Inflation Persistence During the Pandemic

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Abstract. Understanding the behavior of inflation is important to do as an evaluation of the policy and the basis for making the next monetary policy. Bank Indonesia periodically determines the annual inflation rate by considering economic conditions and changes that may occur, especially when the pandemic lasts from 2020 to 2022. Inflationary conditions in the 30 months of the Covid-19 Pandemic, there were months where there was a national deflationary condition and the main driver was driven by volatile food and administered prices. The aim of the research was to determine the persistence of inflation that occurred during the pandemic in Indonesia. The method used in this research is descriptive. The research data is the monthly inflation rate from March 2020 to August 2022.

Keywords: inflation; persistence; pandemic

1 Introduction

The inflation rate is a concern for Bank Indonesia in making policies, so that when inflation is unstable or prices are unstable in public, Bank Indonesia needs to make adjustments to the policies issued. Policy in the monetary sector is carried out by Bank Indonesia in order to control the inflation rate through open market policies, discount politics and adjusting the level of the statutory reserve requirement so that it will control the amount of money circulating in the community. Policy on the fiscal side can be done by adjusting taxes and government spending so that it will affect the supply of goods and services in the community. (Arimurti & Trisnanto, 2011).

The formation of national inflation is an aggregate number of regional inflation, which takes into account the inflation rate of 90 cities determined by BPS - Statistics Indonesia in 2020 to be surveyed with commodities that are considered to have different levels of prices and commodity quality. The Consumer Price Index with the base year 2018 underwent a change in terms of commodity grouping based on the 2018 Classification of Individual Consumption According to Purpose (COICOP).

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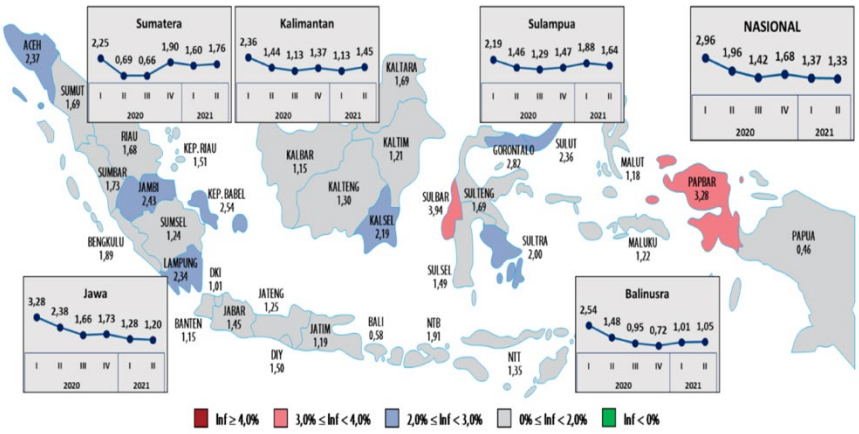

Figure 1. National inflation conditions and cities in Indonesia

The National inflation rate in the second quarter of 2021 was recorded at 1.33% (yoy), lower than the first quarter of 2021 which was 1.37% (yoy), this was influenced by the slowdown in volatile food (VF) and administered prices (AP) inflation. . The condition of decreasing VF inflationary pressure in Java and Sulampua was different from the condition of VF inflation in Sumatra, Kalimantan and Balinusra, which experienced a slight increase. The deflation of air freight rates that occurred throughout Indonesia when the restrictions on community mobility continued during and after the National Religious and National Holidays period caused inflationary pressures for the AP group to slow down, especially in Java, Sumatra and Balinusra (Indonesia, 2021)

The pandemic that has occurred in Indonesia since March 2020 has an impact on all fields, including health, social and economic. Health conditions have become a top priority since an extraordinary occurrence of an infectious disease or known as a pandemic is determined. During the 12 months at the beginning of the pandemic, there had been 3 consecutive months of deflation, its is in July 2020 of -0.1, in August 2020 of -0.05 and in September 2020 of 0.05. Bank Indonesia announced that in July to August 2020 deflation was driven by volatile foods and administered prices, and this condition occurred again in June 2021 where the volatile foods group experienced deflation of 1.23% (mtm) and the administered prices group experienced deflation. 0.21% (mtm). Every change in the consumer price index which is used to calculate inflation, it is necessary to know the factors that cause these changes and control them so that they do not have a prolonged impact.

