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INDONESIAN ECONOMIC THE IMPACT OF COVID 19 (IHSG BY ARDL)

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Abstract

This researcher discusses the economic problems that occurred due to the first Covid-19 virus in China. The outbreak of coronavirus has caused real harm among the people of the world. Indonesia also experienced this loss in various sectors, especially the economic sectors. The COVID-19 epidemic quickly spread to all parts of the world, reaching 187 countries with 294,110 confirmed cases and 12,944 deaths and predicted to cause an economic crisis. One of the impacts seen from this C.O.V.I.D. outbreak, the decline of J.C.I. from 6299,539 in December 2019 to 4194,944 on March 20, 2020. A specific target in this study is to look at the impact of the COVID-19 epidemic on the Combined Share Price Index, Trading Sector, and Financial Sector. This research uses the A.R.D.L. model approach, the Autoregressive Distributed Lag (A.R.D.L.) method, to determine the movement of trade indices and finance indices affecting the flow of J.C.I. in the period October 1, 2019- March 20, 2020. The expected result of all analysis is to find the Leading Indicator of J.C.I. Movements, which are based on the influence of Sectoral Indices, trade, Finance during the Covid-19 Epidemic. The results of research on the evolution of the value of J.C.I., sector trade index and sector finance index in the period October 1, 2019- March 20, 2020, showed the COVID-19 pandemic would affect the economy in Indonesia. This research uses the A.R.D.L. model approach to determine the movement of trade indices and finance indices affecting the flow of J.C.I. in the period October 1, 2019- March 20, 2020, and the results obtained by finance indexes and trade indices are proven to have long-term cointegration or move together – the same long-term against J.C.I. Also, the three variables have a short-term relationship dynamic that has a speed of adjustment towards a balance of 17.21% % per day. This condition shows that the trade sector and sector trade influence the financial industry, especially the capital market. Keywords: Law, Economic, Pandemic, New Normal.

Keywords: *COVID-19 epidemic; J.C.I.; sectoral indices; trade; Financial*

1. INTRODUCTION

The COVID-19 epidemic originated in China, with the first cases of death announced on January 9, 2020. Then C.O.V.I.D. spread quickly to all parts of the world, which has reached 187 countries with confirmed cases of 294,110 people and 12,944 deaths (source: https://www.covid19.go.id/). Indonesia announced the first case of COVID-19 on March 2, 2020, with two examples found in Depok, This number continues to increase until the 23rd mater has been found 579 cases as seen in figure 1.1 below:

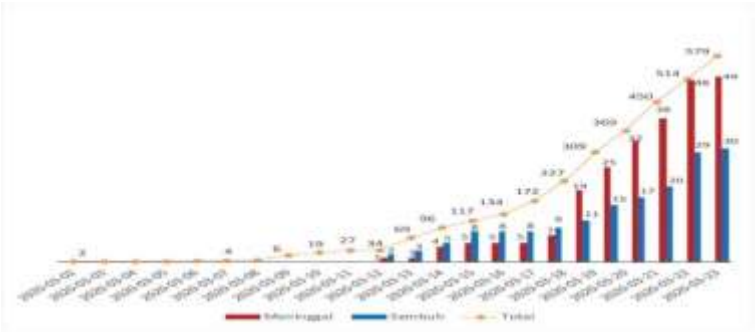

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Figure 1. 1. Number of COVID 19 Cases in Indonesia (source//covid19.kemkes.go.id, processed)

The outbreak of COVID-19 affected the capital market by lowering J.C.I. Which in December 2019 of 6299,539 was seen to decrease to 4194,944 on March 20, 2020, as seen in figure 1.2 below:

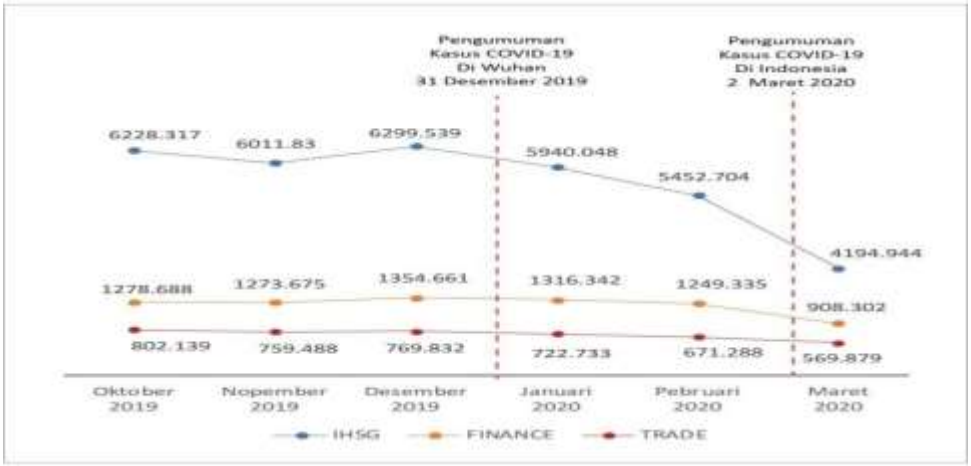

Figure 1.2. The Impact of the C.O.V.I.D. 19 Epidemic on J.C.I. (source//www.idx.co.id, processed)

Jiang, Y. et al. (2017), stated that the epidemic of infectious diseases would cause economic losses reflected in stock price movements. The study they did the daily amount reported from the H7N9 case affected the closing price of the Bird Flu Sector Index and the opening price of the Shanghai Composite Index. Chen, Jang, and Kim (2007) confirmed that the tourism industry suffered the most serious damage in terms of falling stock prices on the Taiwan Stock Exchange during SARS. Period of the outbreak. Chen, Chen, Tang, and Huang (2009) showed that the SARS epidemic hurt the share price related to the tourism, wholesale and retail sectors, but had a positive impact on the share price associated with the biotechnology sector. Referring to the SARS epidemic affecting the tourism, wholesale and retail sectors that on the Indonesia stock exchange is categorized on sectoral trading is something that needs to be observed to know the impact of C.O.V.I.D. in Indonesia. Also, the impact on tourism, wholesale, and retail sectors will generally affect the banking sector. Because it is closely related to bad credit, because tourism, wholesale, and retail will have difficulty in paying credit arrears.

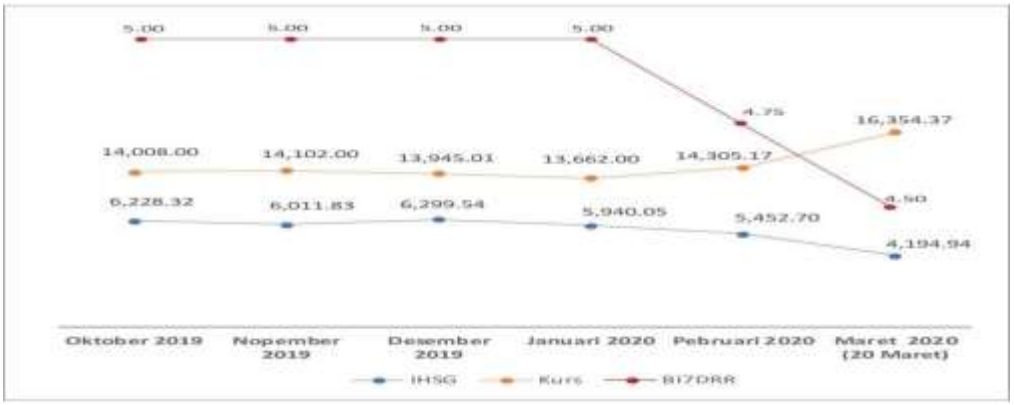

Figure 1.3. Bi's Response to Anticipating Covid-19 Impact
(source//www.idx.co.id and www.bi.go.id, processed)

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Bank Indonesia, on February 19-20, 2020, lowered the B.I. 7-Day ReverseRepo Rate (BI7DRR) by 4.75% to maintain Indonesia's economic growth due to COVID-19 in China. In global financial markets, Covid-19 has increased the risk of encouraging the adjustment of its global fund flows from developing countries to economic and commodity assets that are considered safe, as well as putting pressure on currencies developing countries. Bank Indonesia, on March 18-19, 2020, again downgraded B.I. 7-Day Reverse. Repo Rate (BI7DRR) to 4.50% as a pre-emptive step to maintain the momentum of Indonesia's economic growth and, at the same time, support risk mitigation efforts to spread COVID-19, as well as maintain the stability of money market and financial system. However, B.I.'s move to downgrade BI7DRR has not affected market sentiment because, until March 20, 2020, the value of J.C.I. is still moving down to 4,194.4 Based on the above description, this study will look at the impact of COVID-19 epidemic on the Combined Share Price Index, Trading Sector and Financial Sector both in the long and short term.

