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Indonesia's Monetary Policies and Its Effects in Stock Market

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Abstract - **The COVID-19 virus that is now spreading throughout the world has made it difficult in various sectors. Research proves that COVID-19 makes various countries experience a decrease in economic activity. Therefore, various countries are trying to implement monetary policy to improve the country's economy. The main objective of this study is to investigate the relationship between Rupiah stabilization through FX swap and DNDF and its impact on the stock market stabilization during the COVID-19 situation. Multiple regression in logarithm form was conducted to achieve this research. This method was used to identify the relationship between Rupiah as the dependent variable and FX swap, DNDF, JISDOR, COVID-19 case as the independent variables. The multiple regression model was validated using the ordinary least square (OLS) assumption, which must be achieved to create a valid model. Based on the results in this study, Rupiah stability influenced by FX swap, DNDF, JISDOR, and the stock market. Therefore, during the COVID-19 pandemic, monetary policies are essential. Bank of Indonesia can optimize its policy instruments through DNDF and FX swap for exchange rate stabilization.**

Keywords - **COVID-19, DNDF, FX swap, JISDOR, Monetary Policies, Stock market.**

I. INTRODUCTION

Background

The COVID-19 pandemic remains a demanding challenge to accelerate global economic recovery. The latest developments indicate an increase in total international COVID-19 cases, recorded at 21 million on 16th August 2020, with fatalities exceeding 700,000. That trend has also been accompanied by a second wave of infections in several countries despite a flattening of the curve in several other countries, including the United States, Australia, and Hong Kong. In terms of the fatality rate, Asia has recorded the lowest level. Several countries have continued monetary and fiscal stimuli to mitigate the impact of COVID-19 [6].

The widespread of COVID-19 in most countries has resulted in slower global economic growth. Measures taken to reduce the spread of the virus triggered a recession. Since mid-March, this pandemic happened in Indonesia. The Indonesian government implemented a ban on travel, restricted exports and imports, and restrictions on the distribution that caused economic movements to decline. GDP growth in quartal one the year 2020 decreased drastically compared to quartal 4 2019. Many companies make mass layoffs due to declining corporate productivity. Not even a few companies went into bankruptcy due to COVID-19. Investment also decreased due to uncertainty and lower commodity prices [6].

With the COVID-19 pandemic, there has been a decrease in personal consumption caused by limited travel permits. In addition to decreased consumption, decreased exports and imports due to counterparty countries impose lockdown and or restrictions on travel, making Indonesia's GDP decrease, making capital outflow from bond and the stock market. This investor response from the capital market outflow makes the Rupiah which also affects JCI [6].

To deal with the economic conditions resulting from COVID-19, the Indonesian government issued several policies. During this pandemic, Bank Indonesia implements a tight monetary policy that could later affect the Rupiah exchange rate stabilising, impacting the Jakarta stock market composite index (JCI). While from the government side, the government provides cash assistance to the community and entrepreneurs to mobilise the community's economic activities. Also, reduce the tax rate for entrepreneurs and much more help given to Indonesia's people, known as increasing social safety net [32].

Research Problem

The current pandemic condition is still ongoing, and there is no certainty when the pandemic will end. Financial dan capital market conditions are still experiencing turmoil. Then, the second wave of pandemic conditions emerged in several countries (Japan, Spain, United Kingdom, German, Netherlands), which caused Indonesia's economy to deteriorate. In recent months, COVID-19 cases in Indonesia have continued to increase, which certainly affects the Indonesian economy in the stock sector (JCI). In this study, JCI will be represented by LQ45 shares LQ45 shares are the blue-chip stocks and the most liquid and most attractive to investors (domestic and foreign). Therefore, it is prudent of Bank Indonesia to implement sound policies to overcome Indonesia's monetary problems. For the present condition, there has been no discussion on the influence of FX swap policy and Domestic Non-Deliverable Forward (DNDF) conducted by Indonesia on the Jakarta Stock Exchange Composite Index. Therefore, these approach that has been implemented to maintain the economic stability in Indonesia needs to be studied further. This study will discuss the influence of Rupiah's stabilization of monetary policy using FX swap

and Domestic Non-Deliverable Forward (DNDF) instrument conducted by Bank Indonesia on JCI.

Research Questions
Several questions that related to the research problems are:

1. Will Domestic Non-Deliverable Forward DNDF as monetary instrument has an effect to maintain exchange rate stability?
2. Will monetary policy instrument (FX swap) able to improve stability of exchange rate stability?
3. Will the performance of Rupiah have an effect to Jakarta Composite Index?

Research Objective
Since the COVID-19 pandemic is still going strong, the Central Bank policies' study to recover the economy during a pandemic is an exciting topic for market players, central bank, and capital market. This study will focus on the monetary policies instruments of the Indonesia Central Bank that related to maintaining the stability of the Rupiah exchange rate. Some economic policies mechanisms have implemented by Indonesia, such as FX Swap and Domestic Non-Deliverable Forward (DNDF) conducted by Bank Indonesia every day. This research aims to study the impact of monetary policy of the Indonesian Central Bank's monetary policy instruments regarding Rupiah exchange rate stability using the FX-swap and DNDF instruments. This research also includes the Rupiah Reference rate (JISDOR) during this COVID-19 pandemic. These policies are also studied for their effects on the stock market.

II LITERATURE REVIEW

Asia Faces Crises
In 1997, countries in Asia experienced an economic crisis called the Asia Financial Crisis. This crisis is caused by Thailand's currency collapse that affects the land around it. This crisis caused the currency to devalue, and the stock market also collapsed. At that time, Thailand, Korea experienced a devaluation of the stock market decline above 50%. Then Thailand and Korea experienced a depreciation of 100%. Therefore, several Asian countries, especially Korea and Thailand, get help from the IMF. during this crisis, other Asian countries also received the same shock as the other three countries [21]. Korea faced the Asian financial crisis by raising the interest rate bank rate during the winter of 1997. In comparison, Malaysia recommends an interest rate policy to avoid volatility's ringgit exchange rate even though the results are not satisfactory. In contrast to Thailand, as Thailand became the first country to be hit by the Asia financial crisis, Thailand implemented a forward policy to minimize costly baht sales and skyrocketing interest rates [5].