Understanding the behavior of inflation is important to do as an evaluation of the policy and the basis for making the next monetary policy. Bank Indonesia periodically determines the annual inflation rate by considering economic conditions and changes that may occur, especially when the pandemic lasts from 2020 to 2022.

Factors that cause inflation

The factors that cause inflation can be caused from the demand side, supply side and expectations or a combination of these factors. The demand side occurs when an increase in demand pushes up prices and is referred to as demand pull inflation. Demand pull inflation is inflation resulting from the interaction between long-term supply and demand. Inflationary pressure from the demand side will arise if AD (aggregate demand) is different from AS

(aggregate supply). The difference between aggregate demand and supply is known as the output gap, a condition in which AD > AS will exert greater pressure on inflation and vice versa. If viewed based on this explanation, the output gap can be used as an indicator of whether there is pressure on the inflation rate or not, but it should be noted that the output gap can be used as an indicator when economic conditions are running normally, Output gap in economic conditions after a crisis or in stagnating economic conditions. accompanied by inflation (stagflation) is not appropriate to be used as an indicator.

Factors that cause supply-side inflation are known as cosh push or supply shock inflation. The cause of inflation from the supply side is due to an increase in production costs and other factors that can trigger an increase in the price of an item as well as the price of goods controlled by the Government, including the price of electricity basic tariff (TDL/ tarif dasar listrik) and fuel oil (BBM/ bahan bakar minyak). Supply-side inflation can also be caused by natural factors including crop failure or excessive harvesting, problems or obstacles in the distribution of goods or factors from the existence of certain policies including tax policies, import or export restrictions and other policies.

Expectations of economic actors can be a factor causing changes in inflation. Economic actors will anticipate the condition of the inflation rate that occurs, whether conditions in the past will occur in the future, this is a consideration in order to reduce losses that may occur. Backward expectation inflation is influenced by the following factors: 1) persistent demand inflation in the past, 2) large or frequent supply inflation, and 3) supply inflation reinforced by accommodative monetary policy. . Reducing adaptive inflation expectations can be done by increasing the credibility of the central bank's policies, by having a credible central bank, it is hoped that economic actors will reduce the thought of adaptive inflation expectations and encourage inflationary expectations based on future economic conditions (forward looking).

Inflation caused by the supply and demand sides has the same thing, namely increasing the level of output prices, but has a different impact on real GDP (output volume). Demand-side inflation will cause an increase in output in line with rising prices, on the other hand, inflation with supply-side causes, rising prices will be followed by a decrease in available goods.

Calculation of inflation

Inflation calculation can use the consumer price index (CPI) approach, the GDP deflator approach (implicit price index based on GDP calculations) and the producer price index (PPI) approach. The choice of the consumer price index approach as an inflation calculation is considered to be closer to the cost of living index of the public as consumers of products compared to the PPI and GDP deflator

The Consumer Price Index (CPI) is one of the economic indicators used to measure the level of price changes (inflation / deflation) at the consumer level. With the change in the pattern of public consumption, starting in January 2020, the measurement of inflation in Indonesia uses the base year CPI 2018 = 100. BPS categorizes commodities into 11 groups and 43 subgroups. The groups in the CPI with the base year 2018 are:

1. Foods, Beverages And Tobacco Group
2. Clothing And Footwear Group
3. Housing, Water, Electricity And Household Fuel Group
4. Equipments And Routine Household Maintenance Group
5. Health Group
6. Transportation Group
7. Information, Communication And Financial Service Group
8. Recreation, Sport And Culture Group

9. Education Group
10. Food And Beverages/ Restaurant Group
11. Personal Care And Other Services Group

Inflation Persistence

Continuous price increases that occur due to substantial changes or shocks in the economy can last for a certain period of time until they return to a constant level and this condition is known as the inflation persistence rate. Inflation persistence has long been a concern of economists because it is a comprehensive approach to the problem of inflation (Friedman, 1975). Inflation persistence is a description of the period of time required for inflation to return to a constant level and can be calculated nationally and regionally as well as the level of shock that occurs.