2. LITERATURE REVIEW

2.1. COVID-19 Economic Crisis

Baldwin and Weder in Mauro (2020).stated that there are three 'shock' factors triggered by the COVID-19 virus that can cause an economic crisis, namely: First, the infection results in workers having to be hospitalized or in isolation at home. This creates temporary unemployment and also affects incomes because some workers are not paid when they are sick. The second is prevention efforts through social distraction or work from home akam impact on the closure of factories and offices, travel bans, quarantines, and the like. The third is the expectations of shock. The COVID-19 issue has led consumers and companies around the world to reduce activity and observe future developments. This has led to a decrease in the number of trips and hotel stays - but perhaps only because the data was released so quickly. Baldwin membuat ilustrasi dampak C.O.V.I.D. terhadap perekonomian, seperti terlihat pada Gambar 2.1 berikut:

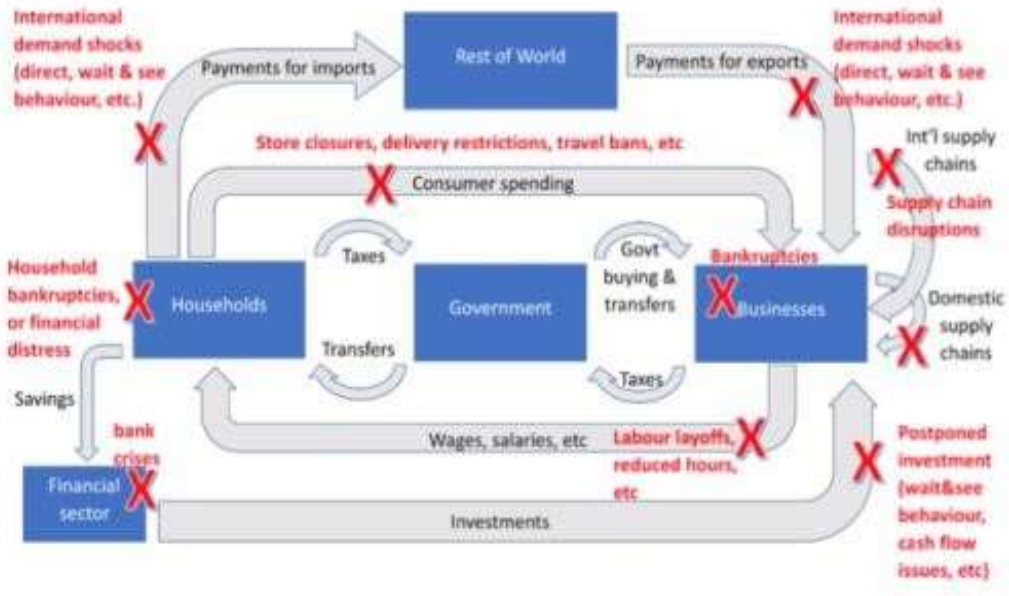

Figure 2.1. The Impact of Covid-19 on the Economy
Source Baldwin (2020)

Households whose family members are affected by COVID-19 are potentially in financial difficulty. This will result in homes reducing spending on buying goods. This means the flow of money from

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households to governments and companies will decrease. This condition will directly affect domestic demand and impact imports in other Countries so that the Importer Country experiences a decrease in revenue. The company has the potential to experience the most difficulty in using it to the bank in its business, making it vulnerable to reduced cash flow. Companies that have experienced bankruptcy or workers who are sick due to C.O.V.I.D. 19 have the potential to experience layoffs. Decreased demand and supply may disrupt international and domestic supply chains.

2.2. Concept of the Combined Share Price Index

Shares are certificates that show proof of ownership of a company, and shareholders have claim rights to the company's earnings and assets. According to Arthur (2001): "Shares are a certificate or charter that functions as proof of the owner of a company with various important aspects for the company. The owner of the shares will have the right to receive a fixed income/dividend from the company as well as the obligation to bear the risk of losses suffered by the company".

