





COVID-19 and Macro-Financial Forces: Who Drives the Conventional and Islamic Stock Markets?

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Abstract: Although WHO has declared the pandemic end, the underexplored area of study around COVID-19, macro-financial, conventional, and Islamic stock markets should be conducted. Therefore, this research remains relevant since a market downturn can happen anytime in the future, and the world will face dynamic changes in investors' behavior. We aim to investigate the drivers of the Conventional and Islamic stock markets, which mainly consider the global pandemic COVID-19 and Macro-financial forces. The main methodology applied panel autoregressive distributed lag (ARDL). This research discovers the following findings: (1) conventional stocks highly rely on the confidence index of the COVID-19 vaccine, whereas Islamic stocks remain more resilient; (2) A safe-haven role of Islamic stocks during global market turbulence and outperform their counterparts; (3) government policies boost the confidence of both stock markets; and (4) conventional stocks are much more dominant than Islamic stocks. Islamic stocks provide safe-haven attributes during market turmoil, whereas conventional stocks take time to recover. We offer suggestions to investor decision-making, regulators, and government policies.


1 INTRODUCTION


Although the global COVID-19 pandemic has come to an end, as announced by WHO at the beginning of May 2023, the underexplored area of study around COVID-19 and stock markets is still crucial to be investigated. Market uncertainty and economic conditions greatly affect investment decision-making, thus determining the future direction of Islamic and conventional stocks (Albaity et al., 2023). COVID-19 shocked the world economy—especially the stock markets—both conventional and Islamic (Al-Awadhi et al., 2020). Conventional stocks (CS) experienced incisive declines in the early pandemic stages. The S&P 500, Nikkei, and Hang Seng indices fell by 34%, 20%, and 18%, respectively (Al-Awadhi


et al., 2020; Zhang et al., 2020). COVID-19 also affects the Islamic Stock (IS) market, but the recovery outperformed compared with their counterparts, the CS market (Nomran and Haron, 2021). IS experienced a smaller decline in its return and rebounded rapidly (Chowdhury et al., 2022). The arrival of vaccines resolved the shock due to the global COVID-19 pandemic. It gave new hope for the economy and thus the stock markets. It brought positive stock markets and economic breakthroughs globally (Rouatbi et al., 2021).

Research about vaccines of COVID-19 and financial assets (i.e., stocks) have been increasing recently. A positive stock market reaction was shown when the COVID-19 vaccines were produced and distributed (Demir et al., 2021; Rouatbi et al., 2021;

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Khalfaoui et al., 2021; Behera et al., 2022). Furthermore, people are more optimistic about investing in healthcare stock due to vaccine doses (Jeremiah et al., 2023). The vaccination rate denoted an exponential increase and signaled bright news for investors. Thus, global stock markets remain less volatile (Rouatbi et al., 2021). Meanwhile, it was found that vaccination was negatively insignificant to the return of the IS market in Malaysia (Tee and Kew, 2022).

A novelty research by Havidz et al., (2023), constructed the vaccine confidence index (VCI), which was derived from the first and second doses, creating confidence in individuals and thus promoting herd immunity. When herd immunity was formed, the economy would rebound eventually. They further explored VCI impacts on the cryptocurrencies and found that VCI positively impacted Bitcoin returns. This result was confirmed by Havidz et al., (2024). The impact of VCI on CS and IS markets has been unexplored; hence, we conducted this study. In addition to VCI, we utilized additional COVID-19 indices (i.e., the index of global fear (GFI), the index of stringency (SI), and the panic index of COVID-19 (CPI)).

Constructed by Salisu and Akanni (2020), GFI negatively impacted the stock market. It was further agreed by others (Makun, 2021). Furthermore, GFI was also utilized to find its effect to commodity (Salisu et al., 2020). SI was also employed because a high stringency index will cause difficulties in business activities (Scherf et al., 2022). Nevertheless, government policy in breaking the chain of COVID-19 infection could accelerate economic recovery. It was assumed that when the economy recovers, the stock market will rebound eventually (Aggarwal et al., 2021; Chang et al., 2021; Gu et al., 2022). CPI was utilized to find the impact on the stock market (Aggarwal et al., 2021), and major fiat and cryptocurrency volatility (Umar and Gubareva, 2020). Both GFI and CPI were utilized to find their impact on cryptocurrency return (Havidz et al., 2023) and Bitcoin volatility (Tiffani et al., 2023).