In general, persistent inflation in Indonesia is at a very high degree and tends to decline after the crisis (Yanuarti, 2007 and Alamsyah.2008). Harmanta (2009) explained that persistent inflation in Indonesia with a backward looking nature decreased during the implementation of the ITF, but persistent inflation that was forward looking experienced an increase. Inflation persistence is seen from the time needed for inflation to absorb 50% of the shock that occurs in order to return to its average value. Commodity groups in the Jakarta area require a period of 5 to 12 months, different conditions occur in South Sulawesi where it takes 13 months, while in the Papua region it takes a longer time, which is 49 months, the same as the time it takes for the City of Surabaya, which is 49 months. return to conditions before the shock occurred (Arimurti & Trisnanto, 2011; Azwar, 2017; Azwar & Subekan, 2017; Farida, Ismail, & Kaluge, 2020). Research in Brazil and Nigeria concludes that inflation targeting has helped the country overcome is history of indexation by building credibility in the notion that inflation will remain anchored at the target and that temporary inflation shocks will quickly dissipate. (Asekunowo, 2016; Roache, 2013).

Inflationary conditions in the 30 months of the Covid-19 Pandemic, there were months where there was a national deflationary condition and the main driver was driven by volatile food and administered prices.

2 Research Methods

The research method is a quantitative method with autoregressive analysis. This method will describe the inflation condition that is the object of research and make the research results clearer. The calculation of inflation persistence is related to the Impulse Response Function (IRF) of the AR process (p). Marques, (2005) describes the Cumulative Impulse Response Function (CIRF) concept which is formulated as $CIRF=1/(1-\rho)$ describing a monotonic 1-r relationship between CIRF and the AR coefficient (p), so the calculation is very dependent on the AR coefficient.

The aim of the research was to determine the persistence of inflation that occurred during the pandemic in Indonesia. The method used in this research is descriptive. This research will calculate inflation conditions starting in March 2020 until August 2022, or for 30 months during the pandemic in Indonesia, the inflation rate research data used is the consumer price index (CPI) which shows the level of prices for goods and services in one period. or in one month. The commodities used to describe the consumer price index (CPI) are divided into 11 groups, according to the methodology used by BPS. Changes in the CPI methodology (2018 = 100) in updating the Weigh Diagram and calculating the Consumer Price Index refer to the international standard Manual, the Consumer Price Index Manual:

Tabel 1. Types and sources of research data

Variabel	Description	Frequency	Source
IHK K1	CPI for Foods, Beverages And Tobacco Group	Monthly	BPS
IHK K2	CPI for Clothing And Footwear Group	Monthly	BPS
IHK K3	CPI for Housing, Water, Electricity And Household Fuel Group	Monthly	BPS
IHK K4	CPI for Equipments And Routine Household Maintenance Group	Monthly	BPS
IHK K5	CPI for Health Group	Monthly	BPS
IHK K6	CPI for Transportation Group	Monthly	BPS
IHK K7	CPI for Information, Communication And Financial Service Group	Monthly	BPS
IHK K8	CPI for Recreation, Sport And Culture Group	Monthly	BPS
IHK K9	CPI for Education Group	Monthly	BPS
IHK K10	CPI for Food And Beverages/ Restaurant Group	Monthly	BPS
IHK K11	CPI for Personal Care And Other Services Group	Monthly	BPS

3 Research Results

Analysis Results Data Description

The condition of the consumer price index (CPI) within a period of 30 months during the pandemic looks volatile with increases and decreases at certain times. The development of CPI in most commodity groups has a pattern that is almost similar to general CPI conditions, but the K7 or Information, Communication and Financial Service Group group shows a pattern that tends to decrease. The pattern of changes in the CPI that has seen drastic changes are K11 (Personal Care And Other Services) and K1 (Foods, Beverages And Tobacco).

