Stringency Index and Stock Market Return Amidst COVID-19 Pandemic: Evidence from Emerging Stock Market Countries

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Abstract

COVID-19 has been rapidly spread worldwide since March 2020 and has caused uncertainty in many sectors, including stock market. Aligned with the previous studies, Government responses toward the crisis are matter in offsetting the effects of the pandemic. Henceforth, we examine the relationship of Stock market return with lockdown policies amidst the pandemic. In specific, this study analyses COVID-19 Government Response Stringency Index, as the primary drivers of stock market movements, and add other country-level indicators are as a control variable. We focus on emerging stock market countries since it has been a number one alternative for global investors diversified their portfolios. Moreover, there is still lack of extend research on how Government's role affects the stock market return in selected countries during the 1-year of COVID-19 pandemic. In total, there are 26 emerging stock markets' monthly return within a period from March 2020 to February 2021, employed in this research. It is believed that the Index has a negative significant relationship with the stock markets' return.

Keywords
COVID-19, Stock Market, Stringency Index, Emerging Markets

1. Introduction

In the beginning of 2020, the world was shocked by the outbreak of coronavirus disease 2019 or COVID-19. The virus rapidly emerged globally from Wuhan, China. On the 11th of March of 2020, World Health Organization (WHO) declared the COVID-19 as a global pandemic[1]. In order to reduce the transmission of the virus, the government around the world took unprecedented actions following the guidance from the WHO, including closures policy[2]. The restriction policy is proven in reducing the growth of COVID-19 cases and deaths (Liu et al. 2021). However, the lockdown policy also affects economic sector, such as West Texas Intermediate (WTI) price reached negative level at -$37/barrel as a result of the global oil demand drop during the cessation of economic activities[3]. Considering the fact that there are differences in socio-culture, capacity of the government, etc. Thus, the progression in tackling the COVID-19 of each country worldwide would be different. In order to compare the stringent policy levels taken by respective governments the authors use the Stringency index created by OxCGRT (Oxford COVID-19 Government Response Tracker) which is an average level of nine generic closure policies worldwide (Hale et al. 2021).

In regard to the differences of COVID-19 response' economic impact worldwide, Latin America's GDP was predicted to decline by approximately -9.4% with a rising number of unemployed populations by 18 million people in FY 2020[4]. Furthermore, in Africa region, the tourism sector was severely affected by COVID-19 with a 46% decrease in total of tourist numbers (Elbany and Elhenawy 2021). And also the GDP fell by 51% Quarter over Quarter (QoQ) in the second quarter of 2020 and there was a projection of 77 million Africans people will fall into poverty level if the lockdown policy prolonged (Lakemann et al., 2020). The economic growth of developing Asian countries were

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[1] https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020
[2] https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---16-march-2020
[3] https://www.cnbc.com/2020/06/16/how-negative-oil-prices-revealed-the-dangers-of-futures-trading.html
[4] https://www.cepal.org/en/pressreleases/contraction-economic-activity-region-intensifies-due-pandemic-it-will-fall-91-2020

projected by Asian Development Bank would be at a level of 2.4% in 2020 (Dhar 2021). Moreover, Central Eastern European countries would be able to reach their pre-pandemic economic level by at least 2 year period after they re-start the businesses (Brada et al. 2021) as a result of lower social trust they had compared to other European countries which provenly cause more confirmed cases and deaths amongst European nations (Oksanen et al. 2020).

By considering the existence of difference economic impact on each region and also interconnected real sectors with stock market, it is appealing to conduct further study related to different COVID-19 impact on each region's stock market. Moreover, this study will also be limited to emerging market, not only due to lack of further research related to the effect of stringent policy on emerging markets, but also the market has been as a number one alternative global investor to diversify their portfolio. Therefore, it is important and appealing at the same time to conduct an investigation on the emerging market area. Furthermore, the research will contribute to emerging literature related to COVID-19 and stock market, providing the government and policymakers additional insight in evaluating their policy, and assisting investors in diversifying their portfolio during the COVID-19 pandemic.

2. Literature Review
2.1. COVID-19: Stringency Index

Oxford University initiated to create a composite index compiled by nine generic government stringency responses, including 1) School closure, 2) Workplace closure, 3) public events cancellation, 4) Restrictions on gathering size, 5) Public transport closure, 6) Stay-at-home requirements, 7) Restrictions on internal movement, 8) International travel ban, and 9) Public information campaign. These policies are measured with ordinal scale which later will be rescaled to vary from 0 to 100 index points. The stringency index has been used widely by many scholars over the world. There are studies in many fields that used this index as an explanatory variable, such as in the environment issue (F. Liu et al. 2021; Venter et al. 2020), politic (Pulejo and Querubín 2020), and public health and economy (Coccia 2020). Thus, it can be concluded that this index is reliable to be utilized as a research variable.

