

The Effect of the Consumer Price Index on Inflation in Indonesia during the Pandemic

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Abstract:- Indonesia as a developing country needs to maintain the stability of its economic growth. The price level is one of the stability factors in economic growth. The purpose of this study was to determine the effect of the Consumer Price Index on inflation in Indonesia during the pandemic. This study uses a simple linear regression analysis technique. The data used are Consumer Price Index (CPI) data and inflation data for 2016-2020 obtained from Statistics Indonesia. The results showed that the CPI had no significant effect on inflation in Indonesia. The value of R Square which shows the magnitude of the influence between CPI and inflation is 2.3%, the remaining 97.7% is influenced by other variables that are not included in this research model. The significance of the regression value can be seen from the results of t-count. The t-count value is $1.18 > 0.05$. In addition, the P-value of the CPI is $0.24 > 0.05$. So the researcher concludes that the CPI has a negative and insignificant effect on inflation in Indonesia.

Keywords:- Consumer Price Index, Inflation, Simple Linear Regression.

I. INTRODUCTION

The level of a country's economy can be seen from how big its economic growth is. If the economic growth is good and in a positive direction, it can be said that the country's economy is good. Inflation is one indicator of macroeconomics in measuring the stability of a country's economy. Indonesia, as a developing country, has its own challenges in maintaining the stability of its economic growth. Therefore, maintaining a balance to maintain economic growth is very necessary.

Changes in people's lifestyles, including in terms of consumption, result in an increase in consumption of goods and services which causes an increase in the price of goods and services continuously within a certain period of time and can affect daily life. Changes in commodity prices are described by one of the important indicators in the economy, namely the Consumer Price Index (CPI). It can be said that the CPI is closely related to inflation, because an increase in the CPI is inflation, while a decrease in the CPI is a deflation. So that the rate of inflation can be seen from changes in the CPI.

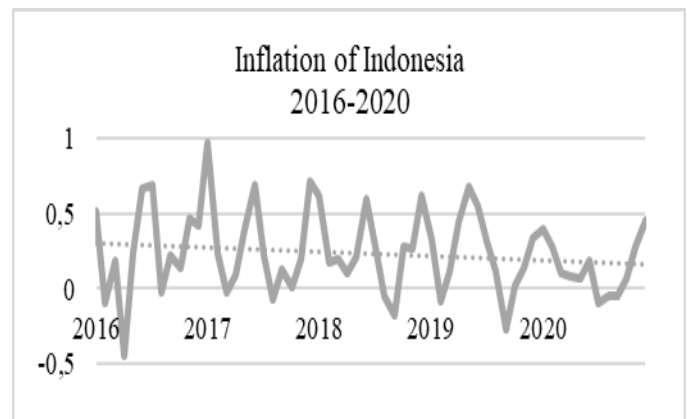


Fig. 1: Inflation of Indonesia 2016-2020

In the history of the economy in Indonesia, inflation that occurred in 1998 had a fairly large impact on the economy in Indonesia (Maggi, 2013). Figure 1 above shows that for 5 years inflation in Indonesia has fluctuated. The highest inflation occurred in January 2017, while the lowest occurred in April 2016. However, if you look at the trendline, during those 5 years, the inflation rate continued to decline.