According to Anoraga and Pakarti (2008), the Combined Share Price Index is a comparison of changes in stock prices over time. A price index is a number used to compare events with other events. The stock price index is a leading indicator that describes the movement of the share price. In the capital market an index is expected to have five functions: (1) as a market trend indicator, (2) as a profit level indicator, (3) as a benchmark (benchmark) of the performance of a portfolio, (4) facilitate the formation of a collection with a passive strategy, (5) facilitate the development of derivative products. Storage and Pakarti (2008:104), in general, some things that need to be considered by a financier before investing in the capital market, among others:

1. Consider the level of profit and the level of risk that can be borne. In the face of higher profits, investors must be prepared to take high risks as well, and vice versa.
2. Know the time horizon. The investment period will determine the investor's behavior in his investment activities. In general, people who invest long-term can bear more significant risk, but the average profit level is stable for the long term. When investing in a short time, the risk will be smaller.

2.3. Arbitrage Pricing Theory (A.P.T.) Multifactor

Ross (1976) formulated a balance model called Arbitrage Pricing Theory (A.P.T.), which stated that two investment opportunities of the same nature could not be sold at different prices. In this case, the law embraced by A.P.T. is the law of one price. An asset that has the same characteristics (identically the same) if sold at a different rate, then there will be an opportunity to arbitrage by buying assets that are cheap and at the same time, sell them at a higher price to earn profit without risk (Husnan, 2000). In the economy of a country, four markets have been known: capital market, money market, foreign exchange market, and goods market. Of the four markets that are strictly related and that reflect the law of one price are generally three markets: capital market, money market, and foreign exchange market. All three markets have the same balance and identical, so they cannot be sold at different prices. If there is no balance between these markets, there will be an arbitrage process from one market to another, as described above.

The factor model bases itself on the assumption that there is a linear relationship between the price of a stock and the amount of all stocks on the exchange represented by the market index. Based on that assumption, the profit level of a stock will correlate with changes in market prices (Sharpe, Alexander, Bailey (1999). As a reward-generating process, the factor model seeks to include major economic forces that systematically drive or influence the price of all stocks. Implicitly, in the composition of the factor model, there is an assumption that the rewards between the two capitals will correlate, i.e., move together-only through the same reaction to one or more factors determined by the model. The factor model can provide the information necessary to calculate the expected, variant, or ovarian rewards of each share. As a result, factor models are useful tools for portfolio management (Sharpe, Alexander, Bailey (1999).

The multi-factor model assumes that the process of pricing shares involves several factors. This means there are several possibilities that more than one pervasive element in the economy affects the share price. The economic situation affects almost all companies. So the change from the foreseeable economy has a significant impact on the amount of most stocks. As a common, there are two sources of macroeconomic risk to G.D.P. and an uncertain interest rate on the share price.

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According to Bodie, Kasne, and Marcus (2006), merely the multi-factor model of the equation can be stated as follows:

$$\mathbf{R_i = E(r_i) + \beta_{iGDP}GDP + \beta_{iIR}IR + e_i}$$

Two equal factors above systematic factors in the economy. As with the single-factor model, these two macro factors have zero expectation values: indicating changes to these variables that were not previously anticipated. The coefficient of each element is that the above equation measures the sensitivity of stock returns to those factors. For this reason, ratios are often referred to as factor sensitivity, factor loading, or beta factor. And he reflects the influence of specific elements of Perusahaan.

3. RESEARCH METHODS

The seals in this study used quantitative material with the A.R.D.L. approach and sat down with a descriptive approach. The parameters observed are J.C.I. data, Trade Sector Index, and Finance Sector for October 1, 2019-March 20, 2020. (Period of C.O.V.I.D. 19)

Table 3.1. Observation Variable Parameters

NO	VARIABLE	pengukuran	SKALA
1	IHSG	Indeks Harga Saaham Gabungan	Radio
2	Trade	Indeks Sektor Trade	Radio
3	Finance	Indeks Sektor Finance	Radio

To explain the relationship between J.C.I., Finance Sector Index, and Trade Sector, this study used the specifications of the Autoregressive Distributed Lag (A.R.D.L.) model. Ardell panel regression is used to obtain the estimated results of each characteristic separately, assuming the cointegration in the long-term lag of each variable. Autoregressive Distributed Lag (A.R.D.L.) was introduced by Pesaran et al. (2001). This technique examines each variable delay located at I(1) or I(0). By contrast, A.R.D.L. regression is a test statistic that compares two asymptotic critical values.

