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The COVID-19 pandemic and the exchange rate: a lesson learned from Indonesia

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Abstract: This paper aims to capture the relationship between the COVID-19 pandemic and the exchange rate. We utilized high-frequency data by utilizing daily data from January 21st, 2020, through June 29th, 2022. In contrast to the vast majority of research that disregards the incubation period of COVID-19 in the number of daily transmission cases, we use the growth of COVID-19 as a 14-day moving average of confirmed cases as the main independent variables. Findings indicate that the devaluation of the rupiah exchange rate is long-term associated with the increase in COVID-19 cases and deaths. According to the efficient market hypothesis, the rupiah depreciates due to the increase of COVID-19 transmission, which is publicized by the media. In the midst of the debate over the impact of the pandemic on the exchange rate and using Indonesia as a lesson learned for emerging market economies, our research is a recent study that examines this topic with completed data-generating processes – when the pandemic entered its last wave phase. In regard to exchange rate behavior, the disease outbreak channel exists. The government must restrict widespread media coverage of data on the spread of COVID-19 while focusing on accelerating measures to control the pandemic. A low-interest rate imposed by the monetary authorities as an effort to stimulate economic recovery can also exert pressure on the exchange rate, necessitating the optimization of other instruments, such as foreign exchange intervention.

Keywords: Indonesia; COVID-19 Pandemic; Rupiah Exchange Rate; Efficient Market Hypothesis
JEL Classification: F31; G18; I18

Introduction

COVID-19 has caused not only a health crisis, but also an economic and social crisis in various countries on an unprecedented scale. The imposition of lockdown and social distancing by the government in the form of restrictions on the movement of people within national borders and even across countries has disrupted the supply of goods and services. This then causes a supply-demand mismatch and disrupts the national supply chain (Sethi et al., 2021).

The COVID-19 infection was first detected in Indonesia on March 2nd, 2020 (See Figure 1). Social distancing measures and lockdowns imposed in many locations have been in effect since mid-March (Olivia et al., 2020). It was then followed by the largest depreciation of the rupiah on April 3rd, 2020, which touched the level of Rp16,622 per USD. It was the deepest level of depreciation rupiah after the Asian Financial Crisis in 1998, which reached Rp16,800 per USD. From this phenomenon, it is expected that an increase in COVID-19 infections has a depreciating effect on the rupiah exchange rate since the disease outbreak channel state that the uncertainty related to the unpredicted nature of COVID-19 infection cases and related deaths, sends negative sentiments to the financial market which then made this thing has predictive power on exchange rate behavior (Iyke, 2020).

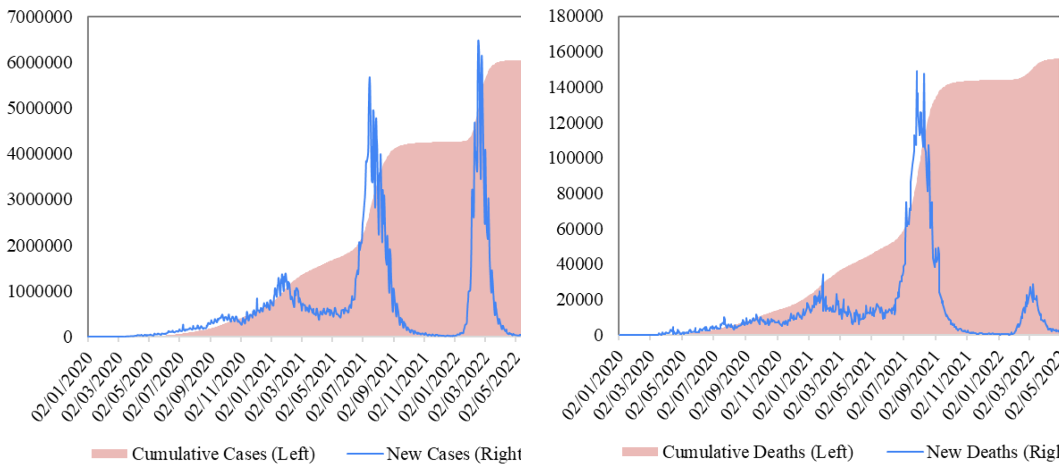


Figure 1 COVID-19 Infection Cases and Related Deaths in Indonesia
Source: WHO Coronavirus (COVID-19) Dashboard.