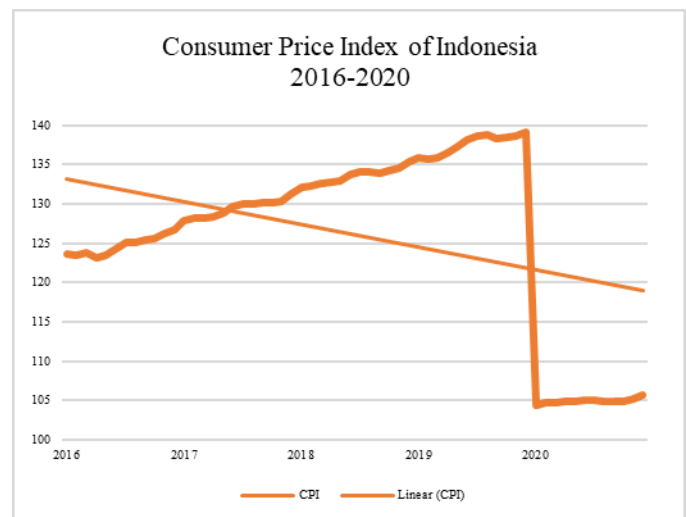


Fig. 2: Consumer Price Index of Indonesia 2016-2020

Figure 2 shows CPI data for 2016-2020. The CPI continued to increase until finally in January 2020 it experienced a sharp decline at 104.33. The trend line also shows a decline. However, the CPI began to creep up towards 105.68 in December 2020. From the two graphs, researchers are interested in researching the effect of the CPI on inflation in Indonesia, given the importance of inflation in the economic growth of a country, including in Indonesia.

According to Kristinae (2018), CPI has a significant influence on inflation. Meanwhile, according to Wulandari & Habra (2020) CPI has a negative and insignificant effect on inflation. Then it was found that the negative correlation between inflation and economic growth in Indonesia in 1968-2012 was 4.3% (Lubis, 2014). Meanwhile, according to Akter & Smith (2021) in Malaysia, there is a negative relationship between GDP growth and inflation in the short term but there is a positive correlation in the long term. Based on previous research, the purpose of this study was to determine the effect of CPI on inflation in Indonesia during the pandemic.

II. LITERATURE REVIEW

According to Ramakrishnan & Vamvakidis (2002), Consumer Price Index (CPI) which is published every month is the most widely used price index in Indonesia. Governments and central banks use the CPI for budgetary and monetary policy purposes. These are published in a timely and well-reached manner by the public. The consumer price index is a statistical estimate built using the prices of representative samples of goods that are collected periodically (K. A. Muhammed, F. A. Bolarinwa, 2019). Based on the Classification of Individual Consumption by Purpose (COICOP), the Consumer Price Index (CPI) is divided into seven categories as follows: (1) Foodstuffs; (2) Processed foods, beverages, and tobacco; (3) Housing; (4) Clothing; (5) Health; (6) Education and sports; (7) Transportation and Communication (*Inflasi*, n.d.).

Inflation is the general increase in the prices of goods and services over a certain period. According to Sukirno (2002) inflation occurs when there is an increase in prices prevailing in the economy. The increase in the price of goods and services in an area will greatly affect the economic conditions of the local community (Lesnussa et al., 2018). An increase in the cost of goods and services will increase inflation. As a result, it will reduce the value of money (Yuniarti et al., 2021). According to Statistics Indonesia, the inflation rate is the contribution of goods affected by price fluctuations to inflation or deflation that occurs at the city or country level. The monthly degree of change (inflation/deflation) in the index value is the contribution of the total types of goods/services affected by price fluctuations in that month. The temporary inflation component is part of the inflation rate caused by infrequent disturbances in the inflation rate. There are factors that cause temporary turmoil, namely an increase in production and distribution costs, and non-economic factors such as natural disasters, epidemics and others (Atmadja, 1999).

Inflation in Indonesia cannot be considered only as a short-term phenomenon, but this problem is a long-term phenomenon because the cause of inflation is not only caused by the monetary policy carried out by the government, but also structural obstacles that have not been completely overcome in the economy in Indonesia (Kristinae, 2018). Then the COVID-19 pandemic has changed the inflation trend in Indonesia. The trend of inflation in Indonesia is slowing, even leading to deflation (Thomas, n.d.). Supported by a statement from BBC News that Indonesia has officially

experienced a recession due to the Covid-19 pandemic, then the third quarter's economy recorded a minus compared to the same period in 2019. According to Fahrika & Roy (2020), economic growth declined in early 2020 to 2.97%. This is due to the handling of COVID-19 which has an impact on almost all aspects of life to the community's economy. The level of community mobility also affects the regional inflation rate in Indonesia (Pratama et al., 2021). According to research conducted by Santosa (2017), the money supply and national income have an effect on inflation, while government spending has no effect on inflation. Therefore, monetary policy by managing the money supply is very helpful in controlling inflation in Indonesia. Inflation is divided into several types as follows (Nanga, 2001):

- Moderate Inflation

It is said that inflation is moderate if there is an increase in the rate of inflation slowly over a relatively long time.