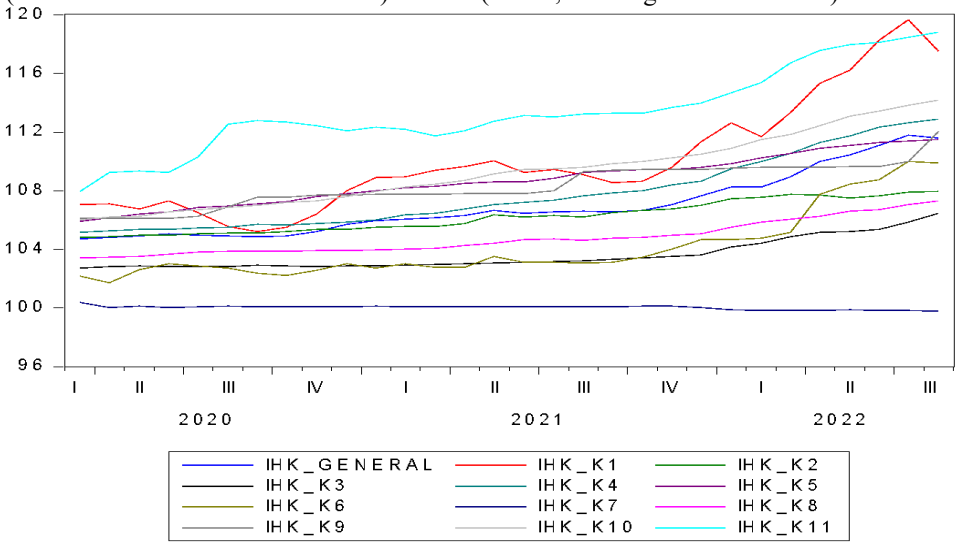

Figure 2. Changes in CPI during 30 Months of a Pandemic in Indonesia

In addition to descriptive data for each commodity group, CPI conditions are also explained based on their disaggregation which is divided into general inflation, core inflation, administered price inflation and volatile good inflation.

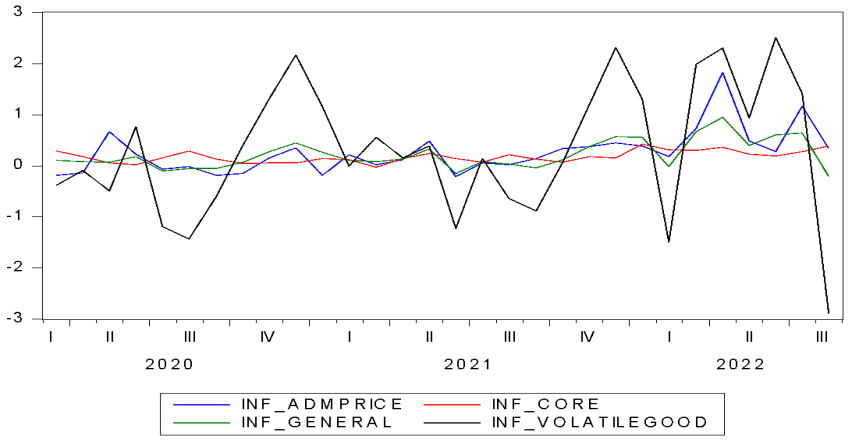

Figure 3. Changes in Inflation based on disaggregation during the 30 months of the pandemic

Results of Inflation Persistence Analysis

Inflation persistence that has been analyzed using autoregressive produces output as shown in table 1. The degree of persistence for 30 months during the pandemic is known to be at a moderate degree, as seen from the autoregressive coefficient of the model which is below 0.80. The low value of inflation persistence indicates that inflation is rapidly returning to its normal state.