The relationship between COVID-19 and the exchange rate can be explained by the theory of efficient market hypothesis, the Taylor rule, and purchasing power parity. Firstly, the efficient market hypothesis states that markets are efficient, leaving no room to get excess returns by investing since everything is already fairly and accurately priced. Under this hypothesis, news related to COVID-19 infections refers to unexpected changes in the fundamental variables relevant to asset price determination (Taylor, 1995). So, the exchange dynamics reflect all the information concerning the exchange rate (Fama, 1970). Taylor's rule suggests that the central bank should raise the interest rate when inflation is above target or GDP is above its potential. Capital flow can be used as a variable to capture monetary policy (Fang & Zhang, 2021). The incorporation of the exchange rate into discussions of monetary policy is to augment a closed-economy Taylor rule with the rate of currency depreciation. Because the interest rate reacts not only to inflation and output but also to movements in the exchange rate. Secondly, the Taylor rule implies overshooting of the exchange rate following a shock (Heipertz et al., 2022). The COVID-19 pandemic can be seen as a trigger for economic shocks where, which has caused tremendous socio-economic disruption and induced capital outflow that depreciated the exchange rate. Thirdly, Purchasing power parity theory states that the law of one price applies; in other words, a freely traded good or service will have the same price in any country. This theory assumes that the market mechanism runs perfectly, meaning assumptions such as no transaction costs and taxes, homogeneous products traded, and the absence of uncertainty elements are met. Purchasing power parity implies that exchange rate depreciation occurs because of the increase in the price level. In the case of COVID-19, the increase in price levels could be triggered by a shortage of supply due to restrictions on economic activity imposed by the regulator, or it could be due to excess demand from panic buying by the public.

Empirical literature related to the effect of the COVID-19 pandemic on the exchange rate is still in the infant stages. The literature can be divided into two groups. The first group concentrates on cross-country evidence, while the second focuses on single-country evidence. Benzid and Chebbi (2020) evaluate the impact of COVID-19 cases and related deaths on exchange rate volatility in Europa, China, and the United Kingdom. Evidence from the GARCH model shows that an increase in COVID-19 cases and related deaths will increase volatility. In terms of power prediction, Iyke (2020) tests the predictive ability of disease outbreaks on exchange rate return and volatility in the 25 most affected countries by COVID-19. Evidence from the GARCH model shows contradictory results. An increase in COVID-19 predicts the depreciation of five returns, namely USD–CHF, USD–EUR, USD–INR, USD–PLN, and USD–SEK, and predicts appreciation of USD–GBP and GBP–USD returns. Especially for USD–CAD, the predictability oscillates from appreciation to depreciation of this currency. In the case of volatility, the effect is also asymmetric; an increase in COVID-19 could increase the volatility of USD-CAD and ISD-EUR and could decrease the volatility of USD-SEK and USD_GBP. Focusing on exchange rate volatility in 20 countries, Feng et al. (2021) find that an increase in confirmed COVID-19 cases does raise exchange rate volatility.

A comparison of the exchange rate response to the pandemic uncertainty between advanced and emerging economies was examined by Sethi et al. (2021). The fixed effect model that analyzed 37 countries shows that an increase in daily confirmed cases and related deaths implies a depreciating country currency. Regarding the effect of uncertainty created by the pandemic on the exchange rate, it tends to be appreciated in advanced economies, while in emerging economies, the result is the opposite. The higher sample was used by Aquilante et al. (2022) by analyzing this phenomenon in 57 countries. A linear regression and panel vector autoregressive model prove that an increase in new COVID-19 cases is associated with countries' currency depreciation. Focusing on the spillover shock of the exchange rate in Europa, Japan, Canada, and the United Kingdom, Narayan (2022) found that exchange rate spillover became 44% more important in the COVID-19 period compared pre the COVID-19 period.

The cross-country studies mentioned above are complemented by studies focusing on single-level evidence. A study in India shows that an increase in confirmed COVID-19 cases caused no change in the value of the exchange rate (Banerjee et al., 2020). In Colombia, a short-term Colombian peso depreciation may be explained by financial market uncertainty, generated by the arrival of the COVID-19 virus (Cardona-Arenas & Serna-Gómez, 2020).