2.2. MSCI Emerging Market Classification

Morgan Stanley Capital International (MSCI) is an America-based company that leading in the financial market data provider industry. The MSCI provides variety of financial market data, such as: 1) equity, 2) fixed income, 3) hedge fund stock market indexes, 4) multi-asset portfolio analysis tools, and 6) ESG products. Moreover, the company also classified global markets into developed, emerging, frontier, and standalone markets. The framework of the classification used by the MSCI has three criteria, which are economic development, size and liquidity, and market accessibility. There are many research that used data of MSCI, such as Trabelsi et al. (2020) who conduct comparison analysis on the Islamic, conventional, and mixed (Islamic-conventional) portfolios used MSCI Islamic stock indices and 15 emerging markets based on MSCI classification. Other than that, analysis of the energy sector by using MSCI energy indices of 21 major energy consumer economies had been conducted by (Singh et al. 2019). Therefore, the MSCI market classification can be concluded that it is reliable to be utilized as a research variable.

2.3. Stock Return

Stock return is the gain from investing in common stock in form of capital gains and dividends. The return in form of capital gain is from of the changes of stock price on initial period of investment with current stock price, while dividends is the attributed cash to shareholders when the company is profit. Recent literatures use this proxy as an indicator of securities performance, instead of the stock price. For instance, Sum (2012) revealed that consumer and business confidence are positively associated with stock market return. In regard to COVID-19 pandemic case, Ashraf (2020) studied on the government interventions effect on stock market of 77 countries worldwide, and also Salisu et al. (2020) who investigated specifically on the relationship of emerging market return with Uncertainty of Pandemics and Epidemics.

2.4. Efficient Market Hypothesis

According to Fama (1970), the time when market price is fully reflects all available information is called efficient. Therefore, in the efficient market, there will be no excess return that will benefit the investors within the market. The fundamentals of market efficient is created are the rationality of the investors, other variables that independently influence the investors to react above their own rationality, and the knowledge and experience of respective investors in the market. The differences of these factors will create an efficiency level of the market. To distinguish the difference of efficiency level, the inventor classified into three market form of efficiency, namely 1) weak form which the current price reflects last price of the securities, 2) semi-strong form which the market is fully reflect all available information such as financial information of the company, and 3) strong form which reflects all the insider information

of particular securities in the market. During the COVID-19 pandemic, some scholars have been testing the efficiency of some markets worldwide, such as Navratil et al. (2021) who argued that the market was inefficiency during the COVID-19 outbreaks as the investors were overreact and underreact on given information available, however, this argumentation makes sense as the investors were still in the early stage of study on the pandemic crisis. Furthermore, inefficiency was shown to decrease after the outbreaks period in OECD and BRICS countries (Scherf et al. 2021). Moreover, Choi (2021) revealed that some industries in S&P 500 indicated market efficiency in the weak form. Thus, it can be concluded that market efficient does exist even during the COVID-19 period.

2.5. Hypothesis Development

In formulating the hypothesis, the authors refer to the efficient market hypothesis and previous studies on stock market return and government interventions during the COVID-19 pandemic. Generally speaking, the COVID-19 has been significantly affect the stock market fluctuation, such as in form of trading volume, volatility, and stock return (Ashraf 2020b; Harjoto et al. 2021). Moreover, the investor herding was also founded during the outbreaks period (Kizys et al. 2021). Along with the increase of daily cases and deaths growth, the government should take physical distancing interventions to reduce the transmission of the virus. On one hand, the physical distancing requirements proven in reducing the spread of the virus, on the other hand the businesses are harmed as most of the national economy activities are halted (McKibbin and Fernando 2020; Nicola et al. 2020). Therefore, it is no wonder that the interventions lead to higher uncertainty of pandemics and epidemics (UPE) (Salisu et al. 2020).

Furthermore, some previous studies has been investigated and proved that the government stringency responses are significantly associated with stock market return, such as Ashraf (2020a) who showed that the stringency index is negatively affect the stock market return in 77 countries during the period of January 2020 to April 2020. The lockdown response is the only one who adversely affect the stock market return compared to other responses, containment-health and economic support responses, which both lead to positive return. Moreover, the effect of nine policies, include in stringency index, on stock market return also has been breakdown by Aharon and Siev (2021) that revealed all the restrictions are associated with negative stock return in emerging markets. Therefore, by compiling with previous studies and the assumption of the market is efficient, we argue that during one year of pandemic period, the market reacts negatively towards the government stringent policy as anticipation of economic downturn due to the cessation of business activities. Thereby the increase of stringency levels of the intervention will decrease the market return. The hypothesis is as follows:

H1: We expect a significant negative relationship between stock market return and stringency index in emerging markets during one year of the COVID-19 pandemic.

