The Covid-19 Pandemic and Inflation in Indonesia

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Abstract*: The Indonesian government has implemented a social distance policy that aims to break the chain of the pandemic that has a large impact on the economy which causes an increase in unemployment, poverty, and the inflationary gap. This study aims to determine what factors affect inflation in Indonesia from the beginning of the time Covid-19 pandemic. The data used is secondary data that has been collected and processed from January 2019 to December 2020. The analysis method used is the Error Correction Model method. The results showed that the level of credit distribution and the exchange rate had a positive effect on the inflation rate in Indonesia both in the short-run and in the long run. Furthermore, exports and the Covid-19 had a negative and significant effect on the inflation rate in Indonesia in the short and long term.*

Keywords*: Inflation, Credit Distribution Rate, Export, Exchange Rate, Covid-19;*

JEL Classification*: E30, E31, A10*

1. Introduction

In early 2020, there was an event that shook the economy globally, namely the outbreak of the COVID-19 Virus, which began at the end of 2019. This outbreak started in China and in a short time, the disease spread to all parts of the world until WHO determined it. As a pandemic on March 12, 2020 (WHO, 2020).

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The COVID-19 virus outbreak has resulted in more than 27 million confirmed cases and more than 890,000 deaths worldwide (WHO, 2020). This virus has caused a contraction in the world economy and has had an impact on all economic sectors. Each country enforces various policies to prevent the spread of the pandemic by limiting social activities in society. As a result of restrictions on society activities and closing national borders in various countries, economic transactions have also been disrupted.

The Indonesian government decided to implement a large-scale social restriction or called PSBB policy that aims to break the chain of transmission. The implementation of this policy has a considerable influence on the Indonesian economy. Many companies have terminated their employees as a step to stabilize the condition of the company and traders are unable to maintain their business because many traditional and modern markets had to close their businesses starting from mid-March 2020. Hence, one of the changes caused by the outbreak of the COVID-19 virus is the decline in people's purchasing power. The implementation of the large-scale social restriction (PSBB) policy causes the society to reduce their economic activities, by reducing the cost of living and increasing savings. As a result, people's purchasing power has decreased. The decline in purchasing power has a major impact on the wheels of the economy, where the economy begins to sluggish. With so many disrupted economic activities resulting in a decrease in economic productivity. Large companies have been forced to impose layoff policies because of the difficulty of supporting their operational costs. This condition becomes a cycle that continues to rotate. So Inflation is an approaching dilemma in the economy of every country, especially for developing countries in the world. A value that is too high signifies scarcity, too low indicates a weak economy (Aghisna, 2013).

Figure 1. Inflation Rate and Cases of Covid-19
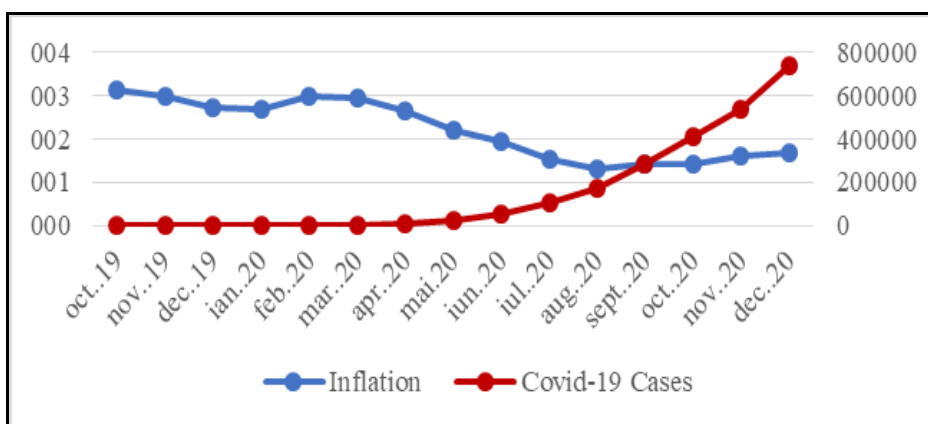
Source: Bank Indonesia, Worldometer

From the figure above, we can see that the higher the rate of confirmed cases of COVID-19, the lower the inflation rate in Indonesia. This indicates that when the number of confirmed COVID-19 cases increases, the government will implement a policy to control the spread of COVID-19, which turns out to have an impact on inflation. The trend shown in the chart above is a downward trend.