Besides COVID-19 factors, macro-financial factors also determine stock market movement (Pan, 2023). Therefore, we include three macro-financial factors (i.e., index of financial stress (FSI), rates of foreign exchange (FOREX), and index of volatility (VIX)) to avoid biased findings because different factors could be executed concurrently. Compared with CS, IS studies during COVID-19 were found to be very limited. There was a dearth of studies of FSI, and scant studies of FOREX (Dewi et al., 2022) and

VIX (Francis & Ambilikumar, 2021; Grima et al, 2021).

The literature on comparison studies between CS and IS grew during the pandemic (Nomran and Haron, 2021; Widjaja et al., 2024), but this current research was executed in different ways. Therefore, we addressed the research gap. We contributed to the literature threefold. First, this was the first study that utilized VCI as a determinant of CS and IS. Prior studies investigated the impact of VCI on the cryptocurrencies' return (Havidz et al., 2023, 2024). Secondly, we scrutinized two main clusters (i.e., global COVID-19 pandemic indices and macro-financial factors) as the determinants, which, as far as we knew when conducting the study, had not yet been investigated. Thirdly, instead of executing a one-sided market, we conducted a comprehensive study that compared CS and IS markets during market turbulence and how the range of determinants may have affected.

2 DEVELOPMENTS OF HYPOTHESES

2.1 Covid-19 Indices

VCI is a new proxy that was initiated by populations receiving full vaccination and it drove economic recovery (Havidz et al., 2023). Once the economy recovered, it drove stock prices—and their returns—up (Demir et al., 2021; Rouatbi et al., 2021). When total vaccination increased, the closing price of CS also increased (Khalfaoui et al., 2021; Behera et al., 2022). On the contrary, vaccination was ineffective in improving IS returns in Malaysia (Tee and Kew, 2022). GFI is an index which composes reported deaths and cases, and it revealed the higher fear that was perceived by people prompted a negative influence on CS (Salisu and Akanni, 2020; Makun, 2021). However, other research revealed insignificant co-movement between GFI with CS and IS returns in Pakistan (Ali et al., 2022).

SI is a government policy related to restrictions including workplace closure and travel bans. Higher SI impediments business activities and leads to a stock market downturn (Scherf et al., 2022). This policy suppresses the infection rate and elevates people's confidence, thus ameliorating the performance of CS (Gu et al., 2022; Chang et al., 2021). On the contrary, the stringency of government did not boost IS performance (Hersh et al., 2023). However, recently, COVID-19 has been considered

as part of people's lives and treated like other common diseases. Thus, people and the stock market have started to adjust. Hence, stock markets start to recover. CPI is a proxy that refers to panic sentiment and circulating news. The increase in public panic invokes a diminution of CS market and affects stock returns negatively (Aggarwal et al., 2021). COVID-19 pandemic induced stock market panic and enhanced volatility in daily returns (Nomran and Haron, 2021). Meanwhile, IS was less volatile in response to pandemic news (Ashraf, 2020). Therefore, we proposed as following hypotheses:

H₁: Vaccine Confidence Index (VCI) positively impacted to both stock indices return, conventional (CSI) vs. Islamic (ISI)

H₂: Global Fear Index (GFI) negatively/positively impacted to both stock indices return, conventional (CSI) vs. Islamic (ISI)

H₃: Stringency Index (SI) negatively/positively impacted to both stock indices return, conventional (CSI) vs. Islamic (ISI)

H₄: COVID-19 Panic Index (CPI) negatively/positively impacted to both stock indices return, conventional (CSI) vs. Islamic (ISI)

2.2 Macro Financial

FSI is a proxy to measure financial markets stress degree (Kaplanski and Levy, 2010). When the FSI is higher than the threshold, this denotes the anomalous market where investment decisions are riskier (Sun et al., 2023). Stock returns will decrease along with an increase in FSI (Christopoulos et al., 2011; Ftiti and Hadhri, 2019). The higher strain level leads to lower returns, both with CS and IS (Aloui et al., 2021). Stock value increment would decrease the price of local currency to the USD (strengthening the value) and vice versa (Khan, 2019; Qin 2018). The COVID-19 pandemic debilitated many countries' economies resulting in an impairment of those countries' exchange rates. Therefore, the CS return declines (Mroua and Trabelsi, 2020; Topcu and Serkan, 2020).

