIC	-	-	-	10%

Source: Authors' own

The results of the short-run analysis found that the COVID-19 death announcement (DEATH) impact stock returns negatively and significantly for both JII and LQ45. The results confirmed earlier studies such as Erdem (2020), Baig *et al.* (2020), Dey *et al.* (2020) and Onali (2020). Moreover, the significant and negative influence of GSV(SEARCH) on stock returns strengthens previous research such Baig *et al.* (2020) and Dey *et al.* (2020). In addition to the pandemic-related variable, the exchange rate (EXRATE) variable also has a significant relationship with the returns of JII and LQ45 during the crisis. The price of Brent oil (OIL) and the volume of stock trading (VOL) significantly and positively affect both indices' returns in the short run. This result confirms the research of O'Donnell *et al.* (2021) and Rahmayani and Oktavilia (2020). Meanwhile, in the long run, only the panic index (PANIC) influences the returns of LQ45. The impact of PANIC on returns is in line with the study by Haroon and Rizvi (2020). The fact that COVID-19's impact is more short-term than long-term can be understood as being due either to adjustment in investor behaviour or to government intervention in the economy, as explained by Erdem (2020) and O'Donnell *et al.* (2021).

In the short run, the effect of the pandemic on the Islamic index and conventional index in Indonesia is similar. This finding is somewhat different from Sherif (2020), who found Islamic stocks in the UK to be more resistant to the effects of COVID-19 than conventional ones. Even so, in the long run, there is a difference: the news panic index variable (PANIC) affects the LQ45 but not the JII.

Maroua and Slim's (2020) research that analysed the impact of COVID-19 in Saudi Arabia found that COVID-19 cases had negatively impacted the stock markets in both the short run and long run. Meanwhile, Erdoğan *et al.* (2020) found that the Islamic stock market in Turkey exhibited less volatility than the conventional market in the face of the COVID-19 shock. This difference is quite interesting because, in Indonesia and Saudi Arabia, the pandemic outbreak had a significant negative influence on the Islamic market, and there was no meaningful difference with conventional ones. However, in Turkey and the UK, Islamic stock markets tended to be more stable than conventional ones. Several things might explain this difference,

one of which is the use of variables and a slightly different observation period. Therefore, it would be better if one study examines a number of Muslim countries using variables that can control for the differences between countries.

CONCLUSION AND IMPLICATION

In general, the early COVID-19 outbreak has influenced investor behaviour in Indonesia during the stock market crisis, both in conventional and Islamic markets. However, this influence is stronger in the short run than in the long run. The COVID-19 mortality rate and the GSV of COVID-19 have a significant negative effect on both stock index returns in the short run. The influence of the pandemic on JII and LQ45 is similar, except for the panic sentiment of COVID-19, which only affects the returns of LQ45 in the long run. These findings reinforce the notion that there is a digital heuristic process that causes behavioural bias in investors' decision-making which led to the crash of the stock market in 2020. Besides, the heuristic effect is more short-term, as the nature of emotions is short-term. That is because the affect heuristic and the availability heuristic will be corrected as more accurate information develops.

The findings of this research have several implications for academia and practice. First, this study provides insight into the need to develop or add policies based on behavioural sciences to prevent or reduce future stock market crises, especially in terms of controlling the heuristic process so that it is less likely to cause bias that leads to irrational decisions during times of uncertainty. Second, the behaviour of Islamic investors was not significantly different from that of conventional investors in response to the pandemic during the 2020 stock market crash, and this is rather different from research in the UK by Sherif (2020). This has led to allegations of differences in the behaviour of Islamic investors in the UK and Indonesia, which can be investigated and further clarified. Lastly, this study confirms earlier studies and provides a deeper perspective from a behavioural finance viewpoint, which means it would be better if research in this field continues to be conducted in order to produce more insights regarding this kind of phenomenon.

Although this study has contributed to the existing literature related to COVID-19 and finance, further research is needed to complete it due to its limitations. Future research could examine investor behaviour towards crises in the experimental form at the individual level. In such research, it would also be possible to examine the role of religion (other than Islam) in dealing with crises. In the digital context, other search keywords that are still crisis-related could also be measured, such as 'unemployment, crisis, lockdown, recession', and so on. Finally, this research also needs to be re-confirmed with research on other research objects or countries.