3. Methods

3.1. Sample and Data Collection

In analyzing the relationship between stock market return and government stringency policy, the authors use quantitative data as the observations. This research focus on the government stringency index as a representative of the non-pharmaceutical interventions taken by respective governments over the countries which is expected to explain the stock market return. The stringency index is collected from Our World Data website (ourworldindata.org) and Blavatnik School of Government of University of Oxford (bsg.ox.ac.uk) which have more specific data up to its nine measurements. Furthermore, the stock market return used in this research is based on the return of market leading index in respective markets. In total, there are 26 emerging markets, based on MSCI market classification, used as the sample of this study. The dataset of stock market return is collected from Investing.com.

The study also uses four country-level indicators as control variables, which are 1) Annual GDP Growth rate (GDP), 2) Inflation rate, 3) Unemployment rate, and 4) Uncertainty Avoidance by (Triandis and Hofstede 1993). The three macroeconomic indicators are obtained from Refinitiv Eikon Thompson Reuters solution and Trading Economics. While the uncertainty avoidance is procured from the Hofstede-insights.com. The expected relationship of the control variables is as follow:

- Inflation rate, which is expected to have a positive relationship with stock return as the higher inflation rate will lead into higher risk premium demanded by the investors (Guesmi et al. 2013).
- Annual GDP Growth rate, which is expected to have positive relationship with stock return as the indicators shows a national economic growth which imply to profitable businesses. And also Hadhri and Ftiti (2017) revealed the GDP positively associated with stock return.
- Unemployment rate, which is expected to negatively associate with the stock return based on the previous studies (Jareño and Negrut 2016; Li et al. 2021).

- Uncertainty Avoidance, which is expected to have negative result with stock market return during as the study of (Ashraf 2021) who revealed that the markets with higher uncertainty avoidance led into steeper decline in stock market return

3.2. Data Analysis Method

Since this study used cross-section and time-series data, hence, the panel data analysis will be utilized to test the hypothesis. Moreover, because of the limitation of this study only used country-level data, thus, there is no a variable that can be precisely explain as precise as firm-level dataset. Therefore, the estimation model suggest that Pooled ordinary least squares (PLS) is the best model compared to fixed effect and random effect models. Moreover, it is the same with the study of (Ashraf 2020a) which used PLS as the regression model. The function of the statistical model is as follows:

$$RET_{c,t} = \alpha_c + \beta_1 SI_{c,t} + \beta_2 Controls_{c,t} + \varepsilon_{c,t} \tag{1}$$

The $RET_{c,t}$ denotes the stock market return of country c at period t. Furthermore, $SI_{c,t}$ and $Controls_{c,t}$ and $\varepsilon_{c,t}$ are denoting the change value of Stringency Index on country c at period t, control variables on country c at period t, and error term respectively. β_1 and β_2 are the coefficients of Stringency Index and control variables respectively. Furthermore, this study also will regress the sub index of the stringency index to have additional insights related to each policies relationship with the stock market return. The function model is as follows:

$$RET_{c,t} = \alpha_c + \beta_1 (SubSI_{i,c,t}) + \beta_2 Controls_{c,t} + \varepsilon_{c,t} \tag{2}$$

Where the $SubSI_{i,c,t}$ is the change value of sub index i of country c, at period t. While the rest of equation is the same.

4. Results and Discussion

The hypothesis testing is going to be explained with one model, which is the model regression of stringency index with stock market return. The model will be regressed based on each region, namely (1) Global, (2) Latin America, (3) Europe, (4) Middle East-Africa (MEA), and (5) Asia. However, the other 9 models which regress the sub index will not be provided on this paper concerning that the limitation of page number of the paper and also the other models are just as the additional insights.