Some facts of exchange rate depreciation above contradict the research results in the following countries. In the Philippines, an increase in the number of COVID-19 daily infections appreciates the Philippine peso (Camba & Camba, 2020). In Korea, after seven days of new COVID-19 cases, the South Korean won tend to be appreciated indicating that investors may have repurchased its currency after an infection spike (Hoshikawa & Yoshimi, 2021).

Some single-country literature also examines other aspects of the impact of COVID-19 on exchange rates. Narayan (2020) evaluates the evolution of the exchange rate from the point of view of shock persistence in Japan. He found that in the early stage, the shock to the yen had a non-transitory effect, while in the subsequent stage, the shock became short-term or transitory. Fang and Zhang (2021) emphasize exchange rate fluctuation around the outbreak of COVID-19. They found that the impact of the COVID-19 pandemic on the RMB exchange rate is transient. The RMB rate rose steadily before the outbreak but fluctuated during the pandemic.

The aforementioned empirical literature is the subject of debate. Some studies found that an increase in the number of COVID-19 depreciates the exchange rate (see Aquilante et al., 2022; Cardona-Arenas & Serna-Gómez, 2020; Sethi et al., 2021). Another study found the opposite (see (Camba & Camba, 2020), some studies found mixed effects (see Hoshikawa & Yoshimi, 2021; Iyke, 2020), and there is even another study that finds no relationship (see Banerjee et al., 2020). We shed light on this debate by analyzing the effect of the number of COVID-19 cases and related deaths on the rupiah exchange rate using high-frequency time series data by employing daily data covering the period January 21st, 2020 – June 29th, 2022 (577 observations). Using single-country evidence (Indonesia) as a lesson learned for emerging market economies, our current study discusses this topic with completed data-generating processes – when the pandemic has entered the last wave phase. Unlike most other studies that ignore the incubation period of COVID-19 in the number of daily transmission cases that imply confirmed cases in a single day may fluctuate sharply, we follow Duan et al. (2021) to consider it and use the growth of COVID-19 which 14-day moving average rate of confirmed cases and related deaths as our main independent variable.

In this context, the present research aims to investigate how COVID-19 affects the rupiah exchange rate while controlling for the role of the Jakarta composite index, interest rate, and world crude oil price. We employ an autoregressive distributed lag (ARDL) specification to see the relationship between COVID-19 and other determinant variables on the rupiah exchange rate that converge toward a long-run equilibrium in the presence of stationary and non-stationary series.

The rest of the paper is organized as follows. Section 2 focuses on the research method we used. We analyzed the results in Section 3 and concluded in Section 4.

Research Method

This paper aims to investigate the effect of the COVID-19 pandemic on the rupiah exchange rate while controlling for the role of the Jakarta composite index, interest rate, and world crude oil price. Our sample consists of daily data from January 21st, 2020, to June 29th, 2020. (577 observations). We use numbers of COVID-19 confirmed cases and related deaths provided by World Health Organization. Nominal exchange rates are obtained via Google Finance through Morningstar, Jakarta composite index from the Indonesian stock exchange, and world crude oil price data from West Texas Intermediate (WTI). In addition, the proxy of interest rate is Bank Indonesia's 7-day (reverse) repo rate. Given the limitation of the availability of daily data, only selected explanatory variables are used as a factor affecting the exchange rate in this study. Following Duan et al. (2021) and considering virus incubation and detection conditions that imply confirmed cases in a single day may fluctuate sharply, we use *COVID19_GROWTH,* which is the 14-day moving average rate of confirmed cases and related deaths cases as our main independent variable as formulated below:

$$COV19\_GROWTH_t = \sum_{t-13}^{t}[\ln(1 + Cumulative\_COVID\_19_t) - \ln(1 + Cumulative\_COVID\_19_{t-1})]/14 \quad (1)$$

Efforts to transform the COVID-19 variable in such a way in Equation 1 also contribute to eliminating heteroscedasticity and avoiding spurious regression (Wooldridge, 2020). Henceforth, the functional relationship is formulated as below to investigate the relationship between the exchange rate and its determinant factors.