VIX is the fear index in the stock market. Higher VIX leads to higher uncertainty of CS (Fernandes et al., 2014; Shu and Chang, 2018), and thus lower the CS return. The worsen COVID-19 cases led to a higher perception of risk and reduced the confidence of stock market investors (Francis & Ambilikumar, 2021; Grima et al., 2021). The fluctuations of VIX are important predictors of IS (Ftiti and Hadhri, 2019; Paltrinieri et al., 2019). Yet, IS was more stable and predictable through the outbreak and proved less volatile than CS (Ali et al., 2022). Therefore, we proposed as following hypotheses:

H₅: Financial Stress Index (FSI) negatively impacted to both stock indices return, conventional (CSI) vs. Islamic (ISI)

H₆: Foreign Exchange (FOREX) negatively impacted to both stock indices return, conventional (CSI) vs. Islamic (ISI)

H₇: Volatility Index (VIX) negatively impacted to both stock indices return, conventional (CSI) vs. Islamic (ISI)

3 DATA AND METHODOLOGY

3.1 Data

We selected the countries around the world based on the availability of vaccine data for them to meet the criteria of our sample. There were 249 countries with available data listed by OurWorldInData (2022), but only 14 countries with complete vaccination data were selected with additional criteria applied.

South Korea had the most recent vaccination program, only starting on 26 February 2021, among our selected countries as the sample. Thus, the starting period was benchmarked from South Korea. Since the VCI is our variable of interest and its computation included the incubation period, $VCI = \left(\frac{\sum_i^N D2_{i,t}}{\sum_i^N (D2_{i,t} + D1_{i,t-28})} \right) \times 100$; (see Havidz et al., 2023), we applied a 28-day lag based on the most-used vaccine in each country of our samples. Employing daily data in our research, the indices of COVID-19 (i.e., VCI, GFI, CPI and SI) have seven-day daily data. Hence, we interpolated the five-day data for the remaining variables to seven days.

Our data spanned from 27 March 2021 to 3 December 2022. We transformed the variables to the change value $((Pt - Pt-1)/Pt)$ to allow an apples-to-apples comparison. Leaving SI and FSI using global data. We concluded to utilize 13 indicators in this paper consisting of two dependents (i.e., CSI and ISI), seven independents (i.e., VCI, GFI, CPI, SI, FSI, FOREX, VIX), and two control variables for each type of markets (i.e., CSMC, ISMC, CSVOL and ISVOL). Table 1 reports the data sources and summary of descriptive.

3.2 Unit Root Test and Panel ARDL

Levin et al. (2002) proposed a unit root test called the LLC (Levin, Lin, and Chu) test. Table 2 shows the LLC's findings, which documented that all variables were significant at level, except for FSI. Afterward,

we used the first difference and verified that all variables were stationary at the first level.

Table 1: Data Sources and Descriptive Summary.

Var(s)	Mean	Std dev	Min	Max
<i>Stock Indices</i>				
CSI	-0.015	1.147	-7.222	9.391
ISI	-0.008	1.386	-8.356	12.006
<i>COVID-19 indices</i>				
VCI	0.008	0.008	-0.429	0.105
GFI	-0.002	0.002	-0.053	0.059
SI	39.359	20.438	5.56	84.72
CPI	0.733	3.764	-0.991	151.361
<i>Macro-financial Factors</i>				
FSI	-0.966	2.427	-4.219	3.32
FOREX	0.018	0.453	-6.876	4.018
VOX	0.171	5.819	-19.463	27.018
<i>Control Variables</i>				
CSMC	-0.013	1.182	-6.835	11.139
ISMC	0.038	2.208	-33.246	79.807
CSVOL	6.646	85.201	-99.047	4535.741
ISVOL	85.02	2087.093	-99.906	164893.7
Note(s): Data for CSI, ISI, FOREX, VIX, CSMC, CSVOL, ISMC, and ISVOL were obtained from www.bloomberg.com; VCI, GFI, and SI were sourced from ourworldindata.org; CPI and FSI were from www.ravenpack.com and www.financialresearch.gov, respectively.				
Source(s): by authors.				