The general model of A.R.D.L. is as follows:

$$\Delta IHSG_t = \beta + \beta_1 \sum_{i=1}^{p} IHSG_{t-1} + \beta_2 \sum_{i=1}^{p} \Delta Finance_{t-1} + \beta_3 \sum_{i=1}^{p} \Delta Trade_{t-1} + \beta_4 Finance_{t-1} + \beta_5 Trade_{t-1} + \varepsilon$$

Where the coefficients β1, β2, and β3 represent the short-term dynamics of the model. While the factors β4 and β5 represent the long-term relationship of the research model. The Δ operator states the difference (change) between the two values of a variable in consecutive periods. Whereas ε is a typical distributed error

The steps of all approach method in research are:

1. Perform stationary tests.
2. Estimating A.R.D.L. models
3. Perform stability testing of selected A.R.D.L. models.
4. Bound test, to know the long-term relationship (cointegration) and causality between the variables used in the model.
5. Perform long-term estimation and short-term dynamics of the selected A.R.D.L. model.

4. RESULTS AND DISCUSSION

4.1. RESULTS

4.1.1. Root Test Unit

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The first stage conducted in this study is a stationary test on data. This test was done with the root unit test presented by Dickey and Fuller, namely the Augmented Dickey-Fuller (A.D.F.) test.

Table 4.1. Unit Root pada Level

Variable	t-statistic	Test Critical Value (5%)	Keterangan
IHSG	3.525880	-2.885863	Tidak Stasioner
Finance	3.326047	-2.885863	Tidak Stasioner
Trade	-10.90724	-2.885863	Stasioner

Stationary test results at the level showed J.C.I. And Finance was not stable at the level, so continued by conducting stationary tests on 1st Difference.

Table 4.2. Root Unit on 1st Difference

Variable	t-statistic	Test Critical Value (5%)	Keterangan
IHSG	-9.076619	-2.885863	Stasioner
Finance	-8.851038	-2.885863	Stasioner
Trade	-10.58691	-2.885863	Stasioner

Stationary test results on 1st Difference showed all fixed data at the level indicated t-statistic greater than test critical value (at 5%) so that it meets the requirements for an Autoregressive Distributed Lag (A.R.D.L.) approach.

4.1.2. Autoregressive Distributed Lag Model

Research data processing is processed with the E-Views 10 application, to select the best A.R.D.L. model with optimal lag combination, selected based on Akaike Info Criterion (A.I.C.). Based on A.I.C. selection, the best A.R.D.L. model for this research model is A.R.D.L. (2, 1, 4). R-Squared value of 0.9983 This value states that 99.83% variation of bound variables is explained by each free variable of the selected A.R.D.L. model, as seen in the following table:

Table 4.3. A.R.D.L. Estimation Results

Dependent Variable: IHSG
Method: ARDL
Date: 03/22/20 Time: 14:14
Sample (adjusted): 10/07/2019 3/20/2020
Included observations: 116 after adjustments
Maximum dependent lags: 4 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (4 lags, automatic): FINANCE TRADE
Fixed regressors: C
Number of models evaluated: 100
Selected Model: ARDL(2, 1, 4)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
IHSG(-1)	0.931290	0.061395	15.16893	0.0000
IHSG(-2)	-0.103404	0.044896	-2.303194	0.0232
FINANCE	3.056227	0.147746	20.68567	0.0000
FINANCE(-1)	-2.646578	0.211766	-12.49766	0.0000
TRADE	3.840593	0.409027	8.900609	0.0000
TRADE(-1)	-3.825748	0.647348	-5.909875	0.0000
TRADE(-2)	1.885329	0.587070	3.211420	0.0017
TRADE(-3)	-1.566754	0.460990	-3.398672	0.0010
TRADE(-4)	0.644692	0.342400	1.882864	0.0625
C	-77.22108	73.86176	-1.045481	0.2982

R-squared	0.998371	Mean dependent var	5974.091
Adjusted R-squared	0.998233	S.D. dependent var	453.2375
S.E. of regression	19.05436	Akaike info criterion	8.814732
Sum squared resid	38485.27	Schwarz criterion	9.052110
Log likelihood	-501.2544	Hannan-Quinn criter.	8.911094
F-statistic	7217.888	Durbin-Watson stat	1.895688
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection.

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From all estimates, it appears that the trade variable has a value of the most significant coefficient (3.94) and has a prob of 0.000 (prob value of <0.05) means that the trade factor is the dominant factor affecting J.C.I. Similarly, Finance with a coefficient value of 3.05 and has a prob of 0.00 (prob value of <0.05) means that the finance factor is also the dominant factor affecting J.C.I. Only the difference is Finance significant on t-1, while trade significant up to t-3 (3 days before).