$$ER_t = f(COV19\_CASEGROWTH_t, COV19\_DEATHGROWTH_t, JKSE_t, IR_t, WTI_t) \quad (2)$$

where,

ER_t	: The nominal exchange rate at time *t*
$COV19\_CASEGROWTH_t$	: COVID-19 confirmed cases growth rate in Indonesia at time *t*
$COV19\_DEATHGROWTH_t$	: COVID-19 related deaths growth rate in Indonesia at time *t*
$JKSE_t$	: Jakarta composit index at time *t*
IR_t	: The central bank interest rate at time *t*
WTI_t	: World crude oil price at time *t*

Considering an integrated order of the stationarity of the variables (some variables are stationary at the level, and some variables are stationary at the first difference – mixed stationary), this study employs ARDL bound testing developed by Pesaran et al. (2001). This provides both short-run and long-run coefficient estimations. Before conducting long-run estimation, a bound test for examining the long-run association among variables using F-statistics must be conducted first to check whether the null hypothesis of no cointegration among variables could be rejected. Once its null hypothesis is rejected, it can be justified to estimate the long-run coefficients.

Instead of conducting analysis short-run estimations, this research focuses on long-run estimation to derive causal relationship inference and to test the research hypothesis. The long-run ARDL (p, q_1, q_2, q_3, q_4, q_5) equilibrium model is as follows:

$$\ln(ER)_t = \alpha + \sum_{i=0}^{p}\beta_{1i}\ln(ER)_{t-i} + \sum_{i=0}^{q_1}\beta_{2i}\ln(COV19\_GROWTH)_{t-i} + \sum_{i=0}^{q_3}\beta_{3i}\ln(JKSE)_{t-i} + \sum_{i=0}^{q_4}\beta_{4i}IR_{t-i} + \sum_{i=0}^{q_5}\beta_{5i}WTI_{t-i} + \varepsilon_t \quad (3)$$

Where, α denotes the constant term in the equation, β is the long-run coefficients, while p denotes lag length of the dependent, and q_1, q_2, q_3, q_4, and q_5 denote the lag length of the independent variables. ε is the error term with white noise in the equation.

Result and Discussion

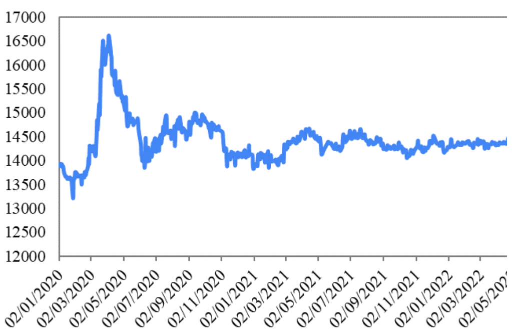
level after June 17th, 1998, which reached Rp16,800 per USD. COVID-19 cumulative cases and cumulative related deaths in Indonesia show an increasing trend. The highest value of cumulative cases was 6,086,212 people, and the highest value of cumulative related deaths was 156,731 people on June 6th, 2022. The Jakarta stock index touched 3,937.63 on March 24th, 2020, the lowest level since June 12th, 2012, which at that time touched 3,889.52. In addition, the mean interest rate is 3.84 percent, while the mean world crude oil price is USD63 per barrel.

The first step in analyzing time series data using the ARDL model is that all variables have to be ensured that no variable is integrated of order two, I(2), or higher. Table 2 shows the result of Augmented Dickey-Fuller and Phillips-Perron unit root tests in a level form. It can be concluded that some variables still show inconsistent test results in terms of stationarity of the level (integrated of order zero, I(0)), except *COV19_CASEGROWTH* and *COV19_DEATHGROWTH*. While

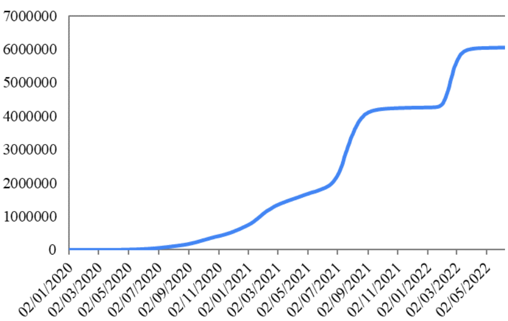
Table **3** shows the unit root test in a first difference form. It can be said that all variables used in this study are integrated of order one, I(1). Therefore, it conforms with the prerequisites of the ARDL models.