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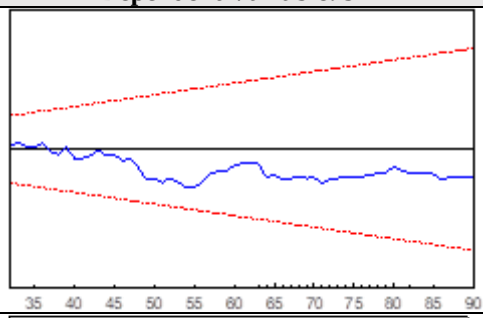
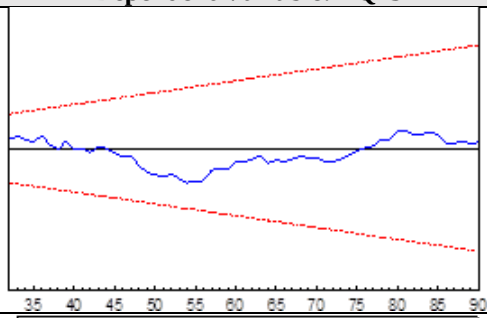
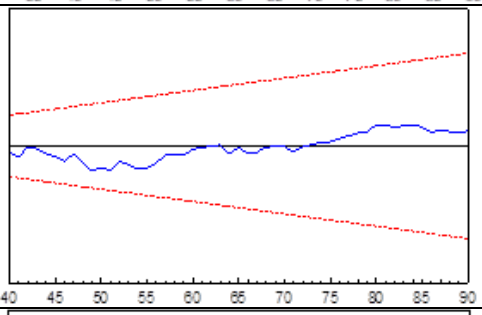
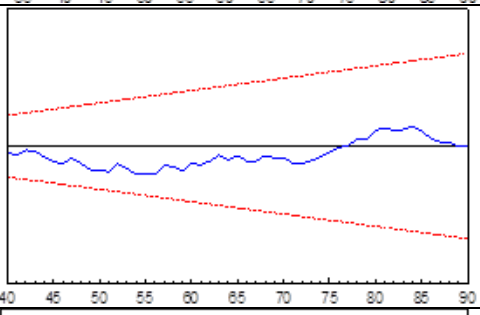
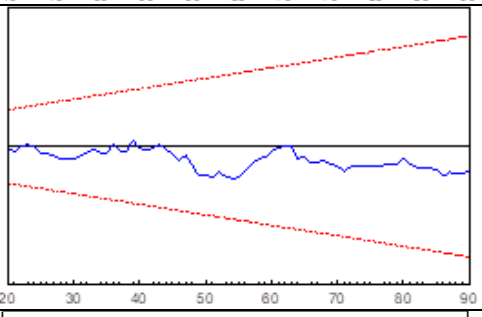
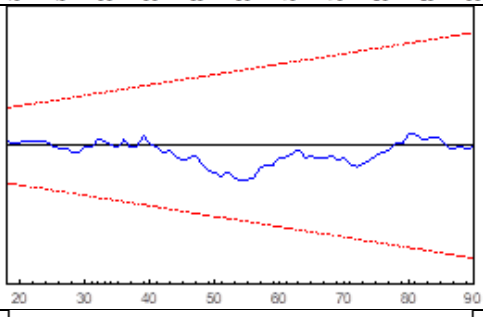
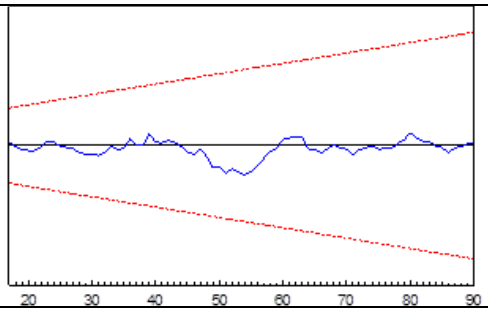
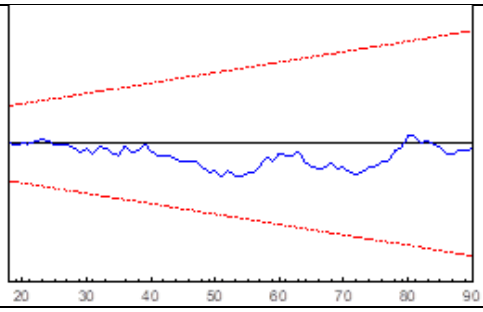
APPENDIX