4.1.3. Correlation Serial Test

Serial correlation test using Breusch-Godfrey Serial Correlation L.M. Test:

Table 4.4. Correlation Serial Test

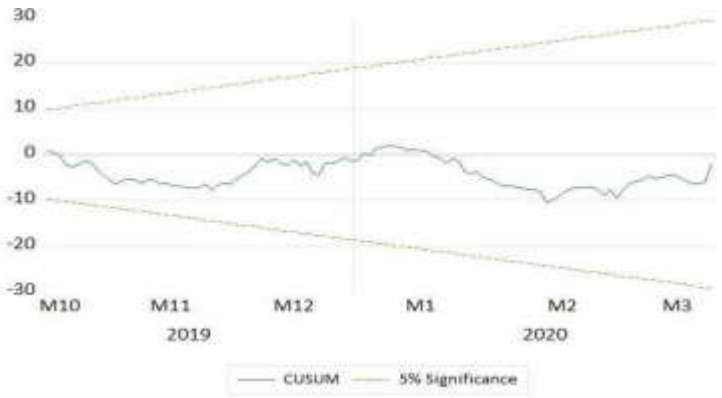
Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 4 lags

F-statistic	0.687744	Prob. F(4,102)	0.6021
Obs*R-squared	3.046397	Prob. Chi-Square(4)	0.5501

Prob 0.5501> 0.05, then H0 (no auto correlation) received, H1 (no correlation) rejected.

4.1.4. A.R.D.L. Model Stability Test

Ardlardl model stability test(2, 1, 4). in this study used CUSUM and C.U.S.U.M.Q. Experiments with a 95% confidence level. CUSUM test results for ARDLARDL models(2, 1, 4). in this study, as in pictures 5 and 6. The stabilization of the model is determined from the position of the blue CUSUM line between two 5% significance lines that are red. For ARDL ARDL models(2, 1, 4). CUSUM line is among the significance lines that prove that modelARDL(2, 1, 4) is stable, as seen in the following image:



Picture 4.1. Uji CUSUM

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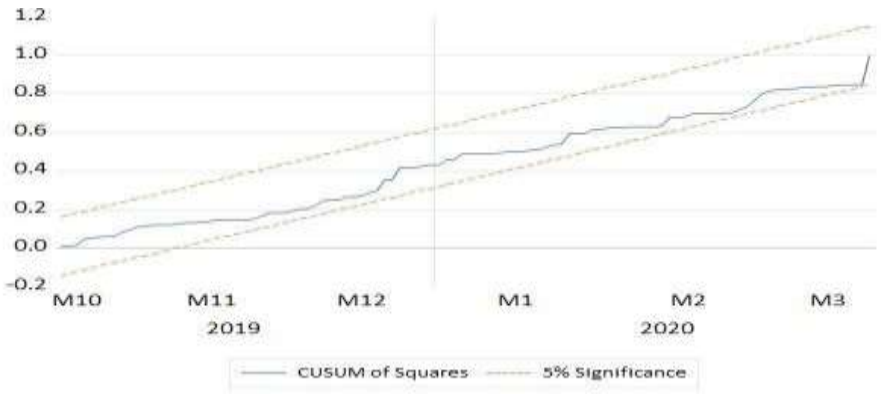

Picture 4.2. Uji CUSUMQ

4.1.5. Bounds Test

Bounds tests are performed to test the long-run association in selected A.R.D.L. models. The result of this Bounds test will focus more on the F-statistic value. The F-statistic will be compared to Pesaran critical value at 5%, which has also been provided by Eviews 10. If the F-statistic has an amount that exceeds the upper Bounds value, then the null hypothesis states that no long-run association is rejected, which means the variables – variables in the study move together – are the same in the long run.

Table 4.5. Bound Test Results

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
		Asymptotic: n=1000		
F-statistic	4.312538	10%	2.63	3.35
k	2	5%	3.1	3.87
		2.5%	3.55	4.38
		1%	4.13	5

From Table 4.5, bound test results show F-statistics 4.32 whose value is more significant than the critical amount (5% = 3.1), so null hypothesis stating that no long-run association is rejected, which means variables – variables in the study move together – are the same in the long run.