Table 1 presents the descriptive statistics of variables used in this study, while

Figure **1** shows all individual graphs for series trends. During the study, the largest depreciation of the rupiah was Rp16,622 per USD on April 3rd, 2020, which almost touched the weakest



Exchange Rate (Rp/USD)



Cumulative COVID-19 Cases (People)

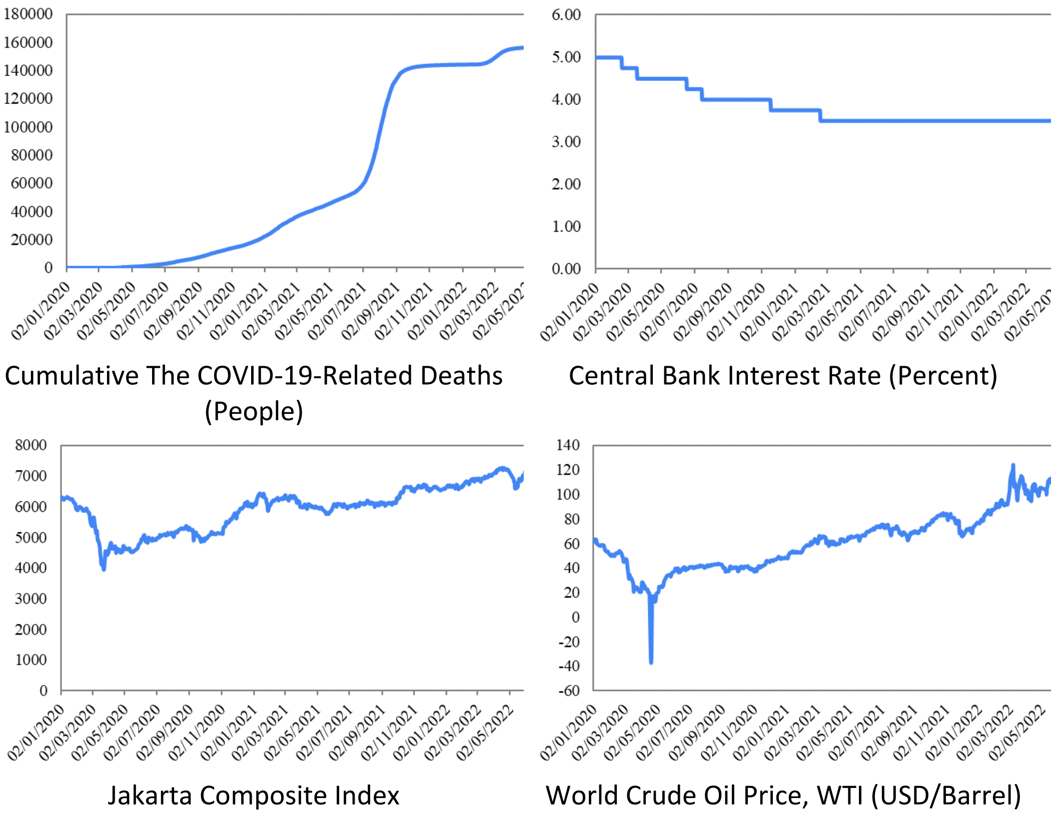


Figure 1 All Individual Graphs for Dataset Trends

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Table 1 Descriptive Statistics

Variables (unit)	Mean	Maximum	Minimum	Std. Dev.	Observations
ER (Rp/USD)	14427.92	16622.2	13213.24	445.459	599

COV19_CASE (people/day)	2220089	6086212	0	2165381	599
COV19_DEATH (people/day)	65514.17	156731	0	62769.63	599
JKSE (index)	5965.69	7276.19	3937.63	747.855	599
IR (percent)	3.84	5.0	3.5	0.469	599
WTI (USD/barrel)	62.99	123.7	-37.63	24.790	599