Table 2. General Inflation Autoregressive Test Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.222306	0.111795	1.988506	0.0574
AR(1)	0.404041	0.191762	2.106997	0.0449
R-squared	0.159167			
Adjusted R-squared	0.094487			

Inflation persistence that occurred during the pandemic according to commodity groups was seen in positive and negative conditions (table 3). The groups with positive persistence rates are Foods, Beverages And Tobacco Group; Health Groups; Transportation Group; Recreation, Sport And Culture Group; and Personal Care And Other Services Group, while the groups with negative persistence numbers are Clothing And Footwear Group; Housing, Water, Electricity And Household Fuel Group; Equipments And Routine Household Maintenance Group; Information, Communication And Financial Service Group; Education Group; and Food And Beverages/Restaurant Group.

The highest persistence value in positive numbers is in the Recreation, Sport and Culture Group and the lowest number is in the Health Group. Testing on each commodity group will assist the monitoring process in maintaining the level of price stability in the community.

Table 3. Commodity Group Inflation Persistence

Komoditi Group	Persistensi Inflasi
K1 : Foods, Beverages And Tobacco Group	0.292644
K2: Clothing And Footwear Group	-0.042756
K3 : Housing, Water, Electricity And Household Fuel Group	-0.267851
K4 : Equipments And Routine Household Maintenance Group	-0.555826
K5: Health Group	0.252726
K6 : Transportation Group	0.130547
K7 : Information, Communication And Financial Service Group	-0.404003
K8: Recreation, Sport And Culture Group	0.436491
K9 : Education Group	-0.128800
K10 : Food And Beverages/ Restaurant Group	-0.295098
K11 : Personal Care And Other Services Group	0.368025

The results of the calculation of persistence based on the CPI of each commodity group are at a moderate degree because they are less than 0.80. The low value of inflation persistence shows that inflation is rapidly returning to its normal state. After knowing the degree of persistence of inflation, it can be calculated the time period for inflation to return to its normal state after a shock occurs. How to calculate the time period using the formula: CIRF=1/(1-ρ), where is the degree of inflation persistence and CIRF is the time period required for inflation to absorb 50% of the shock that occurs and return to its normal state.

The calculation of the duration of the commodity group is less than 1 month, the calculation results show that Recreation, Sport And Culture Group has the highest number, which is 1.77 or 53 days and the lowest number in Equipments And Routine Household Maintenance Group is 0.64 or 19 days. The K8 commodity group has a longer period of time than the general inflation rate, this illustrates the Recreation, Sport And Culture Group's timeframe to absorb 50% of shocks longer than the general inflation period.