4.1.6. Long-Term Estimates and Short-Term Dynamics

Long-Term Estimation Results, as seen in table 4.6, the following:

Table 4.6. Long-Term Estimates

Levels Equation Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
FINANCE	2.380111	0.193383	12.30776	0.0000
TRADE	4.520920	0.279344	16.18403	0.0000
C	-448.6636	339.6586	-1.320925	0.1894
EC = IHSG - (2.3801*FINANCE + 4.5209*TRADE -448.6636)				

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The long-term estimates show the Finance and Trade Sectors had a positive and significant effect indicated by coefficients of 2.28 and 4.52, respectively, with probs over <0.05 with values of 0.0000 and 0.000, respectively.

Table 4.7. Short-Term Estimates

ECM Regression
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(IHSG(-1))	0.103404	0.043764	2.362738	0.0200
D(FINANCE)	3.056227	0.138586	22.05300	0.0000
D(TRADE)	3.640593	0.387931	9.384638	0.0000
D(TRADE(-1))	-0.963267	0.481950	-1.998688	0.0482
D(TRADE(-2))	0.922062	0.297490	3.099476	0.0025
D(TRADE(-3))	-0.644692	0.303994	-2.120738	0.0363
CointEq(-1)*	-0.172114	0.040866	-4.211694	0.0001

Through the A.R.D.L. approach, we also obtain short-term estimates that can be viewed through ect or CointEq values. Through the cointegration test results in table 6 it is known that the cost of CointEq(-1) = -0.172 and significant at the level of 5%, which means there is a short-term cointegration in this model. This means that the 17.21% disequilibrium that occurs between J.C.I., Finance, and trade will be corrected again within one period (1 day). Signs of negative coefficients indicate that there is a correction mechanism for long-term deviations. These results also show Finance and trade to be the dominant factors affecting J.C.I. over the long term.

4.2. DISCUSSION

JCI The Impact Of COVID 19, Covid-19 Pandemic has a direct impact on the mobility of people traveling between Countries/cities as most Countries implement a policy of restricting people in/out of areas indicated by the widespread COVID-19 outbreak. This will affect the business sector engaged in tourism services, including hotels, airlines, transportation. Data on the number of visitors from abroad entering Indonesia and the number of Indonesian nationals leaving the country, as seen in figure 4.3.follows:

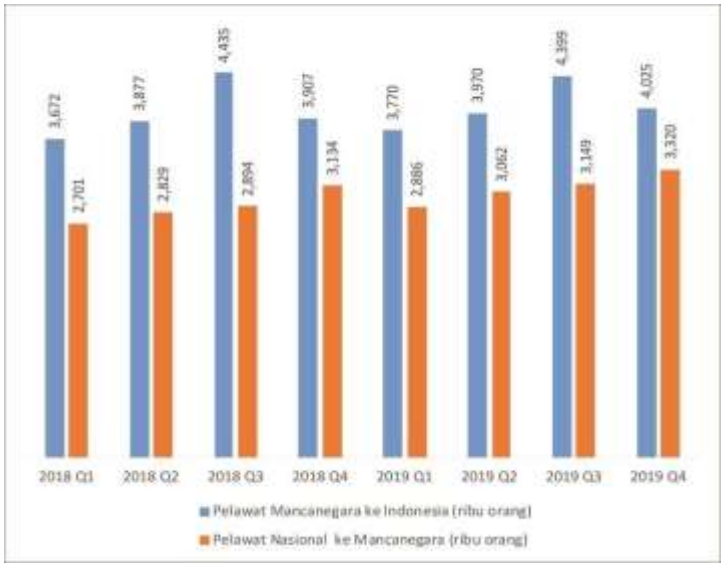

Figure 4.3. Number of Visitors to Indonesia

In Q1-Q2 2020, this number is expected to decrease during the COVID-159 outbreak in 159 countries around the world. Therefore, some states and cities are imposing restrictions on people entering and exiting areas indicated to be experiencing COVID-19 outbreaks.

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In addition to affecting travel, COVID 19 is also expected to affect exports and imports, as Baldwin (2020) said restrictions on people moving to prevent contagion would affect households to buy goods because they make savings to survive difficult times.