Table 2 Result of Unit Test in Level

Variables	Augmented Dickey-Fuller		Phillips-Perron	
	Constant	**Constant and Trend**	**Constant**	**Constant and Trend**
ln (*ER*)	-2.5548	-2.5648	-3.2517	-3.2628
	(0.1032)	(0.2968)	(0.0177)**	(0.0736)*
COV19_CASEGROWTH	-2.5893	-3.5477	-3.0152	-3.56425
	(0.0958)*	(0.0354)**	(0.0341)**	(0.0338)**
COV19_DEATHGROWTH	-3.9309	-5.0160	-3.3945	-3.8485
	(0.0020)***	(0.0002)***	(0.0115)**	(0.0148)**
ln (*JKSE*)	-0.9211	-3.2391	-1.1165	-3.3493
	(0.7815)	(0.0779)*	(0.7109)	(0.0595)*
IR	-2.8090	-1.5711	-2.9158	-1.5097
	(0.0576)*	(0.8034)	(0.0441)**	(0.8256)
WTI	-0.3774	-3.8300	-0.4066	-4.0934
	(0.9102)	(0.0156)**	(0.9054)	(0.0068)**

Notes:
The P-value is in parentheses.
*, **, and ***, shows a level of significance of 10%, 5%, and 1% respectively.
H_0: Variable has a unit root.

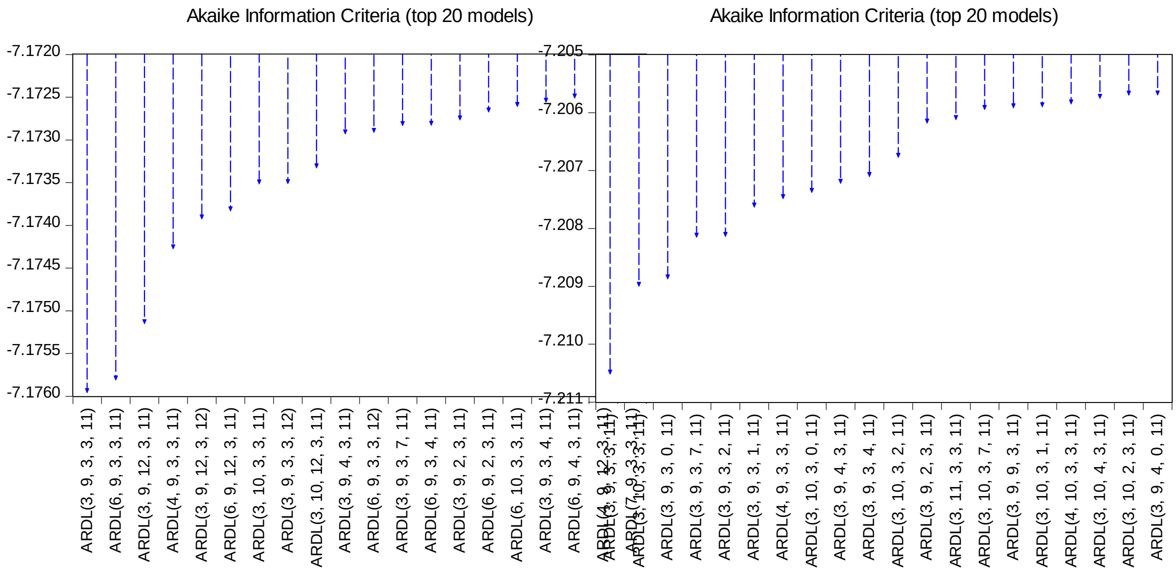
The next step is determining the appropriate lag length using the Akaike information criterion (AIC).

Figure **2** shows the recursive search of the lag length. The result reveals that the model with the lowest AIC is ARDL(3, 9, 3, 3, 11) for Model 1 and Model 2 as the most appropriate model.

Table 3 Result of Unit Test in First Difference

Variables	Augmented Dickey-Fuller		Phillips-Perron	
	Constant	**Constant and Trend**	**Constant**	**Constant and Trend**
Δln(*ER*)	-31.8852	-31.8585	-31.0859	-31.0626
	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***
Δ*COV19_CASEGROWTH*	-7.1030	-7.1081	-21.5189	-21.5075
	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***
Δ*COV19_DEATHGROWTH*	-5.1832	-5.1842	-23.4769	-23.4649
	(0.0000)***	(0.0001)***	(0.0000)***	(0.0000)***
Δln(*JKSE*)	-12.2460	-12.2927	-23.9573	-23.9728
	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***
ΔIR	-24.6415	-24.8512	-24.6462	-24.9165
	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***
Δ*WTI*	-22.6102	-22.6751	-37.4977	-38.3472
	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***

Notes:
The P-value is in parentheses.
*, **, and ***, shows a level of significance of 10%, 5%, and 1% respectively.
H_0: Variable has a unit root.