In written by Saubani (2020) the Head of the Central Statistics Agency (BPS) Suhartoyo said that the annual inflation (year-on-year / YoY) in July 2020 against July 2019 was recorded at only 1.54 percent. This figure was recorded to be the lowest in the last 20 years. According to Suhartoyo, the COVID-19 pandemic had a huge impact on the amount of inflation in 2020. In January 2020, the calendar year inflation was 0.39 percent, or still within normal figures. However, the inflation rate began to decline slowly starting February 2020 due to the COVID-19 virus outbreak, which continued to spread and was declared to have entered Indonesia in early March 2020.

Previous research (Cargill and Parker, 2004) found deflation in China caused by supply that decreased rivalry and productivity, while deflation in Japan was caused by a demand for tight monetary policy. Djambak (2008) showed money supply or M2, depreciation of the rupiah, an expectation of inflation, income per capita, and deficit of APBN have a significant effect on the development inflation. Yilmazkuday (2011) found that inflation is measured by a movement towards the exchange rate and the expectation of inflation itself. Lin and Wu (2012) show exchange rate pass-through (ERPT) increasing when deflation. Langi et al. (2014) found that BI rates and exchange rate are positively significant related to inflation, while money supply is negatively insignificant. Because of that, inflation becomes an important thing is seeing the rate of controlled and planned economic growth, so this research is needed to be related to what affects the inflation rate in Indonesia in the lead-up to the Covid-19 pandemic and how it affects it.

2. Literature Review

According to Lipsey's general equilibrium theory, inflation is when the general prices of goods and services increase continuously. The price increase occurs because of an imbalance between aggregate demand and aggregate supply. According to the General Equilibrium Theory, if the level of aggregate demand is greater than the level of aggregate supply, the price will rise. Because the general price is a combination of all commodity prices of all commodities traded in the market, the event of an increase in these prices is inflation (Lipsey, 1981).

Quantity theory is known as the model of the monetarists (Fisher) which explains that inflation is caused by an increase in the money supply regardless of other factors (Mishkin, 1997). The conclusions of this theory are: Inflation will only occur when there is an increase in the money supply in the community. If the amount of money in circulation increases, the

inflation rate will also be higher. And Inflation will also occur when people think there will be price hikes in the future. When people think there will be an increase in prices, what they will do is spend the money, so that demand will increase and cause inflation.

According to Keynes's theory, inflation occurs when people want to live beyond their economic capacity, marked by a public demand for goods that exceeds the amount of supply available or the amount of supply, this causes an inflationary gap. The inflationary gap incident occurred because the community succeeded in turning their wishes for effective requests for the goods they asked for. For example, people get funds obtained from loans, credit from banks, or wages that exceed productivity. This model is more often used to explain the phenomenon of inflation in the short run.

According to structuralist theory, inflation is caused by pressure on the economic structure of a developing country. Inflation occurs due to economic turmoil from within the country. For example, crop failure due to external factors such as unexpected seasonal changes, natural disasters, and so on. Or something related to foreign relations, for example worsening foreign debt and foreign exchange rates. These things can cause price fluctuations in the domestic market. Structural events that occur due to inequality or structural constraints in the economy in developing countries can be called structural bottlenecks, which consist of inelasticity of supply from the agricultural sector (food) and the inelasticity of export revenues. Therefore, it is necessary to assess factors that affect inflation which is one of the indicators of community planning in production or investment activities. Based on this, the problem of this study is What factors affect the Level of Inflation in Indonesia in the run-up to the time of the Covid-19 pandemic and how did it affect it?

3. Research Methodology

During the preparation of this study, the data used were the inflation rate in Indonesia as a dependent variable and the level of credit distribution, interest rates, exports, exchange rates, and the COVID-19 dummy as independent variables. These data were obtained from the website of Bank Indonesia (BI), the Financial Services Authority usually abbreviated as OJK, the Central Statistics Agency it's usually called BPS, Investing, and Indonesian Banking Statistics for the period 2019 - 2020 (monthly).