Table 1 Summary Results

RET	(1) Global	(2) Latin America	(3) Europe	(4) MEA	(5) Asia
SI	-0.0025***	-0.0042***	-0.0015***	-0.0022**	-0.0022***
	(0.00)	(0.00)	(0.009)	(0.021)	(0.00)
GDP	-0.1032**	0.1026	-0.4530**	-0.2295	-0.0282
	(0.032)	(0.152)	(0.013)	(0.159)	(0.486)
INFL	0.1476*	-9.2826***	0.7157**	-0.4649	0.4170
	(0.06)	(0.006)	(0.011)	(0.237)	(0.39)
UNEMPLOY	0.0020	-1.4506**	-0.5429*	0.2281	0.0790**
	(0.959)	(0.044)	(0.059)	(0.296)	(0.048)
UA	0.0001	omitted	0.0026*	0.0012	0.0003**
	(0.271)		(0.078)	0.462	(0.043)
Constant	0.0093	0.3035**	-0.1964*	-0.1110	-0.0046

	(0.268)	(0.012)	(0.091)	0.483	(0.682)
Observations	312	72	72	60	108
R-squared	0.3876	0.6666	0.2533	0.5735	0.3284

This table presents panel data regression for the impact of the Government Stringency Policy (SI) on stock market return in global emerging markets, Latin America region, Europe region, Middle East and Africa (MEA) region, and Asia region for model (1), (2), (3), (4), and (5) respectively. The dependent variable of the model is natural logarithm stock market return. Panel pooled ordinary least squares models, with heteroskedasticity and autocorrelated robust, are used for estimations. P-values are given in parenthesis. Denotation ***,**,* represents statistical significance at 1%, 5%,and 10% levels, respectively.

Referring from Table 1, we know that the Stringency Index is negatively associated with stock market return at all regions. All regions indicate a statistical significance at 1% level. While emerging markets globally, in Europe, MEA, and Asia regions are harmed by -0.25%, -0.15%, -0.22%, and -0.22% respectively, Latin America region being the most harmed region with a decline about -0.42% of market return as additional one point of stringency index. Furthermore, global emerging markets are considering the Annual GDP growth rate and Inflation rate as the result show a significance denotation at 5% and 10% levels respectively. This statistical significance of GDP and Inflation rate continue at Europe region and Latin America & Europe regions respectively. Even though Unemployment rate and Uncertainty Avoidance are not statistically significance at global emerging markets, both these two control variables are found to be significant at Latin America, Europe, and Asia for Unemployment rate, and Europe and Asia regions for Uncertainty Avoidance. On one hand the three macroeconomic indicators are having mixed relationship with stock market return in different regions, on the other hand the uncertainty avoidance is consistent with a positive contribution towards the market return in all regions. For further discussion will be focus on Stringency Index due to it is the main explanatory variable and also there is a significant difference impact founded between Latin America compared to other three regions. Thus, the discussion will be classified into two sub sections, namely 1) Less affected region and 2) More affected region.

4.1. Less Affected Region: Europe, Middle East-Africa (MEA), and Asia

In the initial period of COVID-19 pandemic, all regions around the world experienced a similar global shock in both real sectors and financial sectors. For instance, the stock markets in Europe, MEA, and Asia regions were declining by roughly of -16.7%, -19.4%, and -16.7% in average respectively during the COVID-19 outbreaks period in March 2020. Moreover, according to Oksanen et al. (2020) the Central Eastern Europe (CEE) countries, which all of the emerging markets in Europe include in particular region, show more daily growth cases and deaths due to the lower institution trust of the citizen in respective countries. As a result, the countries in that region was projected to be recover to pre-pandemic level around 2 years after restarting the businesses (Brada et al. 2021).

Moreover, in MEA region, the average economic output was reportedly negative, at -4.23% (according to dataset of the authors). The change in transit behavior leads to a decrease of total numbers tourists and travelers in Africa region about -46% in 2020 (Elbany and Elhenawy 2021). Furthermore, the economics of Gulf countries, which are dominated by commodities export, were abruptly damaged as the oil price shocks in April which reached at the bottom level. Another country which was damaged by particular global phenomena is Egypt, concerning that the country's economy mainly supported by the transport and tourism industries (Dabrowski and Domínguez-Jiménez 2021). Furthermore, south Asia countries were projected to be vulnerable in facing the pandemic, due to fragile health infrastructure and system (Babu et al. 2021). Similar with south Asia, the ASEAN countries, especially Indonesia also has an inadequate health system before the pandemic period. Moreover, the people of Philippines protest and scared at the same time towards the government initiative due to more military participation in tackling the pandemic (Djalante et al., 2020).

Despite of the lack resources and several challenges raised during the initial period of pandemic, all of the governments in regions succeed to manage the COVID-19 pandemic by earlier in implementing the stringent policy, like in India and Pakistan who started to conduct airport screening in January 2020 (Babu et al. 2021). Likewise, Asia countries made an early stringent policy. For instance, Taiwan and South Korea implemented early intervention by quarantining the foreigners from Wuhan as early as December 2019 (Shaw et al. 2020).