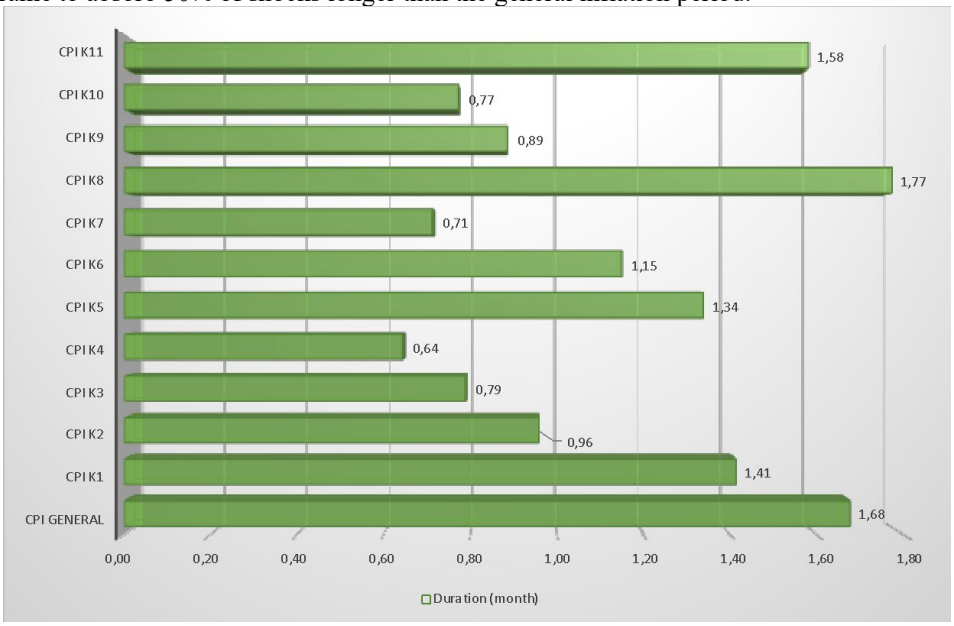

Figure 4. The length time required for the commodity group

The calculation of inflation persistence based on its disaggregation is divided into general inflation, core inflation, administered price inflation and volatile good inflation as shown in table 4. It can be seen that the degree of inflation persistence is moderate.

Tabel 4. Persistensi inflasi berdasar disagregasinya

Inflasi	Persistensi Inflasi
General Inflation	0,403769
Core Inflation	- 0,118521
Administered Price Inflation	0,310565
Volatile Good Inflation	0,295394

The calculation of the inflation period based on its disaggregation shows the highest figure for general inflation, which is 1.68 or 50 days. The second longest period is administered price inflation, which is 1.45 or 43.5 days, the third longest is Volatile Good inflation, which is 1.42 or 42.6 days, and the fastest period is Core inflation, which is 0.89 or 27 days. When administered price inflation and high volatile good will affect inflation expectations, it will affect efforts to control inflation in general.

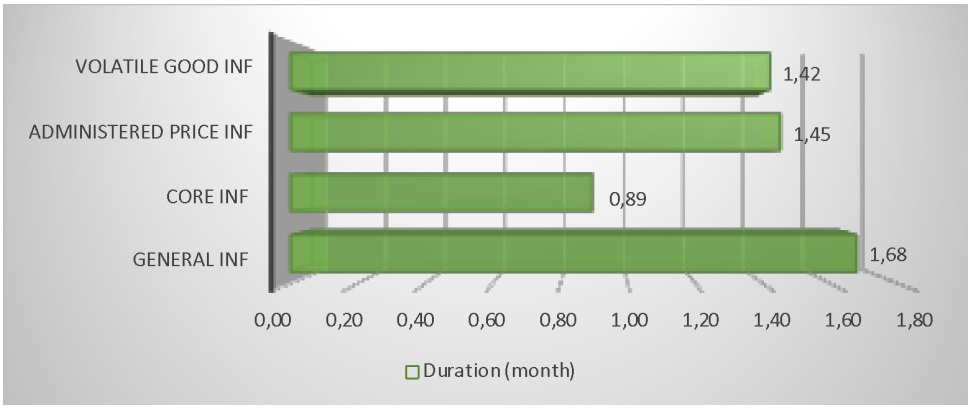

Figure 5. The length time required for inflation persistence based on its disaggregation

4 Conclusion

The calculation of inflation persistence using data during a pandemic has its own characteristics, because during a pandemic the government issues policies that limit community activities and have an impact on economic activity. The calculation results show that Recreation, Sport And Culture Group has the longest period of 53 days and the lowest period of time for Equipments And Routine Household Maintenance Group is 19 days. The Recreation, Sport And Culture Group commodity group has a longer period of time than the general inflation rate, this illustrates the Recreation, Sport And Culture Group timeframe to absorb 50% of shocks longer than the general inflation period.

The calculation of the inflation period based on its disaggregation shows that general inflation has the longest period of 50 days, followed by administered price inf, which is 43.5 days, then Volatile Good inf, which is 42.6 days and the fastest period is Core inf, which is 27 days. When administered price inflation and high volatile good will affect inflation expectations, it will affect efforts to control inflation in general

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