In this study, the data analysis methods used are quantitative and descriptive using the Error Correction Model analysis which was introduced by Engle and Granger (1987). The use of this technique aims to explain the influence of the independent variable on the dependent variable in the short and long term to find out if the empirical model is consistent with economic theory, ECM as a dynamic model to find solutions for non-stationary time series data.

1. Short Term Equation

ΔInflation

$$= \beta_0 + \beta_1 \Delta LN\_KREDIT_t + \beta_2 \Delta LN\_EKSPOR_t + \beta_3 \Delta LN\_EXCHANGE\_RATE_t + \beta_4 \Delta DCOV_t + \beta_5 ECT + e_t \tag{1}$$

2. Long Term Equation

Inflation

$$= \beta_0 + \beta_1 LN\_KREDIT_t + \beta_2 LN\_EKSPOR_t + \beta_3 LN\_EXCHANGE\_RATE_t + \beta_4 DCOV_t + \beta_5 ECT + e_t \tag{2}$$

The Inflation rate is dependent variables and Δ and t its meaning about Short Term Equation, that measured by independent variables that are Credit Distribution Rate (LN_CREDIT), export (LN_EXPORT), the exchange rate that USD/Rupiah (LN_EXCHANGE_RATE), also dummy variable of Covid-19where the value 0 is the period before the Covid-19 pandemic and the value is 1 in the period after the Covid-19 pandemic (DCOV). While β0 is the constant of the regression, β1 is the Coefficient, e is an error term.

4. Results

Figure 2 shows a downward trend between inflation and the level of credit distribution. At the beginning of 2020, inflation experienced a slight increase but remained stable until March 2020, this increase was contributed by a partial increase in prices on the index of spending groups, especially food, beverage, and tobacco commodities. However, in April, inflation began to decline and continued a slowing trend in the following month, this was due to the entry of the COVID-19 virus in Indonesia in March 2020 which caused a decline in demand for goods and services in the community due to the large-scale social restrictions (PSBB) also decreased household purchasing power. As well as being driven by the abundance of food commodity supplies with limited demand. Similar to inflation, bank lending also increased from January 2020 to March 2020. However, in April 2020, credit disbursed experienced a slowdown, this was due to the slowing growth in demand for credit originating from all types of credit, with the largest decrease in consumption credit. The decline in credit distribution was also caused by the increasingly selective banking system in channeling credit due to the increased risk of loan arrears resulting from a decline in people's purchasing power due to a reduction in social activities.

At the beginning of the 2020 period, inflation was under control until it began to decline from April 2020 and continued in the following months due to the entry of the COVID-19 virus into Indonesia which caused a reduction in various social activities which resulted

in decreased economic activity. Likewise, exports were in a controlled or stable state in the initial period in this study. However, in April 2020 there was a decline in exports of 13.11% which was caused by a decrease in oil and gas exports by 6.55% and non-oil and gas exports by 13.66%. According to the Central Statistics Agency (BPS), specifically for crude oil and gas (oil and gas) in April 2020, there were no crude oil export activities. This decline continues until May 2020.

Figure 2. Between Inflation Rate and Credit Distribution during Covid-19
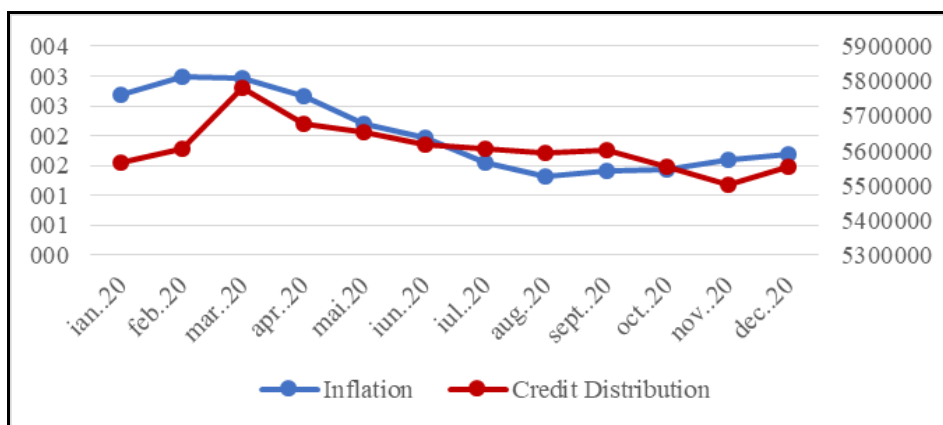
Source: Bank Indonesia, Worldometer