Model 1: ARDL(3, 9, 3, 3, 11) Model 2: ARDL(3, 9, 3, 3, 11)

Figure 2 Lag Length Selection Summary

Table 4 Bounds Test Results

F-Statistic	K	Level of Significant	Critical Bounds		Remarks
			Lower Bound I(0)	Upper Bound I(1)	
Model 1: ARDL(3, 9, 3, 3, 11)					
6.0801	4	10%	2.2000	3.0900	Cointegrated
		5%	2.5600	3.4900	Cointegrated
		1%	3.2900	4.3700	Cointegrated
Model 2: ARDL(3, 9, 3, 3, 11)					
4.4410	4	10%	2.2000	3.0900	Cointegrated
		5%	2.5600	3.4900	Cointegrated
		1%	3.2900	4.3700	Cointegrated

Note:
K denotes the number of independent variables.
H_0: No cointegration.

Table 4 presents the computed F statistic based on the bound test. It shows that the computed F statistic is more than both the lower bound and upper bound, even at the lowest significant level, so, the null hypothesis of no cointegration can be rejected. It can be concluded that there is a long-run cointegrating relationship among variables used in this study. These results justify the use of long-run estimates of the ARDL model.

Table 5 Estimated Long-Run Coefficients

Dependent Variable: ln (*ER*)	Model 1	Model 2
	ARDL(3, 9, 3, 3, 11)	ARDL(3, 9, 3, 3, 11)
COV19_CASEGROWTH	0.4282***	
	(0.0587)	
COV19_DEATHGROWTH		0.4866***
		(0.0838)
ln (*JKSE*)	-0.2164***	-0.1857***
	(0.0474)	(0.0561)
IR	-0.0306***	-0.0195**
	(0.0083)	(0.0093)
WTI	0.0010***	0.0010***
	(0.0002)	(0.0003)
Constant	11.4989***	11.1962***
	(0.4099)	(0.4877)
N	577	577
H_0: No serial correlation[1]	0.4337	0.7004

Note:
[1]Shows Prob. Chi-Square of Breusch-Godfrey Serial Correlation LM Test. *, **, and ***, shows a level of significance of 10%, 5%, and 1% respectively. The standard error is in brackets.

Table **5**, reports the result of long-run estimates measuring the effect of COVID-19 infection cases and related deaths, as well as other control variables on the rupiah exchange rate. Both Model 1 and Model 2 used ARDL(3, 9, 3, 3, 11). They are non-autocorrelation as Breusch-Godfrey serial correlation LM test resulting failed to reject the null hypothesis. The values of the long-run coefficients indicate that the growth of COVID-19 infection cases in Indonesia has a positif effect on the rupiah exchange rate. In logarithmic form, it can be interpreted that a 1 percent increase in the growth of COVID-19 infection cases causes a 0.43 percent increase (depreciation) in the rupiah exchange rate.

Similarly, a 1 percent increase in the growth of COVID-19-related deaths causes a 0.49 percent increase (depreciation) in the rupiah exchange rate. These results show that the increase in COVID-19 cases and related deaths are related to the depreciation in the rupiah exchange rate. The Rupiah exchange rate against the USD has weakened due to economic disruption caused by the COVID-19 pandemic. It confirms the existence of the disease outbreak channel and supports the findings of several studies conducted by Aquilante et al. (2022), Cardona-Arenas and Serna-Gómez (2020), and Sethi et al. (2021). The increase in the spread of COVID-19, which is broadcasted by the media, drives market sentiment to be negative, so through the efficient market hypothesis, the available information causes the rupiah to be depreciated.