Not long after the Asia financial crisis, the whole world was shaken by the Global financial crisis that emerged in 2008 and lasted until 2009. Asian countries such as South Korea, the Philippines, Malaysia, Thailand are improving the economic foundation system. At this time, the newly built financial system tested its stability. Moreover, the countries also suffered a collapse due to the crisis of 1998 [38]. In general, the government implements Ease monetary policy, introduce fiscal stimulus, Expand deposit insurance to deal with the 2008 crisis [14].

The world is being hit with a virus outbreak similar to SARS that first struck Wuhan on December 2, 2019. The virus has an 88% resemblance to the SARS virus from bats, but it is further away from the SARS coronavirus. Simultaneously, the virus is called novel coronavirus 2019 (N-COVID 19) [51]. The widespread of COVID-19 in most countries has resulted in slower global economic growth. The outbreak has expanded and impacted 214 countries. It provides for 99.8% of global GDP, with reported cases totaling more than 4.7 million and epicenters in the United States and Europe [6]. Monetary stimulus introduced by the central bank is a reduction in policy rates and an injection of liquidity. Monetary policy easing has been instituted through large-scale Quantitative Easing (QE) using several instruments, including government bond purchases, lower reserve requirements and the Pandemic Emergency Purchase Program (PEPP). This strategy was applied by several banks globally, such as the Bank of England, Bank of Japan, and European Central Bank [18].

Indonesia Faces Crises
Indonesia has faced a crisis in recent years face several problems that have disrupted the country's economy. Based on [23], Indonesia faced two enormous situations in 1997-1999 and 2008-2009, which significantly impacted the Indonesian economy. In the 1997 crisis, Indonesia experiencing the Asia crisis where Indonesia's currency depreciated very high compared to 3 other Asian countries (Thailand, Malaysia, Korea). Also, generally, the four countries in Asia, Indonesia, experienced inflation in the range of 5-10%, while in 1997, Indonesia experienced inflation more than the maximum percentage limit of inflation of 5%. Also, Bank Indonesia does not work effectively because of political problems. Indonesia experienced a sudden change of president from Suharto to B.J. Habibie, which made political and economic conditions increasingly unstable [32]. Based on [32] and [23], Indonesia implemented a tight monetary policy in which Bank Indonesia controlled the base money, also supported with the help of loans from the IMF at that time. With the 1998 crisis, Indonesia implemented the Inflation Targeting Zone (ITF), where Indonesia must maintain inflation conditions.

Unlike the previous situation, in 2008, Indonesia experienced a global financial crisis caused by the financial crisis initially started with the United States sub-prime mortgage market. Because of this, Indonesia, which is a country that is very dependent on invests from foreign countries affected by this crisis where foreign investors withdraw their investment from Indonesia that makes the Indonesian currency depreciate and a decline in the value

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of the capital market [9]. Unlike in 1998, Indonesia already has more robust economic fundamentals. Therefore, handling is better than before. Previously, Bank Indonesia saw a risk from trends, behaviour to hedge, now Bank Indonesia can see from portfolios, assets, and other information [9]. To handle the 2008 crisis, Bank Indonesia implements a monetary mix to deal with the problem. One of the instruments is expansion policy by lowering the interest rate from 9.5% to 6.5% [9].

Now, precisely 12 Years after the 2008 crisis, Indonesia is hit by a virus called the COVID-19 virus that makes the government lockdown nationally, which certainly impacts the Indonesian economy. The government also dilemmas making decisions between allowing people to contact or do public meeting so that the impact of rising deaths or limiting the interaction between people leads to cost and high unemployment [11]. Similar to the previous crisis, this pandemic makes the Rupiah exchange rate continue to weaken. Therefore, Bank Indonesia has a vital role in improving Indonesia's economy with a pandemic that does not know the end.

Indonesia's efforts to deal with the COVID-19 crisis

To improve Indonesia's economic situation during the COVID-19, Indonesia implemented several monetary policies, namely, lower interest rates, increasing the intensity of intervention in the market to stabilize the Rupiah exchange rate. Second, intervention is carried out both through the sale of foreign currencies on the spot and forward with DNDF transactions and by purchasing national securities from the secondary market. Third, improve instruments and commerce in the money market and foreign exchange markets such as DNDF and FX swap. Fourth, increase liquidity injection in the money market and banking industry to boost the domestic business world and economy. Fifth, macroprudential policy easing to encourage banks to finance the business world and economy. Lastly, ensuring the smooth transactions carried out by Indonesia's people [7]. From all these instruments, this paper will discuss one of the expansion policies, namely FX swap and Domestic Non-deliverable Forward (DNDF)/ Domestic NDF, which will be discussed further below.

FX swap

The policy transmission mechanism is an overview of a monetary policy's response to economic and financial activities. It is expected that the approach can achieve the desired objectives. In the monetary transmission mechanism, a monetary policy instrument is implemented and seen the impact. The Financial sector is measured by how much influence the policy has on the development of interest rates, exchange rates, and stock prices. While in the real economic sector, the approach is influential or not, can be seen from the development of consumption, investment, exports, inflation and imports. Bank Indonesia has several monetary policy instruments, namely Open Market Operations, Rupiah intervention, foreign exchange sterilization, discount facility, Minimum Mandatory Giro, and Bank Indonesia Wadiah Certificate FX swap instruments are included in the open market operation policy. But open market operation itself is an instrument by which the Central Bank increases or decreases the market's currency by buying or selling government securities Swap is one way of hedging the value of a currency from volatility. Americans first introduced swap in 1970, and swap have become very common for economic actors such as banks and companies to avoid the exchange rate and interest rate from economic movements in the market [13].