June 2020, inflation continued to decline from the previous month. This is due to the limitation of social activities to reduce the chain of transmission of the COVID-19 virus which has an impact on decreasing economic activity and people's purchasing power. Meanwhile, in terms of export, there was an increase of 15.73 percent in non-oil and 3.80% in oil and gas exports of oil products. The increase in oil and gas exports was caused by an increase in exports of oil products by 47.21% and exports to crude oil by 201.55%.

Based on research from Burhanuddin and Muhammad (2020), they look at the impact of corona on the economy globally it affects three sectors, namely the market shares, debentures, and Gold Value. Besides, domestically also affected. Because most of the transactions Indonesia's exports come from the country China. In July 2020, amidst the global economic slowdown, Indonesia's export performance showed an increase. According to the Minister of Trade, Indonesia recorded a trade balance surplus. This is due to the decline in imports, the decline in imports was triggered by the strengthening of the domestic value chain in which economic actors optimize the availability of domestic products.

The increase in exports was also due to an improvement in the non-oil and gas trade balance with major trading partners such as the United States, Japan, and Singapore. Meanwhile, on the inflation side, it continues to decline, according to the Head of BPS Suhariyanto, the cause of low inflation in July 2020 is due to the decline in people's purchasing power, reduced demand due to insufficient purchasing power, and the number of companies issuing automatic termination of employment (PHK) policies which also disrupt the supply side.

The experience of inflation has also occurred in Uganda from 2009 to 2011 as written by Albuka (2019) with inflation shocks up to double digits even to affect some countries around it. The central bank took the pace of tightening and lowered it gradually in three months.

In September 2020 inflation in Indonesia increased from August but remained lower than in July, this increase was contributed by the expenditure group, namely the education, personal care, and routine household care equipment groups. Similar to inflation, exports in September 2020 increased by 6.97% from the previous month, this was due to an increase in non-oil and gas exports by 6.47%.

Figure 3. Relation between Inflation Rate and Exchange Rate during Covid-19
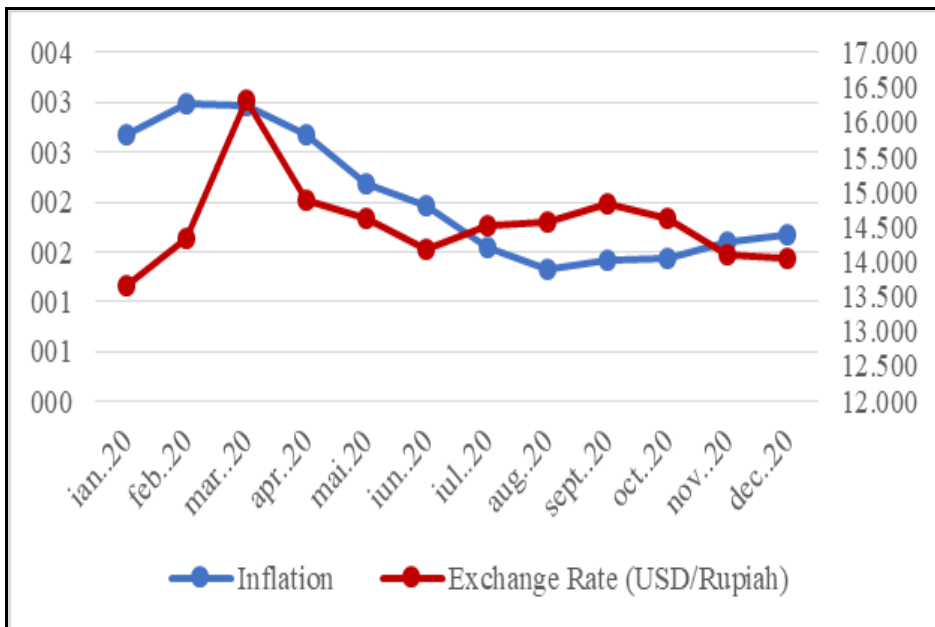
Source: Otoritas Jasa Keuangan, Worldometer.