Mixed stationarity at the level and the first level exists hence the most appropriate method is panel autoregressive distributed lag (ARDL) (Pesaran et al., 1999). A similar approach was also utilized by prior works (Havidz et al., 2023, 2024). By using the Hausman test (1978) to choose the most suitable model, three estimators were applied (i.e., dynamic fixed effects (DFE), mean group (MG), and pooled mean group (PMG) and). The model of the ARDL panel can be explained as follows:

$$Y_{it} = \alpha_{it} + \sum_{i=1}^k Y_{it}^{Y_{it-i}} + \sum_{i=1}^q \beta_{it}^{X_{it-i}} + \mu_{it} \quad (1)$$

The dependent denotes as $Y_{i,t}$, while the independent variables is $X_{i,t}$, the parametric coefficients were α_{it} and β_{it} . μ_{it} marked as the residual term, t and i were the time-series and cross-

section, and the ideal lag length was depicted by k and q , explaining the number of predictors.

Table 2: Unit root test result.

Variables	LLC I(0)	Variables	LLC I(1)
CSI	-63.1149***	Δ CSI	-120***
ISI	-64.2405***	Δ ISI	-120***
VCI	-24.2758***	Δ VCI	-90.1856***
GFI	-17.6710***	Δ GFI	-130***
SI	-1.6975**	Δ SI	-68.6120***
CPI	-80.5758***	Δ CPI	-140***
FSI	-1.0006	Δ FSI	-60.3651***
FOREX	-65.7013***	Δ FOREX	-120***
VIX	-73.5749***	Δ VIX	-120***
CSMC	-63.2171***	Δ CSMC	-120***
ISMC	-68.8239***	Δ ISMC	-130***
CSVOL	-81.9031***	Δ CSVOL	-130***
ISVOL	-76.2618***	Δ ISVOL	-130***
Note(s): ** and *** denotes a significant level at 5% and 1%, respectively.			
Source(s): by authors.			

4 RESULTS AND DISCUSSIONS

As suggested by the Hausman test, the long-run results should refer to the MG estimator for CSI, while the PMG estimator should be referred to ISI (see Table 3).

Our results support the entire hypotheses (H_1 , H_2 , H_3 , H_4 , H_6 , and H_7), except H_5 . It is revealed that VCI positively impacted CSI significantly, while it was insignificant for ISI. Our results support prior works (Khalfaoui et al., 2021; Behera et al., 2022; Tee and Kew, 2022). It indicates that fully vaccinated people increase confidence in the economy (Havidz et al., 2023), hence the stock returns bounced back. The conventional and Islamic stocks rebounded, and the behavior of investors tended to re-buy the stocks. Conventional stock is highly reliant on the vaccination rate which leads to a much more stable market (Khalfaoui et al., 2021; Behera et al., 2022). However, Islamic stocks applied Shariah law which prohibited excess risk and emphasized ethical-oriented trade in doing business (Jawadi et al., 2014). Hence, Islamic stocks are much more resilient during market turbulence.

Table 3: Panel ARDL results for Conventional and Islamic Stocks.

Dependent variables	CSI	ISI
Model	MG	PMG
Long-run coefficients		
VCI	2.468**(1.234)	0.241(1.171)
GFI	-1.307(3.253)	11.512*(5.898)
SI	0.001**(0.003)	0.001**(0.001)
CPI	0.004(0.003)	-0.001(0.004)
FSI	0.004(0.003)	0.011*** (0.004)
FOREX	-0.211*** (0.061)	-0.032(0.020)
VIX	-0.000008	-0.004(0.002)
CSMC	0.856*** (0.036)	0.85*** (0.007)
CSVOL	-0.000001	-0.002(0.003)
Short-run coefficients		
Δ VCI	-6.272**(2.850)	2.715(3.014)
Δ GFI	3.600(6.119)	-6.862(8.876)
Δ SI	0.007(0.009)	-0.005(0.01)
Δ CPI	-0.002(0.002)	0.001(0.003)
Δ FSI	-0.284*** (0.074)	0.036(0.063)
Δ FOREX	0.064*(0.037)	-0.069(0.068)
Δ VIX	0.002(0.002)	-0.001(0.001)
Δ CSMC	0.041(0.045)	-0.024(0.028)
Δ CSVOL	0.003(0.002)	-0.007(0.001)
Speed of convergence		
ECT	-0.964*** (0.041)	-0.772*** (0.087)
Constant	-0.020(0.013)	-0.056*** (0.006)
Number of Obs (N)	8,638	8,638
Note(s): *, **, *** denotes a significant level at 10%, 5%, and 1%, respectively.		
Source(s): by authors.		