In this paper, one type of swap will be discussed, namely foreign exchange (FX) swap. FX swap is an instrument that aims to avoid fluctuations in exchange rates. FX swap are the same as currency swap. However, in FX swap, contract executors make agreements by exchanging foreign currencies at spot rates and making agreements to re-exchange with the forward rate determined when making the contract [29]. For example, when Bank Indonesia conducts FX swap with the market (the market here is a domestic bank and an overseas bank located in Indonesia), Bank Indonesia will exchange Rupiah against the U.S. dollar using spot rate on that day. In the same run, both parties agreed to exchange the forward rate. In other words, FX swap is a combination of forward and spot contracts. Therefore, FX swap only last for the short term (1-12 months) [13].

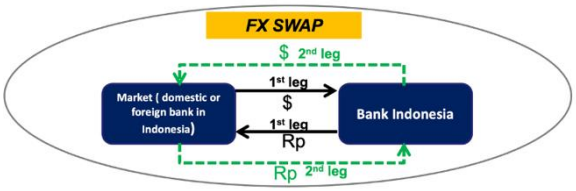

Fig. 1. FX swap process

Source: Bank Indonesia

Domestic Non-Deliverable Forward

To restore economic conditions currently being disrupted by COVID-19, Bank Indonesia also implements Domestic Non-Deliverable Forward (DNDF) instruments. Domestic Non-Deliverable Forward (DNDF) is settled net in local currency and traded in DNDF issuing country [43]. Based on the regulation issued by Bank Indonesia, namely PBI No. 20/10/PBI/2018 concerning DNDF (Domestic Non-Deliverable Forward). DNDF is a form of contract cooperation with foreign exchange derivative transactions against standard Rupiah (Plain Vanilla). DNDF transactions consist of Forwarding transactions by adapting fixing mechanisms conducted in the Indonesian domestic market. A fixing mechanism is a transaction settlement mechanism without the main movement of funds by calculating the difference between the Forward transaction rate and the that has been determined on a specific date in a contract (fixing date). In DNDF trading, Jakarta Interbank Spot Dollar Rate (JISDOR) becomes the USD's reference currency against IDR [16]. In contrast to NDF

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(Non-Deliverable Forward), which is usually completed in USD and offshore dealing. Indonesia is one country in ASIA that uses DNDF as a monetary policy tool while trading the secondary market development stage.

The reason Bank Indonesia developed DNDF is an intervention without affecting exchange reserves. Because DNDF trading is settled with local currency, therefore, in short exposure, USD in DNDF does not require USD liability on the issuing central Bank's balance sheet. The second reason is that DNDF can soften the need for a spot or forward for USD by providing options for hedge market risk from short USD positions. Lastly, offers an alternative FX intervention tool that the central Bank can later control. In Indonesia, DNDF trading occurs in the primary market in large quantities. Bank Indonesia offers DNDF 1 month and three months daily traded to local and international banks with subsidiaries in Indonesia [42].

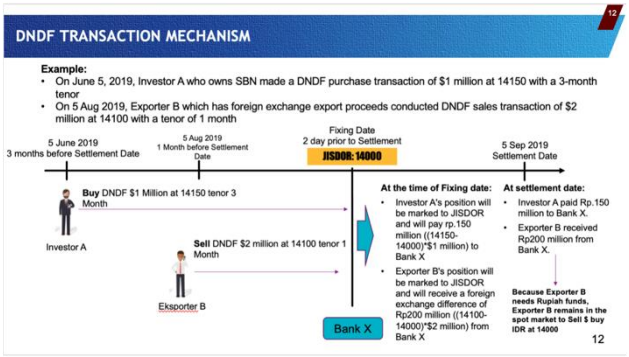

Fig. 2. FX swap process

Source: Bank Indonesia

Monetary policies effectiveness

In the face of the current crisis, there monetary policies will be applied to improve economic conditions. According to [35], monetary policy has an important role to play, and considers monetary policy to have an ineffective influence is a fatal mistake. Because according to [35], monetary policy has a more significant influence in times of crisis than average time. The same statement also states by [23] that monetary policy will be seen to have an effect when conditions are abnormal. In Indonesia, according to [48] , since 2010, Indonesia has managed to maintain monetary stability with a combination of monetary policy and macroprudential. During the COVID-19 pandemic, Indonesia implemented several monetary policies. According to [37], Bank Indonesia has successfully implemented several policies to cure the depreciating Rupiah condition by 20% in March and again improved from April and continued to increase in May. This is proven by the condition of Rupiah in April 2020 worth RP14,200, which was initially at a value of Rp16,700 [20]. Thus, monetary policy is key to dealing with conditions with high uncertainty [24].

Rupiah and Stock Market

In theory, in the relationship of Rupiah and the stock market, a namely traditional approach or known as "flow-oriented" and portfolio approach or known as "stock-oriented" [30] . The portfolio approach explains that the stock market can affect the exchange rate. This is supported by when the stock market experiences a positive movement. It will attract investors to invest. When the stock market price increases, investors buy the domestic currency to make domestic currency appreciated. It has been discovered that the relationship between exchange rates and asset values exists only in short-term investments [41]. The basic concept of *hot money* is that as long as a country does not have financial or political issues, the foreign investor will invest in Indonesia to create a short-term investment that helps the Indonesian economy. Because the *hot money* itself is a short-term investment in a significant amount of money and at the same time, the money can experience immediate outflow when a country's condition is not favourable for the investor. Moreover, investors can sell it quickly when the country's economic condition is weakening. When Indonesia gets an injection of *hot money* investment funds, the market's stock price condition will tend to increase. Also, the Rupiah's value is appreciated by the presence of this hot money [47].

In contrast, Flow oriented is a theory where the exchange rate movement will affect the stock market [30]. Because the exchange rate is one factor considered by investors, the exchange rate influences investor decisions [41]. When the Rupiah depreciates, it is more profitable for investors to hold the dollar than the Rupiah. When investors convert their profits from Rupiah to the dollar, their opinion will be less because the Rupiah has depreciated. Also, when the Rupiah depreciates, it will make the stock market return less. When the stock market has a low profit rate, investors will not be interested in investing in the stock market in Indonesia. Investors will invest somewhere else that have higher profits [46]. In the research conducted by [32], it was found that the Rupiah and Jakarta Composite Index have a negative relationship. When the value of the Rupiah increases (in other words, depreciation), then JCI will decrease. Because investors would prefer to invest in dollars rather than Rupiah [2].