Figure 3 shows the trend of the negative relationship between inflation and the exchange rate. In February 2020, there was an increase in inflation of 0.28% from the previous month. The groups that contributed the most to inflation were the food, beverage, and tobacco group. The exchange rates also depreciated in February 2020 due to global market concerns about the impact of the COVID-19 virus. This is because the global economy is affected by the COVID-19 virus which continues to spread throughout the country.

March 2020, when the COVID-19 virus began to enter Indonesia, inflation was still quite under control from the previous month, which was at 2.96%. Meanwhile, the Rupiah exchange rate depreciated against the US Dollar by 12.86%. This time, the trading level is the lowest level in 22 years and the rupiah's worst daily performance since August 2013. Head of Research and Education at Monex Investindo Futures, Ariston Tjendra, said that market concerns are still high about the prospect of an economic slowdown amid the spread of the Coronavirus. As long as the spread continues to increase and the lockdown continues, economic activity will be disrupted and slowed down.

April 2020, the Rupiah appreciated again by 0.39 percent. Rupiah strengthened sharply against the US dollar due to improving sentiment from market players after hearing the news that there was an effective drug that could treat the Covid-19 virus in the US. It's the same with research of Aghisna (2013) which showed that exchange rates have a positive and significant effect on inflation in Indonesia. Positive sentiment on rupiah performance was supported by the stimulus policy of Bank Indonesia with triple intervention, namely intervention in the Domestic Non-Delivery Forward (DNDF) markets, intervention on the spot market, and the Government Securities (SBN) market.

The rupiah continued to appreciate until June 2020, while inflation continued to decline from March to August 2020. This was due to the decreasing purchasing power of the public since the start of restrictions on social activities in the form of the PSBB policy which weakened economic activity and led to deflation.

From September 2020 to November 2020, inflation began to increase in line with the increasing trend of food commodity prices, especially chicken meat, chicken eggs, red chilies, and shallots. The increase in inflation was also influenced by disruptions on the supply side. One of the reasons is the implementation of the Ministry of Defense's policy which requires breeding companies to reduce the production of broiler chickens by delaying the hatching of eggs. Likewise, the Rupiah exchange rate has begun to appreciate due to the start of the new provisions issued by the DKI Jakarta Provincial Government, namely the start of allowing several indoor activities such as theaters, cinemas, marriage contracts, and other activities.

Figure 4. Relation between inflation and cases of Covid-19
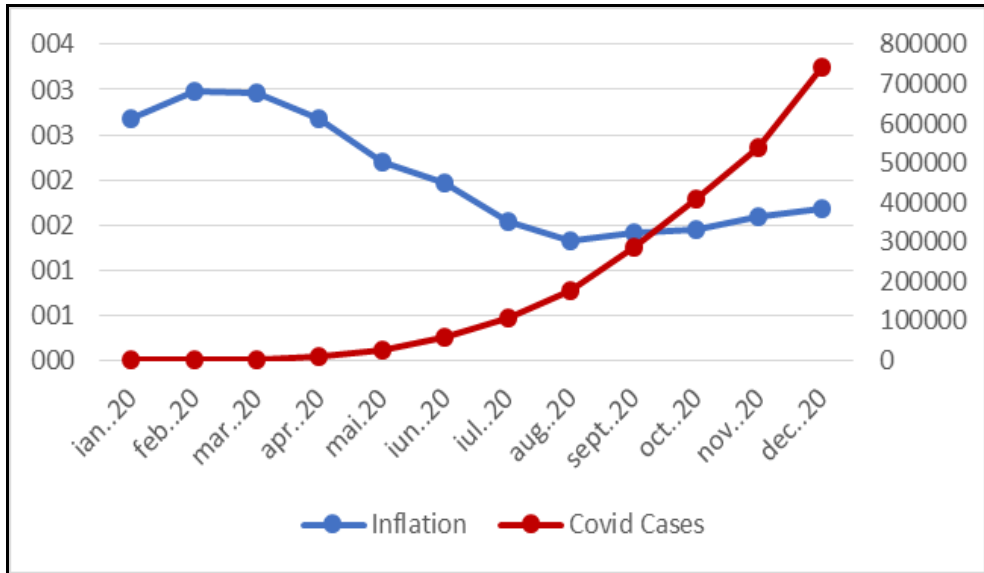
Source: Bank Indonesia, Worldometer.