Indonesia's export and import data for the period October 2019-January 2020 show a decline, as seen in figure 4.4. Following:

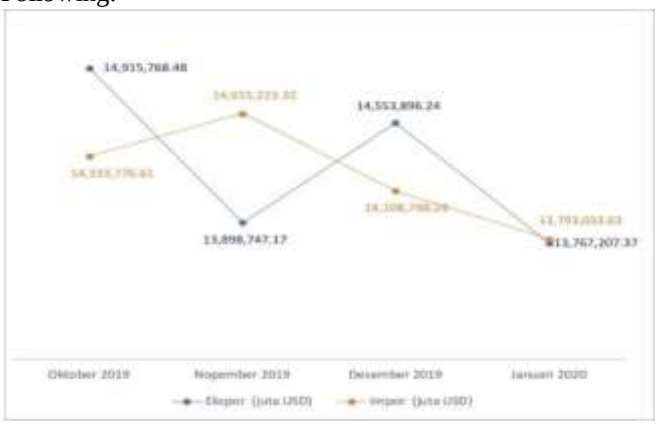

Figure 4.4. Indonesia Export and Import Value October 2019-Jan 2020

Bank Indonesia expects a decrease in capital inflows due to the impact of COVID-19. Direct investment data to Indonesia for the period October 2019 to December 2019 showed a decline from 6,634, 58 million USD to USD 4,712.30 million, as seen in figure 4.5. Following:

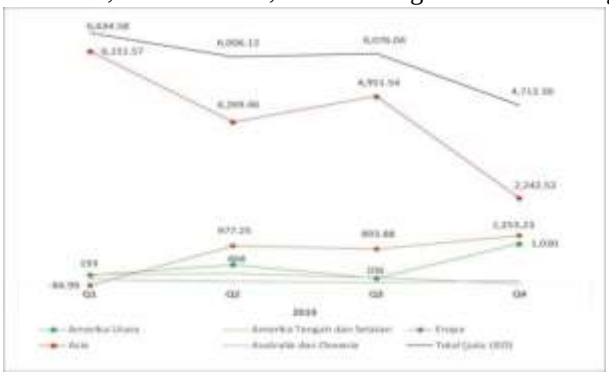

Figure 4.5. Direct Investment to Indonesia by Country
Period October 2019-Jan 2020

Figure 4.5. shows, Countries from the Asian region are experiencing a decrease in investment in Indonesia, and number 9 shows that Japan is experiencing a drastic reduction in investment from 4,488 USD to 226 US, as seen in figure 4.6:

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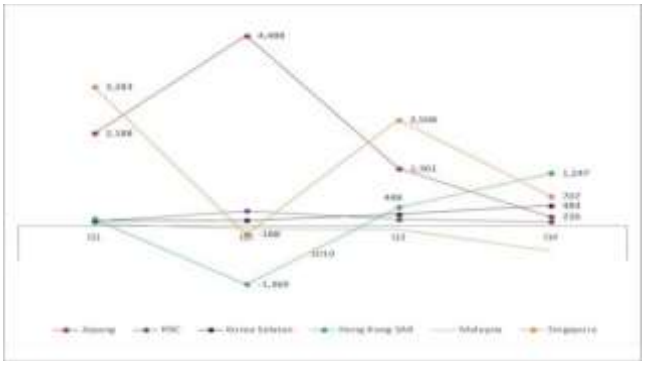

Figure 4.6. Direct Investment to Indonesia by Region of Asia
Period October 2019-Jan 2020

Nevertheless, there is still an increase in investment from Hong Kong and South Korea in October 2019-2020. However, looking at the condition of South Korea, which is also experiencing a severe impact due to COVID 19, it is expected that Investment in 2020 will decrease.

Covid-19 has had an impact on the Indonesian economy, in the short term, the decline in the share price in sector finance and trade has resulted in economic losses for companies in the finance and trade sectors.

In the long run, it will affect the cash flow of companies, especially those engaged in the trade sector, by declining the number of people traveling or using hotel facilities. This condition will also have an impact on the banking sector, as the company generally conducts it's business using bank loan funds. This will be seen with the potential for increased Non-Performance Loans (NPLs) from national banks. Therefore, the government prepares to mitigate the impact mainly on the trade and finance sectors.

5. CONCLUSION

The results of research on the movement of the value of J.C.I., sector trade index and sector finance index in the period October 1, 2019- March 20, 2020, showed the COVID-19 pandemic would affect the economy in Indonesia.

This research uses the A.R.D.L. model approach to determine the movement of trade indices and finance indices affecting the flow of J.C.I. in the period October 1, 2019- March 20, 2020, and the results obtained by finance indexes and trade indices are proven to have long-term cointegration or move together – the same long-term against J.C.I. Also, the three variables have short-term relationship dynamics that have a speed of adjustment to balance of 17.21% % per day. This condition indicates that the trade sector and sector trade influence the financial industry, especially the capital market.

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