Rupiah and COVID-19

According to [50], during this pandemic, the Rupiah depreciated significantly. This was revealed in a study conducted by [51], which stated that Rupiah and COVID-19 have a direct relationship. Whereas when the case of COVID-19 increases, the Rupiah will continue to weaken. Also, from the results of research conducted by [21], [27], and [25] showed the same findings that the COVID-19 pandemic has relationship with the Rupiah performance.

Stock market and COVID-19

Reference [40] stated that the health crisis caused by COVID-19 is having a considerable impact on the stock market. For instance, the authors examined the effect of

lockdown policy on the stock market. The results of his study showed that the length of the number of lockdown days when it was implemented by the government and the monetary policy used, also the rule of traveling abroad, had greatly influenced economic activities. It affects closures, openings, and the lowest and highest stock prices of major stock market indices. According to research [36], COVID-19 causes volatility in the stock market that also influences investor decisions. The existence of COVID-19 shows that twenty-one stocks have decreased in value. With the decline in stocks can be seen the panic in the stock market. Similar things happened in previous pandemics. Research conducted by [11] revealed that during the SARS pandemic in 2003, hotel stock in Taiwan experienced a drastic decline. Based on these two researchers prove that with the pandemic, the stock market will be responsive to pandemic conditions that will harm investors in the future. Based on these two researchers prove that with the pandemic, the stock market will be responsive to pandemic conditions that will harm investors in the future. With lowered interest rate by Bank Indonesia, the stock sector is expected to increase over time [20].

The LQ45 index can illustrate the current condition of market condition that got impact because of COVID-19. LQ45 is well known as a blue-chip stock [26]. The LQ45 index is one of the most influential indices on the Indonesia Stock Exchange. The LQ45 index has a significant capitalization, accounting for about 70% of the total transaction volume on the Indonesia Stock Exchange. It is determined using the market-weighted capitalization of the 45 most liquid stocks listed on the Indonesia Stock Exchange. The movement of the index can be used to illustrate the current Indonesian capital market [4]. The LQ45 index is a stock index with a high degree of liquidity that investors, dealers, brokers can use, and stock analysts to monitor the progress of stocks and markets.

III. METHODOLOGY

Type of Data

The type of data used in this study is secondary and quantitative data. Quantitative data is data measured in numerical scales (numbers). At the same time, secondary data is data that has been presented and can be obtained from existing sources [44]. Besides that, the secondary data used is the data recorded systematically within a certain time, known as time-series data. The data used in this study include Rupiah exchange rates, JISDOR, FX swap, DNDF rates, and cases of increased COVID-19 in Indonesia. All this data is taken from March 23 to the end of December 2020.

Source of Data

The data in this study is taken from searches conducted manually from the expansion of secondary data from websites on the internet and the use of books. In this research, Jakarta Interbank Spot Dollar, FX swap, DNDF data will be taken from several sources such as Bank Indonesia reports that can be seen on the official website (https://www.bi.go.id). For Rupiah movement and COVID-19 will be taken from https://www.Bloomberg.com and LQ45 stock from https://www.finance.yahoo.com.

Variables

There are two groups of variables in the analysis data: the dependent and independent variables. The dependent variable is the Rupiah movement from March until December 2020. While there are five variables used as the independent variable, i.e.: (i) Jakarta Interbank Spot Dollar Rate (JISDOR), (ii) the movement of the Jakarta Stock Exchange composite index (JCI) represented by LQ45 from March to December 2020, (iii) the number of FX swap conducted by Bank Indonesia over the past ten months. (iv) the Rupiah value when implementing DNDF policy in the afternoon, (v) the number of COVID-19 cases. These independent variables data will be collected from March to December 2020. On this model, the FX swap will be dummy because FX swap do not occur every day.

Analysis Method

Multiple Regression in Log model

In this study using the secondary data, the multiple regression method is used to analyse these data quantitively. *Multiple regression* is a statistical analysis used to determine the outcomes of a response variable using several variables, such as the relationship between a dependent variable and independent variables in the study, the regression analysis was carried out using dummy variables. The dummy variables are required to capture a categorical variable such as the central bank policy. The dummy variable is coded with the number of "1" if the central bank policy in the swap market exists. Otherwise, it is coded with the number "0". In addition, the data used are the data series taken at different times, so the regression analysis carried out is a time series multiple regression. In this regression analysis, there is also a time lag where the independent variable (X) in the previous time can affect the variable dependent (Y) at the current time. The regression form to be used for this research is a logarithmic (base 10) model. In this model, both the independent and the dependent variables are shown in logarithmic form. Interpretation of this form is the percentage increase of dependent variable (Y) caused by the increase in independent percentage (X) [9]. The software used in this analysis is SPSS statistical application. The multiple regression model is used in this calculation as follow:

$$\text{Log } Y = ®_0 + ®_1 \text{log} X1_t + ®_2 \text{log} X2_{t-4} + ®_3 \text{log} X3_t + x®_4 \text{log} X4_{t-1} + ®_5 D1_{t-2} + \sum_t \quad (1)$$

Description:
Y= Current Rupiah exchange rate
$X1_t$= Jakarta Interbank Spot Dollar Rate (JISDOR)
$X2_{t-4}$= Jakarta Composite Index (JCI)
X3= Domestic Non-Deliverable Forward

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$X4_{t-1}$= COVID-19 case
$D1_{t-2}$= Dummy FX swap
$\sum$ = Standard error
t = Time Period

The use of logarithm in this model, with logarithm, makes the relationship between variable dependent and independent interconnected effectively. Also, with logarithmic form, making variables distributed normally [9]. Furthermore, this study uses variable dummy in it. According to [1] , variable dummy can be used for research that is intangible. In this research that will be his variable dummy is FX swap. Because, in this study, whether variable dependents will be affected if Bank Indonesia conducts FX swap or does not do so. Therefore "exercise" and "not exercise" are intangible. Also with this variable research can be easier and measurable [1].