Based on Figure 4, during this research period, it can be concluded that the relationship between inflation and Covid-19 is negative. Since the COVID-19 case was recorded for the first time in Indonesia, inflation has started to decline. President Joko Widodo announced the discovery of positive cases of COVID-19 for the first time in Indonesia on March 2, 2020, as many as 2 people were confirmed. The number of Covid-19 cases also spread so quickly to various regions in Indonesia that the government finally set a PSBB (Large-Scale Social Restriction) policy in April 2020 to reduce the Covid-19 transmission chain. This policy had an impact on various economic activities, which caused the economy to become sluggish. It can be seen from the graph above that the number of Covid-19 cases continues to increase, followed by inflation which began to decline from April 2020 to August 2020.

In September 2020, the number of confirmed cases of Covid-19 continued to increase, reaching over 3000 cases per day. DKI Jakarta is the largest provider of Covid-19 cases, followed by East Java. The cause of the continued increase in the spread of Covid-19 is that the community has not maximally implemented health protocols. Inflation in September 2020 was still in a low position but had increased until November 2020. This was due to the slow increase in people's purchasing power. The increase in prices is also driven by the rainy

season because the distribution of goods from producers to consumers will be hampered by the weather as well as high waves and rainfall.

Table 1. Results Unit Root Test

ADF stat	Level		1st Difference		2nd Difference	
	T-stat	Prob.	T-stat	Prob.	T-stat	Prob
Inflation	-1.157077	0.6736	-2.69609	0.0906	-4.54807	0.0019
ln_credit	-2.697206	0.0897	-4.38499	0.0027	-8.58129	0.0000
ln_export	-3.496806	0.0176	-7.89016	0.0000	-5.44369	0.0003
ln_exchangerate	-3.029184	0.047	-5.08803	0.0005	-7.08803	0.0000
ln_dcov	-0.795052	0.8017	-4.69042	0.0013	-7.54983	0.0000

Source: Authors' calculations, 2021

From the results of the Unit Root Test that all variables are not stationary at the same level because there are variables that have a probability of more than alpha = 5% (not significant). Then proceed with a higher level test, namely the test of the first difference level. However, at the first difference level, there is still one variable that is not stationary, namely the inflation variable. Then continued testing at a higher level, namely the second difference test. In the second difference, all variables are stationary at alpha = 5% or prob < 5%, which means that all variables are stationary at the second difference.

Table 2. Results cointegration test

Hypothesized			0.05	
Hypothesized No. of CE(s)	Eigenvalue	TraceStatistic	CriticalValue	Prob.**
None *	0.822647	73.04130	69.81889	0.0270
At most 1	0.514301	34.98986	47.85613	0.4485
At most 2	0.440863	19.10220	29.79707	0.4856
At most 3	0.205157	6.312282	15.49471	0.6586
At most 4	0.055700	1.260858	3.841466	0.2615

Source: Authors' calculations, 2021

Cointegration test results from Johansen obtained statistical trace value = 73.04 > critical value = 5% = 69.81 with probability = 0.000 < = 0.05 then Ho is rejected, which means data from all variables have a long-term relationship (cointegrated).