Furthermore, the cooperation within regional also important and proven in minimizing the pandemic impacts of the state members, like south Asia countries who held an early meeting to create a COVID-19 Emergency fund and disaster management center to assist the governments in tackling the pandemic (Babu et al. 2021). Similar with south

Asia region, China and South Korea also helping each other in facing the pandemic in terms of supplying medical goods and other commodities (Shaw et al. 2020). Moreover, both countries also met southeast Asia (ASEAN) leaders to strengthen the cooperation between East Asia and ASEAN through a digital conference of ASEAN plus three forum (Djalante et al. 2020).

In regards to the European countries, European Union (EU) actively assist the governments of its state members in minimizing the transmission of the virus as well as the impacts by providing a fiscal support and moderating the cooperation between countries (EUROPEAN COMMISSION, 2021). Other than that, EU also allocated a budget to support Africa countries by roughly EUR3.25 billion. Moreover, the Africa region was also supported by African Development Bank and United States which provided a response package worth US$10 billion and US$500 million respectively (Lakemann et al. 2020). Furthermore, Egypt might also benefited from its free trade area agreements with EU and euro area countries (Dabrowski and Domínguez-Jiménez 2021).

4.2. More Affected Region: Latin America

In contrast from other regions, Latin America stock market would be adversely affected by restriction policy by roughly -0.42% every one-point addition in stringency level (see Table 1), which then considered as the most adversely affected amongst other regions. The reaction of investor may be driven by the fact that happened in the real sectors as the poor implementation of COVID-19 response by the governments.

According to Benítez et al. (2020) several strategies of lockdown policy have been taken by the government in Latin America region. For instance, like in Chile, the government implement the dynamic lockdown policy, which means only close particular regions based on each case and death rates. While in Peru, they centralized the national lockdown immediately seven days after the first case announcement. However, the Government in the regions lifted the restriction policies too early, even though the confirmed cases were keep increased. Moreover, there was a poor coordination between the COVID-19 advisory council with the federal government of Chile during the initial period of the pandemic. Likewise, Brazil's president did not aware of the urge of COVID-19 and later fired the health minister as they 50 both argued about the public closures policies. Thus, the Government failed to contain the transmission of the virus and as well the socio-economic impacts.

Despite of the poor leadership by the government in time of the crisis, the other reasons of the COVID-19 response failures were also due to the instability of political circumstances in most of Latin America countries, the entrenched of corruption culture, which led into the distrust of the citizen towards their government. As a result, people were not complying with the regulation (Lancet n.d.). Moreover, the disparities and inequalities within the region led into many people fell below the poverty line. The labour market landscape of south America is dominated by the informal workers; hence, the majority of people have to go to work and facing their lives to risk of being infected by the virus (Bargain and Aminjonov 2021). Thus, the confirmed cases and death was late to decline after six months of lockdown policy, which in period of August 2020. The progression of the containment viruses in Latin America was recognized as one of the latest compared to other regions.

5. Conclusion

As a conclusion, we examine the economic impact of stringency policy in emerging markets based on its stock market return over one-year period of COVID-19 pandemic. For empirical analysis, we use the monthly market return and monthly changes of stringency index value considering the fact that government response is less changing after the outbreaks period. Moreover, we add some country-level data that reflects respective countries' economic characteristics to control the relationship between stock market return and stringency index.

We find that restrictions policy indeed negatively associated with a return of the stock market in emerging markets across the world. There is a different magnitude effect between the three-less affected regions with Latin America. We conclude the four factors which mainly driven the impact magnitude difference, which are: 1) Leadership of the government, 2) Regional council contribution, 3) Bilateral and Multilateral efforts, and 4) Harmony level of government and its people.

Our findings have important implications. Since we find the difference impact's immensity and discuss the causes behind that over all regions of emerging markets. Thus, the governments in respective regions have a broad summary of their responses progression and the economic implications after one-year period pandemic, which will be helpful to evaluate the policies for the rest of pandemic period. Moreover, the global investors also have a specific overview regarding each region markets' performance over the one-year COVID-19 pandemic, which will be helpful as an additional guidance in diversifying their portfolio. Our result also confirmed previous studies that revealed significant relationship on stock market and stringency index (Haroon and Rizvi 2020; Zaremba et al. 2020). Moreover, the study of Ashraf (2020a) and Aggarwal et al. (2021) that show market returns severely affected by the stringency index. And

also confirmed that there are significant negative associations between the nine sub-stringency index and stock return in emerging markets (Aharon and Siev 2021).

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