- Galloping Inflation

It is said to be moderate inflation if there is a fairly large price increase, which usually reaches double digits or even triple digits, and runs in a relatively short time and is accelerated. This has a more severe impact on the economy, when compared to creeping inflation.

- Hyper Inflation

Hyper inflation is inflation at the most severe level. It is said to be hyper inflation when there is a price increase of up to five times or more. When this happens, people prefer to exchange their money for goods rather than keep it because the value of the currency will decline sharply.

There are several previous studies that support this research. According to research conducted by Kristinae (2018) there are two independent variables, namely the City of Palangka Raya and Sampit. Then one dependent variable is inflation. This study uses secondary data from the website of the Central Statistics Agency. The data analysis technique used is multiple linear regression by performing the F test, T test, and classical assumption test. The results showed that the CPI in Palangka Raya and Sampit had a significant effect on inflation in Central Kalimantan. CPI's contribution to inflation in Sampit was 79%, while in Palangka Raya it was 50%. Research conducted by Wulandari and Habra (2020) uses secondary data from the website of the Central Statistics Agency in Medan City with CPI as the independent variable and inflation as the dependent variable, using Eviews 10 as an analytical tool with Linearity Test, Normality Test and Hypothesis Testing. The results of this study indicate that the CPI has a negative and insignificant effect on inflation in Medan City.

Lubis (2014) found a negative correlation between inflation and economic growth in Indonesia in 1968-2012 of 4.3%. There is a significant long-term and short-term relationship between inflation and economic growth in Indonesia in 1968-2012. The advice given in this research is that the government should avoid inflation that is too high so that the prices of goods and services or inflation that can be controlled can have a positive effect on economic growth in Indonesia. Then another study found a strong correlation between the real value and the estimated value with a coefficient of determination of 0.98 and another conclusion

which states that there is no strong variation compared to the real data (Cogoljević et al., 2018). This study uses multiple regression analysis to determine the effect of CPI, monetary aggregates, discount rate, the exchange rate on inflation. CPI is used to describe inflation in the European Union based on the World Bank Dataset. Vinayagathan (2013) states in his research that inflation interferes with economic growth when it exceeds 5.43%, but will have no effect if it is below that figure. The purpose of this study is to investigate the existence of a threshold level of inflation and how inflation can affect Asian economic growth. The researcher used the dynamic panel data regression method. To observe the non-linear relationship between inflation and economic growth in 32 countries in Asia during the period 1980–2009. Based on previous research, the researchers made the following hypothesis:

- H0: The consumer price index has a significant effect on inflation in Indonesia.
- H1: The consumer price index has no significant effect on inflation in Indonesia.

A hypothesis is an assumption that is not known to be true or false. The hypothesis needs to be tested to find out whether the hypothesis is accepted or rejected by conducting a significant test. By doing a significant test, it can be seen whether the two variables have a significant effect or vice versa.



Fig 3: Research Model

III. METHODOLOGY

This research is a type of quantitative descriptive research, which aims to provide an overview of the composition and characteristics of the object under study using data containing numbers. The data used in this research is secondary data taken from Statistics Indonesia which is accessed through www.bps.go.id. These data are CPI data and inflation for the 2016-2020 period in Indonesia. The analytical tool used in this research is a simple linear regression with the help of data analysis tools in Microsoft Excel.

The Regression method is a measurement method based on the relationship between one or many other variables. This method can also be used to assess the strength of the relationship between variables and forecasts in the future. This method is one of the most useful tools for a business analyst because it can be applied in many situations. Regression analysis can be applied to part data and time-series data.