Table 3. Results of Short-Term Inflation Estimation Analysis

Independent Variables (Constanta = -0,055487)	Coefficient	Mean Inflation	Elasticity	Meanof Independent Variables	Slope	Inflation Estimate	Contribution to Inflation
ln_credit	8.508893	2.57	3.07016381	15.52738	0.508155	3.891208	33.44%
ln_export	-0.11009	2.57	-0.04283541	9.521924	-0.01156	2.559688	21.99%
ln_exchange rate	0.832871	2.57	0.32407432	9.56976	0.087032	2.637937	22.67%
ln_dcov	-0.46061	2.57	-0.17922451	4.728008	-0.09742	2.54889	21.90%
Total	8.152498	10.28	3.17217821	39.34707	0.486205	11.63772	100%
Average	2.038125	2.57	0.79304455	9.836768	0.121551	2.909431	25%

Source: Authors' calculations, 2021

The results of the short-term inflation estimation can be explained as follows:

$$\Delta \text{INFLASI} = -0.055487 + 8.508893 \, \Delta \text{LNKREDIT} - 0.108293 \, \Delta \text{LN\_EKSPOR}$$

$(0.005812)^{***}(0.657348)^{***}(0.52339)^{***}$

$+ 0.0709918 \, \Delta \text{LN\_EXCHANGE\_RATE} \, 0.0446492 \Delta \text{DCOV} - 0.418071 \, \text{ECT}$

$(0.25584)^{***}(0.039333)^{***}(0.019639)^{***}$ (3)

The rate of change in inflation has a downward trend of -0.055487. This means that, if all independent variables (Credit Distribution Rate, Exchange Rate, Exports, and Number of COVID-19 Cases) have a value of 0 or do not change, then inflation will be negative or decrease. For each independent variable, the average result of credit distribution of this research period was IDR 5.6 billion, an average export of 13.7 billion, an average exchange rate of IDR 14333.4 and the number of confirmed cases was 98197 cases. Based on the regression results, the average elasticity value of all independent variables on the dependent variable is 0.793 (<1) which means that all variables are inelastic to inflation. When viewed from the elasticity value of each variable, it is found that:

1. If the credit elasticity is 3.07, then inflation will change by 3.07 percent.
2. If the export elasticity is -0.04, the inflation will change by -0.04 percent.
3. If the exchange rate elasticity is 0.32 then inflation will change by 0.32 percent.
4. If the elasticity of the Covid-19 dummy is -0.18, inflation will change by -0.18 percent.

From the results of the analysis of the elasticity of the short-term ECM model, it is concluded that there is one elastic variable, namely the variable level of credit distribution because it

has an elasticity value of 3.14> 1. The slope is a value that shows how much contribution an independent variable has to the dependent variable.

The regression coefficient analysis is carried out to show the rate of increase or decrease in the dependent variable based on the independent variable. From the calculation results of the short-term ECM model data analysis, the total coefficient impact on inflation is 2.450, which means that the independent variable has a positive effect on the dependent variable as a whole.

The Rw-square coefficient is 0.36, which means that all variations of the independent variables can explain the variation in the rate of change in inflation by 36 percent, and the remaining 64 percent is influenced by changes in other variables outside the model. The prob values. Rn-square statistic = 0.000 <α = 0.05, then H0 that Credit Distribution Rate, export, the exchange rate that USD/Rupiah, also dummy variable of Covid-19 has no effect on inflations rejected, which means that all independent variables significantly influence changes in inflation.

5. Conclusions

This research becomes something important because it discusses the purchasing power of people that are part of a nation's fundamentals of the measurement of inflation with credit distribution, exchange rate, Exports, and Covid-19 In the lead-up to and during the pandemic Covid-19.This research concluded that both in the short term and long term, credit distribution and the exchange rate have a positive and significant effect on inflation in Indonesia. In the short and long term, Exports and Covid-19 have a negative effect on inflation in Indonesia. There was an economic contraction that caused many companies to impose layoffs and a decrease in income per capita. So, this Covid-19 pandemic could probably reduce economic activity due to social restrictions, which has an impact on people's purchasing power.

Therefore, the government is expected to focus on controlling inflation in Indonesia during the pandemic through increased demand in the community with policies of restructuring credit and interest subsidies and strengthening SMEs. The hope is that further research can be done with a long time and using other methods.

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