Classical Assumption of Ordinary Least Square
The classical Assumption Union aims to detect whether the Ordinary Least Square (OLS) model produces the best linear unbiased predictor (BLUE). Ordinary Least Square itself is a method by which the independent variable can explain the change of variable dependent [8]. OLS itself is a method of minimizing the number of errors. In this OLS method, there are 4 types of tests, namely normality, autocorrelation, multicollinearity, and heteroscedasticity tests which will be described below.

Normality Test
A normality test is a data test used to test whether a regression model, dependent variable, independent variable, or both have a normal distribution or not. But in this study, the normality test will not be tested. According to [14] and [42] , when the sample size is more than 30, then violations of the normality test are reasonable. In this study, there were 201 tests. Therefore, violation of normality is not a problem.

Autocorrelation
One of the requirements of the classic assumption is the autocorrelation test. According to [8] , to know whether or not there is an autocorrelation, can use the Durbin-Watson Test (DW) provided that:

1. If d is smaller than dL or greater than (4-dl), then null hypothesis is rejected, then this indicates the existence of autocorrelation.
2. If d is flexed between dU and (4-dU) then the null hypothesis is accepted, then this indicates no autocorrelation.
3. If d is located between dL and dU or delivered (4-dU) and (4-dL), then there is no definite conclusion.

To get dU and dL, can be obtained from the statistics table Dublin Watson. Also, if the regression model contains autocorrelation, Durbin's two-step test can be applied to eliminate autocorrelation [3].

Multicollinearity
Multicollinearity test is a test to indicate a linear relationship or correlation between independent variables. Multicollinearity can be seen from variance inflation factors or (VIF). if the VIF value is below 10, there is no multicollinearity. If the VIF value more than 10, there is a multicollinearity [8].

Heteroscedasticity
Heteroscedasticity test is a test to determine the presence of variant and residual inequalities in the regression model. But when variances of residual remain or constant, then this condition is called homoscedasticity [18]. A good regression model is a regression that does not contain heteroscedasticity. The Glesjer test can determine heteroscedasticity. If the test result produces a significant value below 0.05, the result indicates that the data is heteroscedastic. On the contrary, a significant value above 0.05 means that the data is not heteroscedasticity.

Hypotheses test
T Test
Based on [17] , the t test is used to test how far the influence of one independent variable individually in describing dependent variables. T-test was conducted using significance levels 0.01, 0.05, and 0.1. If the significant value of the regression test above the significant level means partially the independent variable in the model has no significant effect on the dependent variable. However, if the significant value of the regression test is below the significant level, it means that the independent variable has a significant influence on variable dependent.

F test
According to [17] , the F statistical test basically shows whether the independent variables used in the model have a simultaneous influence on dependent variables. Testing is done using significance level 0.05 and applies under the following conditions:

A. If the significant value is greater than 0.05, then simultaneously the Independent variable does not have a significant influence on dependent variables.
B. if the significant value is smaller than 0.05, then the Independent variable has a significant influence on dependent variables.

Coefficient of Determination
Coefficient of determination or well known as R^2 is defined in linear models and R^2 measures how much dependents variable affects independent variable. Therefore a good regression result is a regression that has a high R^2 [8].

IV. RESULTS

Classical Assumption Result
Classical assumption test used in linear regression with the Ordinary Least Squared (OLS) approach includes autocorrelation test, multicollinearity test, heteroscedasticity test.

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Autocorrelation

A good regression model is a regression that does not contain autocorrelation. The Durbin-Watson test was used to test for autocorrelation with the conditions 1.623 <DW <2.275. the Durbin Watson value is 1.926, because 1.623 <1.926 <2.275, then there is no indication of autocorrelation.

TABLE I
AUTOCORRELATION[B] TEST

Model	R	R square	Adjusted R square	Std. error of the estimate	Durbin-Watson
1	0.991[a]	0.982	0.982	0.00216	1.926

[a] Predictors: constant, COVID-19 cases (–1), JISDOR, JCI Index (–4), DNDF, FX SWAP Dummy (–2).
[b] Dependent variable: IDR currency.

Multicollinearity

The multicollinearity test results are shown in Table 4.2. The VIF value obtained for those five variables is below 10, which JISDOR (X1) with a value of 8.545, JCI Index (X2) with a value of 3.120. DNDF exchange rate (X3) with a value of 9.548 and case of COVID-19 in Indonesia (X4) with a value of 3.150. the last one is FX swap dummy (D1) with a value of 1.048. Thus, referring to the basis of decision-making in multicollinearity tests, it can be concluded that this model does not occur symptoms of multicollinearity.

TABLE II
MULTICOLLINEARITY[B] TEST

Model	Variables	Collinearity tolerance	Statistics VIF
1	Constant	-	-
	JISDOR	0.117	8.545
	JCI Index (LQ45) (–4)	0.321	3.120
	DNDF exchange rate	0.105	9.548
	COVID case (–1)	0.317	3.150
	SWAP Dummy (-2)	0.955	1.048

[b] Dependent variable: IDR currency

Heteroscedasticity

The significance value between an independent variable and a residual absolute is greater than 0.05. therefore, the conclusion does not occur heteroscedasticities problem. However, for heteroscedasticity test cases of COVID-19 addition has a value below 0.05 which causes heteroscedasticities problem.