CUSUM Stability Test

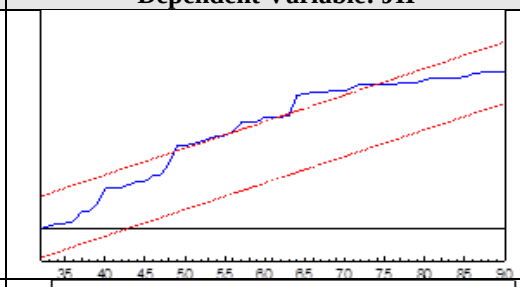
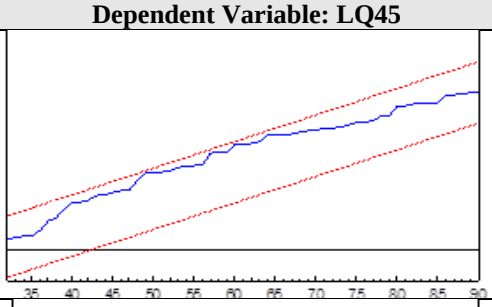
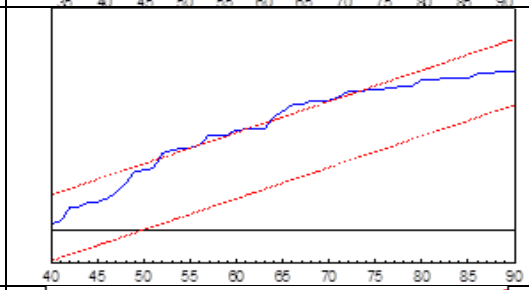
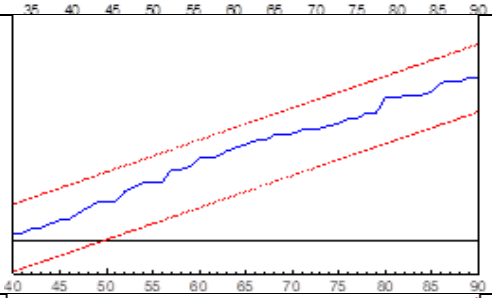
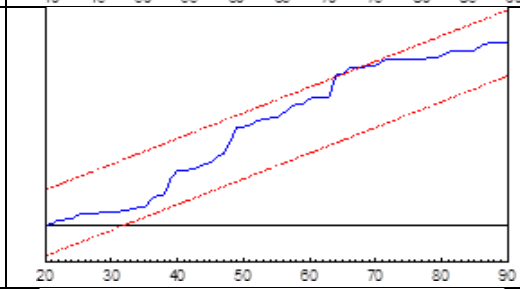
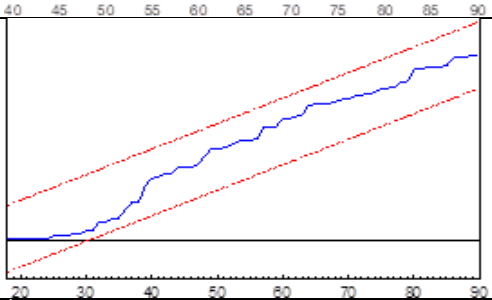
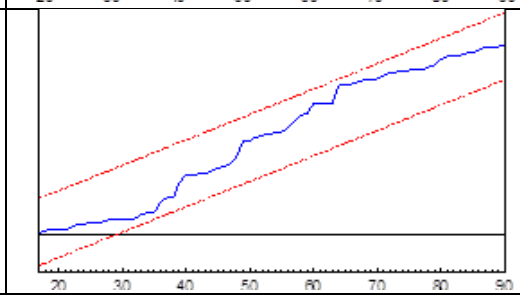
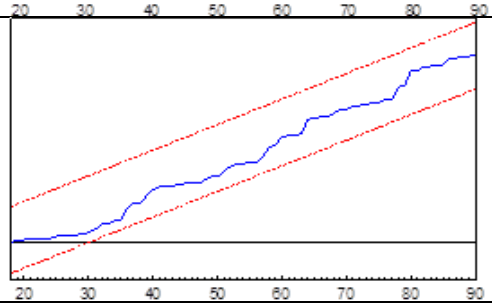
Processed by EViews 10 (2021). The red line represents the critical value of 5 per cent.

Model	Dependent Variable: JII	Dependent Variable: LQ45
Model: CASE		
Model: DEATH		
Model: SEARCH		
Model: PANIC		

Source: Authors' own

CUSUM of Squares Stability Test

Processed by EViews 10 (2021). The red line represents the critical value of 5 per cent.

Model	Dependent Variable: JII	Dependent Variable: LQ45
Model: CASE		
Model: DEATH		
Model: SEARCH		
Model: PANIC		

Source: Authors' own

Co-integration Bound Test Results

These results were processed with EViews 10 (2021).

Dependent Variable	Model	F-Stats	Critical Values		Results
			Lower bound	Upper bound	
Returns of JII	CASE	9.061676	3.29	4.37	Co-integrated
	DEATH	10.05008	3.29	4.37	Co-integrated
	SEARCH	8.822722	3.29	4.37	Co-integrated
	PANIC	9.779799	3.29	4.37	Co-integrated
Returns of LQ45	CASE	10.73712	3.29	4.37	Co-integrated
	DEATH	10.54261	3.29	4.37	Co-integrated
	SEARCH	12.13376	3.29	4.37	Co-integrated
	PANIC	12.02603	3.29	4.37	Co-integrated

Source: Authors' own