In simple regression analysis, there is a linear relationship between variables. This means that changes that occur in variable X will be followed by changes in variable Y permanently. The purpose of simple regression analysis is to determine the relationship between the independent variable and the dependent variable. Then the data used in simple

regression usually have intervals. Here's a simple linear regression formula (C. Albright & W. L. Winston, 2013) :

$$Y = a + bX$$

Where,
 Y = Consumer Price Index
 a = coefficient
 b = regression coefficient
 X = Inflation

The values of a and b can be found using the formula below:

$$a = \frac{\sum y - b \sum x}{n}$$

$$b = \frac{n \sum xy - (\sum x)(\sum y)}{n \sum x^2 - (\sum x)^2}$$

To measure the strength of the relationship between X and Y, correlation analysis was performed and the results were expressed in numbers known as correlation coefficients. Here's the formula for calculating CPI:

$$CPI = \frac{\sum Wn.Hn}{\sum Wo.Ho}$$

Where,
 Wn = Value of relative importance (weights) of goods on day n

Wo = Value of relative importance (weights) of goods on a time basis

Hn = The market price of goods on day n

Ho = The market price of goods on the base day

Meanwhile, to calculate inflation based on CPI, use the following formula:

$$Inflation = \frac{CPI_t - CPI_{t-1}}{CPI_{t-1}} \times 100\%$$

Where,

CPI_t = CPI for the month

CPI_{t-1} = CPI Previous month

IV. RESULTS AND DISCUSSION

Based on the results of a simple regression analysis using the Analysis Tool Pak feature in Microsoft Excel, several tables appear as follows:

A. Summary Output

Regression Statistics	
Multiple R	0,153
R Square	0,023
Adjusted R Square	0,007
Standard Error	0,272
Observations	60,000

Table 1: Summary Output

Summary Output is a table that shows the strength of the relationship between variables. Multiple R as correlation coefficient shows the strength of the relationship between variables. In the table, the Multiple R value is 0.153, which means that there is no relationship at all between CPI and inflation. Then in the table there is R Square which shows the magnitude of the influence between CPI and inflation with a value of 0.023 or 2.3%. So that the remaining 97.7% is influenced by other variables that are not included in this research model. Standard error indicates the level of accuracy of the regression analysis performed. The smaller the standard error value, the more convincing the regression analysis. The table above shows the standard error value of 0.272.

B. ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1,00	0,10	0,10	1,39	0,24
Residual	58,00	4,30	0,07		
Total	59,00	4,40			

Table 2:-ANOVA

ANOVA is often referred to as analysis of variance. This table shows the acceptability from a statistical perspective in the analysis of variance. Degree of Freedom (df) indicates the number of degrees of freedom associated with the source of the variance. Table 2 shows the df value of 1. Sum of Square (SS) shows the number of squares. The smaller the residual value of SS compared to the total SS, the better the model with the data. In table 2 the SS value is 0.1. Mean of Square (MS) shows the mean square. In table 2 the MS value is 0.1. F represents the F-test for the null hypothesis which is used to test the overall significance of the model. In table 2 the F value is 1.39. Lastly, Significance F is the P-value of F. In table 2 the Significance F value is 0.24.

C. Regression Coefficient

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	- 0,22	0,39	-0,57	0,57
IHK	0,00	0,00	1,18	0,24

Table 3: Regression Coefficient

Based on the values in table 3, the following regression equation can be made:

$$CPI = -0,22 + 0 \text{ Inflation}$$

The significance of the regression value can be seen from the results of t-count. In table 3, the t-count value is 1.18 > 0.05. This shows that the CPI has no effect on inflation, because it is greater than the value of (degree of significance) of 0.05. Then the significance of the regression value can also be seen from the P-value. In table 2, the P-value of the CPI is 0.24 > 0.05, indicating that the CPI has a negative and insignificant effect on inflation in Indonesia. The results of this study are in line with previous research

conducted by Wulandari & Habra (2020) which stated that the CPI had a negative and insignificant effect on inflation. Although the household sector is the economic sector most affected during the COVID-19 pandemic (Susilawati et al., 2020). However, in this study, because the scope of the data is global, namely throughout Indonesia and data taken during the last 5 years, the results are negative and not significant.

V. CONCLUSION

Based on the results of the research above, it can be concluded that the CPI has no significant effect on inflation in Indonesia. This research can be useful as additional insight regarding the effect of the CPI on inflation in Indonesia. Then suggestions for further researchers, by adding other variables and using multiple linear regression methods can complete the results of the study. And the object of research can be narrowed by taking objects from provinces, districts, or cities in Indonesia to see more significant results.

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