TABLE III
HETEROCEDASTICITY[B] TEST

Model	variables	Unstandardized coefficient B	Coefficients Std. Error	Standardized coefficients beta	t
1	Constant	0.065	0.050		1.303
	JISDOR	–0.003	0.020	–0.031	–0.153
	JCI Index (LQ45) (–4)	–0.004	0.005	–0.100	–0.821
	DNDF exchange rate	–0.009	0.023	–0.084	–0.396
	COVID CASE (-1)	–0.001	0.000	–0.267	–2.191
	SWAP Dummy (–2)	0.000	0.000	–0.054	–0.774

[b] Dependent variable: ABS_RES

Multiple Regression Test

Multiple regression analysis in logarithmic form is used to determine the relationship between dependent variables and independent factors that affect them. Double linear regression equations are seen below as follows:

TABLE IV
MULTIPLE REGRESSION[B] TEST

Model	variables	Unstandardized coefficient B	Coefficients Std. Error	Standardized coefficients beta	t	Sig.
1	Constant	0.035	0.065		0.546	0.586
	JISDOR	0.171	0.026	0.185	6.624	0.000
	JCI Index (LQ45) (–4)	–0.010	0.006	–0.028	–1.661	0.098
	DNDF exchange rate	0.825	0.029	0.833	28.225	0.000
	COVID Case (-1)	0.002	0.001	0.055	3.215	0.002
	SWAP Dummy (-2)	–0.001	0.000	–0.024	–2.448	0.015

[b] Dependent variable: IDR Currency.

$$Y = 0.035 + 0.171(X1_t) - 0.010(X2_{t-4}) + 0.825(X3_t) + 0.002(X4_{t-1}) - 0.001(D1_{t-2}) \quad (2)$$

Information:
Y= IDR Currency
$X1_t$= Jakarta Interbank Spot Dollar Rate (JISDOR)
$X2_{t-4}$= Jakarta Composite Index (JCI)
$X3_t$= Domestic Non-Deliverable Forward exchange rate
$X4_{t-1}$= COVID-19 Case
$D1_{t-2}$= Dummy FX swap

From the regression equation above can be concluded:

a. The constant of 0.035 states a free variable that is in constant condition, then the Rupiah currency value will increase by 0.035 percent.
b. Coefficient of regression Jakarta Interbank Spot Dollar Rate (JISDOR) (X1) by 0.171, stating that if the increase of JISDOR by one unit and independent variable remains, it will make the Rupiah currency will increase by 0.171 percent.
c. Coefficient of regression Jakarta Composite Index (JCI) ($X2_{t-4}$) by -0.010, stating that if the increase of JCI by one unit and independent variable remains, it will make the Rupiah currency will decrease by 0.010 percent.
d. Coefficient of regression Domestic Non-Deliverable Forward exchange rate (DNDF) ($X3_t$) by 0.825, stating that if the increase of DNDF by one unit and independent variable remains, it will make the Rupiah currency will increase by 0.825 percent.
e. Coefficient of regression COVID-19 ($X4_{t-1}$) by 0.002, stating that if the increase of COVID-19 by one unit and independent variable remains, it will make the Rupiah currency will increase by 0.002 percent.
f. Coefficient of FX swap Dummy ($D1_{t-2}$) by -0.001, stating that if the increase of swap dummy by one unit and independent variable remains, it will make the Rupiah currency will decrease by 0.001 percent.

Hypotheses Test

T-test and f-test are conducted to test this research hypothesis.

F Test

Based on the table above, obtained a calculated value of F of 2153.740 greater than F Table of 2.4179. Significance of F of 0.000 smaller than 0.05. Therefore, it can be

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concluded that there is a significant influence of independent variables on dependent variables.

TABLE V
F TEST RESULT (ANOVA[A])

Model	Parameter	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	0.050	5	0.010	2153.740	0.000[b]
	Residual	0.001	195	0.000		
	Total	0.051	200			

[a] Dependent Variable:IDR Currency
[b] Predictors: constant, COVID-19 cases (−1), JISDOR, JCI Index (−4), DNDF, FX SWAP Dummy (−2).

T Test

The t statistic test shows the influence of one explanatory/independent variable individually explaining the variation in the dependent variable. The t-test is used to answer hypotheses. The t-test can be seen in Table 4.6 below:

TABLE VI
T-TEST RESULT[A]

Model	Variabel	t	sig
1	Constant	0.546	0.586
	JISDOR	6.624	0.000
	JCI Index (LQ45) (−4)	−1.661	0.098
	DNDF exchange rate	28.225	0.000
	COVID Case (-1)	3.215	0.002
	SWAP Dummy (−2)	−2.448	0.015

[a] Dependent Variable:IDR Currency

a. Jakarta Interbank Spot Dollar Rate (JISDOR)
Based on the data that is above the calculated T value of 6.624 greater than the table T is 1.9722 and the significance value of the test results shows that the test value is smaller which is 0.000 than the error level of 0.05. therefore, it is concluded that variable A partially has a positive and significant effect on the Rupiah exchange rate. From the results of the t-test analysis, it is stated that hypothesis 4 is accepted.

b. Jakarta Composite Index (JCI)
Based on the data above, for JCI gives different results. JCI rejected in error level 0.05 therapy received in error level 0.1. Based on calculated T value of 1.661 greater than the table T is 1.6527 and the significance value of the test results shows that the test value is smaller which is 0.098 than the error level of 0.1. therefore, it is concluded that variable A partially has a negative and significant effect on the Rupiah exchange rate. Also, this result proves that JCI has a weak influence on the Rupiah. So, hypothesis 5 is accepted in error level 0.1, according to the findings of the t-test analysis.

c. Domestic Non-Deliverable Forward exchange rate
Based on the data that is above the calculated T value of 28.225 greater than the table T is 1.9722 and the significance value of the test results shows that the test value is smaller which is 0.000 than the error level of 0.05. Therefore, it is concluded that variable A partially has a positive and significant effect on the Rupiah exchange rate. According to the results of the t-test analysis, Hypothesis 2 is accepted.

d. COVID-19 Case
Based on the data that is above the calculated T value of 3.215 greater than the table T is 1.9722 and the significance value of the test results shows that the test value is smaller which is 0.002 than the error level of 0.05. therefore, it is concluded that variable A partially has a positive and significant effect on the Rupiah exchange rate. Hypothesis 1 is accepted based on the findings of the t-test analysis.

e. Dummy FX swap
Based on the data that is above the calculated T value of 2.448 greater than the table T is 1.9722 and the significance value of the test results shows that the test value is smaller which is 0.015 than the error level of 0.05. Therefore, it is concluded that variable A partially has a negative and significant effect on the Rupiah exchange rate. From the results of the t-test analysis, it is stated that hypothesis 3 is accepted.