The Jakarta stock index has a negative effect on the rupiah exchange rate. In logarithmic form, it can be interpreted that a 1 percent increase in the Jakarta stock index causes a 0.22 percent decrease (appreciation) in the rupiah exchange rate. Rising stock prices indicate that portfolio investment in Indonesia is profitable. It attracts foreign investors to put their funds into the Indonesian stock market. The purchase of Indonesian shares increases the demand for the rupiah, so its currency appreciates. Hoshikawa and Yoshimi (2021) found similar results, the decrease in foreign investors' holdings of domestic stocks, and indirectly leads to the depreciation of the South Korean won. The movement of stock prices will affect the foreign domestic stock ownership changes, thereby affecting the exchange rate. Another study by Prawoto and Putra (2020) found that an appreciation in the rupiah exchange rate can reduce the industry's comparative advantage, which then lowers the Jakarta stock index. The competitiveness of Indonesian products is non-independent of natural resources and processed using low technology (Suparmono et al., 2022). This low-value-added product is highly vulnerable to exchange rate fluctuations.

Central bank interest rates have a negative effect on the rupiah exchange rate. A 1 percent increase in the central bank interest rate causes a 3.06 percent decrease (appreciation) in the rupiah exchange rate. Raising interest rates has increased the demand for the rupiah and appreciated its exchange rate. This finding supports the study conducted by Arintoko and Kadarwati (2022) in the case of Indonesia, Fang and Zhang (2021) in the case of RMB China, and Garg and Prabheesh (2021) in a case of Brazil, Russia, India, China, and South Africa (BRICS countries) and also Pham (2019) in case of Vietnam. Bank Indonesia's 7-days (reverse) repo rate as a proxy of the central bank interest rate has the highest effect compared to other explanatory variables used in this study in maintaining the rupiah exchange rate. So, using monetary policy in dealing with exchange rate dynamics is still effective during the COVID-19 outbreak.

The remaining variable – world crude oil price is found to have a positive effect on the rupiah exchange rate. 1 USD increase in world crude oil price caused a 0.1 percent increase (depreciation) in the rupiah exchange rate. It indicates that Indonesia's dependence as a net importer of crude oil has consequences for the need to maintain foreign exchange reserves as a means of payment for imports. The increase in the price of crude oil increases the amount of foreign currency to be purchased, thus increasing the supply of the rupiah. This has contributed to the weakening of the rupiah exchange rate. This finding contradicts the study of Cardona-Arenas and Serna-Gómez (2020). It is because Cardona-Arenas and Serna-Gómez (2020) use the case of Colombia, which is a net exporter of crude oil, so when crude oil prices rise, it increases the demand for the Colombian peso currency, and its currency will appreciate.

Conclusion

We analyzed the effect of the number of COVID-19 cases and related deaths on the rupiah exchange rate using daily time series data over the period January 21st, 2020 – June 29th, 2022, we provide evidence indicating an increase in COVID-19 cases and related deaths depreciated rupiah exchange rate. This result indicates that the information available to market participants related to data on the spread of COVID-19 has exposed them to uncertainty. It then, through efficient market hypothesis, makes the price of rupiah currency depreciate. In addition, another important finding is that the effect of interest rates on the rupiah exchange rate shows a convincing magnitude. It indicates that interest rates are effective in maintaining the rupiah exchange rate.

Overall, we found that the disease outbreak channel exists in the case of exchange rate behavior. This result suggests that the government needs to suppress massive news related to data on the spread of COVID-19 in various media. Data on the spread of COVID-19 is openly available at WHO, so the public who wants to know this information can easily access it. The government should better encourage media channels to provide news that builds optimism, such as the government's real steps in controlling the spread of the virus and the progress of vaccination so that foreign investors are confident about Indonesia's economic prospects. Because the spread of COVID-19 has caused the depreciation of the exchange rate, actions to control and resolve a pandemic are essential, so exchange rate stabilization cannot be separated from resolving this pandemic. A low-interest rate imposed by the monetary authorities to encourage economic recovery can pressure the exchange rate. Therefore, the central bank's policy to lower interest rates to boost the domestic economy must also be accompanied by other instruments to stabilize the exchange rate, such as optimizing foreign exchange intervention instruments.

Moreover, we acknowledge this research's limitation that provides potential avenues for future research. In evaluating the effect of COVID-19 on the rupiah exchange rate, this study uses high-frequency data, that is, daily data. This results from the limited control variables (determinants of the rupiah exchange rate) available in daily data.

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