GFI implied a negative insignificant relationship with CSI. People are getting used to the COVID-19 outbreak, and the level of fear has started to decrease, driving stock prices up and, therefore, the returns. These findings are in line with prior works (Salisu and Akanni, 2020; Makun, 2021). However, a positive significant impact of GFI on ISI was documented. Islamic stocks serve as safe-haven assets (SHA), similar to gold, because of their ability to remain stable during global crises (Hasan et al., 2021). Further, investors highly consider Islamic stocks in

the inclusion of the portfolio during the crisis as it remains as defensive sector (Jeremiah et al., 2023). SI impacted positively and significantly on both CSI and ISI. The government's policy in managing COVID-19 increased public confidence in the stock market. This is also in line with previous findings (Chang et al., 2021; Gu et al., 2022). Moreover, people's fear is lessening regarding COVID-19 as they have adapted to the notion that COVID-19 can be seen as part of daily existence. Therefore, they are no longer panicked by the situation. These results contradicted prior works (Aggarwal et al., 2021).

FSI impacts positively on both, but is significant to ISI, while insignificant to CSI. Our results contradicted previous studies (Christopoulos et al., 2011; Ftiti and Hadhri, 2019). As COVID-19 had been underway for a year, thus facing financial difficulties, the stock markets started to understand and adjust the conditions. Therefore, stock markets start to rebound during the stress. Investors' behavior certainly does not stop looking for the best stocks when the market goes down. Prior studies showed that ISI outperformed CSI (Nomran & Haron, 2021). Therefore, investors are more interested in Islamic stocks as it serves as a safe haven.

The exchange rate negatively impacted both markets but is significant for CSI, while it is insignificant for ISI. Most indices used around the world are dominated by conventional indices. Therefore, the volume of exchange rates for the conventional stock is greater than the counterpart, Islamic indices. Our findings are in line with prior work (Khan, 2019). Moreover, the tendency of people's stock consumption leads to the exchange rate movement (Mroua and Trabelsi, 2020). VIX shows a negative relationship with both CSI and ISI. It proves that the less volatile the market, the more people will invest. This result was supported by Francis and Ambilikumar (2021) and Grima et al., (2021). VIX is determined by the movement of the S&P 500 which is considered as conventional stocks. Therefore, CS is more likely to be impacted than IS. Furthermore, both market caps have a positively significant impact on CSI and ISI. Indeed, the growing market cap implied the growth of stock markets as it gained more investors, thus affecting the returns. Meanwhile, the volume of both markets remains a weak determinant of returns compared with the market caps.

Overall, the short-run results of CSI supported several significant variables. Although the number of fully vaccinated people keeps increasing, investors still question how quickly it will stabilize the conventional market as recovery takes time.

Moreover, the outbreak keeps the market stressed which leads to investors' anxiety; they will not invest in the conventional market when turbulence occurs. The money supply is affected by hot money inflow and leads to greater stock returns. COVID-19 has been going on for a brief period but will recede in time. Therefore, most of the factors were revealed to be insignificant in the short run. Likewise, Islamic stocks remained stable and resilient compared with their counterpart, conventional stocks.

5 CONCLUSIONS

Islamic stocks were found to be more resilient during high turbulence compared to its counterpart, conventional stocks. Our findings benefit investors and suggest the inclusion of Islamic stocks in their investment portfolio to mitigate the risks. Islamic stocks are suggested to investors who aim for long-term behavior investments because they are more resilient no matter how bad the economy. Meanwhile, investors who aim for a quicker, higher return may consider conventional stocks, yet they should be able to bear higher losses when high uncertain times occur. Governments should be able to control and encourage society to be fully vaccinated as well as get booster doses to keep the economy stable. The COVID-19 vaccine should be an annual vaccine program provided by the government. This research is limited to stock indices and could be further examined in a company's level data to have a better suggestion for the stock pick. Further, it is interesting to include emerging countries and compare them with developed countries to assess the navigation during uncertain times of these countries.

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AUTHOR CONTRIBUTIONS

Melissa Putritama, Natanael Christian Adinata, and Nathalie Noviani – data collection, methodology, original draft, analysis, and interpretation. **Shinta Amalina Hazrati**

Havidz – conception, project administration, original draft, methodology, review, revision, validation, and supervision.

DATA STATEMENT

The data used in this study cannot be made available due to commercial reason.

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