Coefficient of Determination

Based on the table above can be seen Bahia the influence of independent variables on dependent variables produces an adjusted value of R square by 0.982 or 98.2%. which means, dependent variable namely Rupiah currency can be explained by 98.2% by independent variables namely Jakarta Interbank Spot Dollar Rate (JISDOR), Jakarta Composite Index (JCI), Dummy FX swap, Domestic Non-Deliverable Forward exchange rate, COVID-19 Case. While the remaining 1.8% is explained by other variables outside of this study.

TABLE VII
COEFFICIENT DETERMINATION[B]

Model	R	R-aquare	Adjusted R-square	Std. error of the estimate
1	0.991[a]	0.982	0.982	0.00216

[a] Predictors: constant, COVID-19 cases (−1), JISDOR, JCI Index (−4), DNDF, FX SWAP Dummy (−2).
[b] Dependent variable: IDR currency.

V. DISCUSSION

The purpose of this study was to identify how Bank Indonesia used FX swap and the Domestic Non-Deliverable Forward (DNDF) instrument to maintain JCI through Rupiah stabilizations. This part includes a discussion of the relationship between Rupiah and regression variables which are Jakarta Interbank Spot Rate (JISDOR), Jakarta Composite Index (JCI), Domestic Non-Deliverable Forward (DNDF), FX swap, COVID-19 case. This chapter discuss the findings of each regression variables.

This chapter contains discussion to help answer the research questions:

(i) Will monetary policy instrument (FX swap) able to improve stability of exchange rate stability?

(ii) Will Domestic Non-Deliverable Forward DNDF as monetary instrument, especially foreign exchange

intervention, have an effect to maintain exchange rate stability?

(iii) Will the performance of Rupiah has an effect to Jakarta Composite Index?

In this research, five variables influence the Rupiah movement during the COVID-19 pandemic, which are JISDOR, JCI, DNDF, FX swap, and COVID-19 case. The analysis confirms that most of these variables have significant influences on the Rupiah movement. This study also indicates some violations of the method of analysis. Such as heteroscedasticity test results for variable cases of COVID-19 addition. Then T-test on the variable Jakarta composite index is not accepted at the level of significance 5% but received at the level of significance of 10%. These variables will be discussed further below.

Findings on Regression Variables

Jakarta Interbank Spot Rate

JISDOR is a reference rate for investors when conducting Domestic Non-Deliverable Forward (DNDF) transactions. JISDOR is also a reference rate before closing Rupiah at the end of the day. With JISDOR, people can imagine the condition of the Rupiah until the end of the day. Therefore, JISDOR has a significant influence on the Rupiah movement. Also supported by t-test on table 4.6 results, JISDOR have a significance of 0.000. This is supported by previous research conducted by [31], which states that JISDOR as a reference rate has high sensitivity in influencing the Rupiah at the spot rate.

Jakarta Composite Index

In this study, Jakarta Stock Market Index represented by LQ45 did not have significant influence. Rupiah exchange rate movement is influenced by inflation, interest rate, and balance of payment (BOP), describing a country's transactions in one period [49]. With the lack of involvement of stocks in determining the movement of the Rupiah, this is illustrated from the t-test results (table 4.6) that explain that the JCI represented by LQ45 has a significant weakness of 0.098 or 9.8%. Where other variables have significant below 5%, but JCI has significant below 10%. Therefore, the Jakarta Composite Index has less significant effect on the Rupiah.

It can also be seen from the T-test results that JCI has a negative relationship with the Rupiah. This means that if the Rupiah value on the model increases or in the actual condition the Rupiah weakens, the JCI value decreases. It can also be seen in actual condition. When the Rupiah weakens, investors will withdraw their investment from Indonesia, making the value of Indonesia's stock market volatility. The findings of this study are consistent with previous studies by [32] and [2], which found a negative association between JCI and Rupiah.

Domestic Non-Deliverable Forward (DNDF)

Domestic Non-Deliverable Forward (DNDF) is a hedging instrument to protect the value to avoid the movement of Rupiah value. DNDF instrument, describing controlled Rupiah volatility. Therefore, Rupiah will have positive sentiment and encourage inflows. With inflows, Rupiah will continue to strengthen. Thus, the table 4.6 shows that DNDF has a high significance on the t-test against the Rupiah. In this research, the DNDF exchange rate is not the value of its DNDF. Because investors need the exchange rate reference provided by Bank Indonesia or other domestic bank as a reference for future Rupiah movements. This result proves that DNDF has a significant influence to help the Rupiah stabilization process. The study's results are supported with other studies, which reported that the currency NDF market acts as a channel through which the Chinese Yuan affects another Asian currency. This study [28] proved that the NDF could strengthen the Chinese yuan and New Taiwan Dollar exchange rates against the US dollar.

FX swap

FX is an instrument used to provide Rupiah sentiment in the future for investors. When the Rupiah is in a strong and stable condition, businesses will exchange their dollars for Rupiah. With the dollar entering Bank Indonesia, Indonesia's foreign exchange reserves will increase, which makes investors calm to Indonesia's condition, which certainly provides positive sentiment for investors.

It can also be seen from table 4.6 shows that the T-test analysis shows that FX swap negatively influence the Rupiah. T-Test indicates that when the Rupiah rises, the FX swap will be negative. Because if the Rupiah weakens or its value is depreciated, it will cause dollar demand higher than Rupiah. Then there will be no businesses that need Rupiah. Moreover, Businesses will tend to need dollars. This is related to the company that need dollars to pay obligations. Then when the Rupiah weakens, there will be no FX swap auction winner. The relation is illustrated in this T-test (table 4.6) when the Rupiah increase (its value increases which means depreciating), negative FX swap, i.e., no FX Swap transactions occur. From the table 4.6, this finding demonstrates that FX swap have a major impact on the Rupiah's stabilization mechanism. The results of this study are identical to the research conducted by [38]. FX has the influence to maintain exchange rate volatility and FX swap are one of the instruments used by central banks used during times of crisis.

COVID-19

Although variable COVID-19 have high significance, the variables have heteroscedasticity problem. This cause due to the type of data in the form of time series. Therefore, it allows the regression model to contain heteroscedasticity if the dependent variable changes drastically from the beginning of the period to the end of the period.

As the fig. 1 and 2, both Rupiah and Rupiah in log value experienced a very significant decline. COVID-19 has a strong relationship with the movement of Rupiah during this pandemic. It can be seen from the T-test in table 4.6,

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where COVID-19 has a significant influence, which is below 1%, on the Rupiah movement.

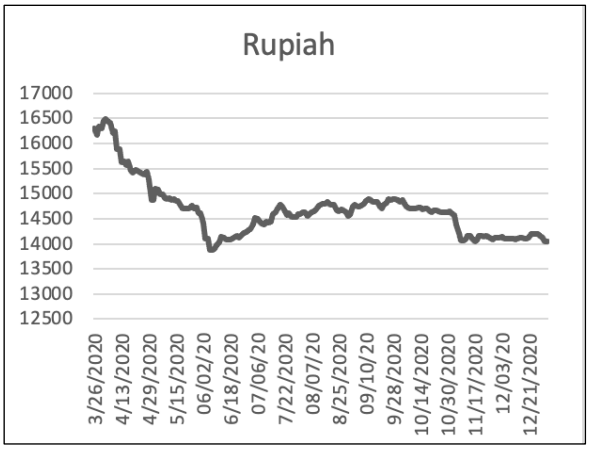

Fig.1 Rupiah movement from the beginning to the end of the period

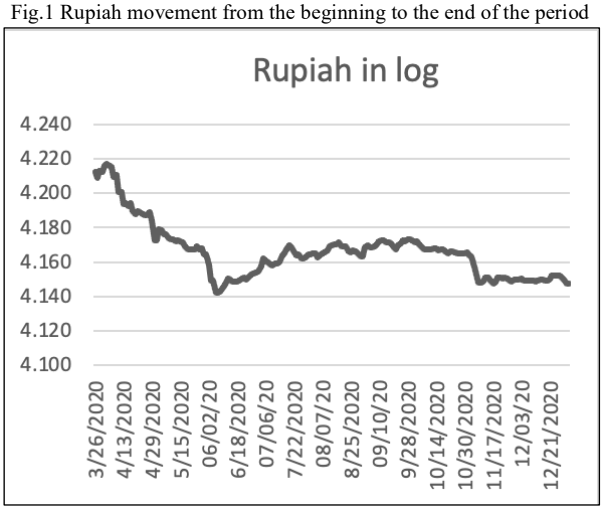

Fig. 2. Rupiah movement from the beginning to the end of the period

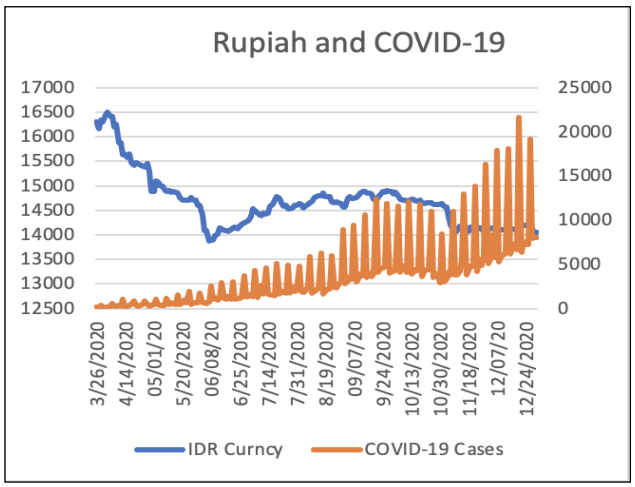

Fig. 3. Rupiah and COVID-19 Movement

The Fig. 3 show that the increase in COVID-19 cases, Rupiah depreciated. Rupiah also experienced daily movement accompanied by the ups and downs of COVID-19 cases. These results are similar to those of research conducted by [21] , [27], and [25] , and several other researchers in chapter 2.8.

Rupiah impact on Stock market

Based on sub-chapters 5.1.3 and 5.1.4, the results of this study explain that domestic non-deliverable forward monetary instruments and FX swap have a very high significant impact on the Rupiah movement. Therefore, it can be said that these two instruments have a significant role to play in maintaining Rupiah stability during the COVID-19 pandemic. Rupiah has a massive role in the Indonesian economy because the Rupiah represents the value of Indonesia's currency against other countries [45] . Also, the Rupiah will significantly affect the flow of investment capital into Indonesia. With the high investment, the value of the Rupiah will continue to appreciate and vice versa. Therefore, Bank Indonesia conducts monetary instruments in order to facilitate capital flows into Indonesia [45].

On the contrary, if the Rupiah is unstable, foreign investors will tend to withdraw their investments from Indonesia (and cause outflows), and foreign investors will choose to invest in dollars, which results in a decline in stock prices [46]. Therefore, the Rupiah condition maintained with the instrument that Bank Indonesia has applied will bring investment. When investment comes in, the Rupiah will strengthen. The strengthening Rupiah will increase investor sentiment to put investments in existing stock in Indonesia. When the investment comes in, the stock price in Indonesia will increase. Therefore, it can be concluded that the Rupiah influences the condition of the stock market in Indonesia.

VI. CONCLUSION

This research aimed to identify how monetary policies used by Bank Indonesia can maintain stock market stability through Rupiah stabilization. Based on a quantitative analysis of the Rupiah movement in response to regression variables, it can be concluded that FX swap and DNDF influence the Rupiah movement. Including the JISDOR has a positive significance to increase Rupiah stability. This result shows that the investor needs a reference rate for the Spot rate (from JISDOR) and Forward rate (from DNDF) to see the potential currency risk in the future. Moreover, the result indicates that both instruments of policies significantly influence maintaining the Rupiah movement. Furthermore, by analyzing the impact of the Rupiah on JCI, this dissertation has shown how rupiah has influenced JCI and provides the same relationship with previous research. Last, the increase of COVID-19 will impact the Rupiah stability. Indonesia's government must focus on reducing the COVID-19 number to increase Economic recovery.

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