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Analysis of The Effect of Food Commodity Price Changes on Inflation in Central Java

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Abstract

Commodity price movements have a significant impact on regional economic stability, especially in terms of inflation. In Central Java Province, fluctuations in the prices of rice, shallots, curly red chilies, red cayenne peppers, and cooking oil are the main causes of inflation. This phenomenon requires a more in-depth examination of the relationship between price fluctuations and inflation. This means that studies at the regional level are still limited. The purpose of this study is to analyze the impact of commodity price changes on inflation in Central Java. The data used is from 2021 to 2025 using the Autoregressive Distributed Lag (ARDL) - Error Correction Model (ECM) method. The data used is monthly secondary data obtained from the Central Statistics Agency (BPS) and the National Food Agency. The estimation results show that in the short term, the variables of curly red chili price, previous period curly red chili price, previous period rice price, and previous period cooking oil price have a significant effect on inflation, while in the long term, curly red chili price has a positive effect and rice price has a negative effect on inflation in Central Java. The CointEq(-1) coefficient, which has a value of -0.106705 and is significant, indicates the existence of a correction mechanism towards long-term equilibrium. This value suggests that around 10.67% of the deviation of inflation from its equilibrium in the previous period is adjusted or corrected during the current period.

Keywords: ARDL, ECM, Food Commodities, Inflation, Price

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INTRODUCTION

Inflation is an important economic phenomenon that must be studied in depth because it has a broad impact on a country's economy. Inflation has a major impact on public welfare, including reducing real income,

disrupting rational economic decision-making, and exacerbating inequality through the process of income redistribution (Asab, 2025). Because product prices are subject to variations, the partnership between supply and demand can enhance a number of repercussions that develop (Surbakti et al., 2022). According to Keynes' theory, inflation could result from pressure on aggregate demand that is out of equilibrium with existing production capacity (Elsharif & Elamin, 2025).

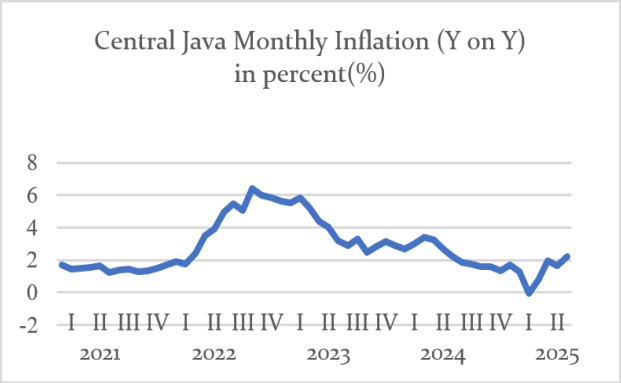

Figure 1. Central Java Monthly Inflation (YonY)
Source: BPS, 2025

Keynesian theory divides inflation into two categorie, inflation brought on by increasing demand and inflation brought on by growing expenses (Elsharif & Elamin, 2025). When the total demand for goods and services rises too much, producers are forced to raise the pricing of their products, which results in inflation owing to high demand (Lapavitsas, 2022).

Meanwhile, cost-push inflation occurs when production costs increase, which ultimately leads to price increases for various goods and services in the economy through a process of price adjustment (Tolasa et al., 2022). This situation is particularly true in Central Java. Which is not only the center of national food production but also has a large population with high consumption levels, so that changes in food commodity prices greatly affect the inflation rate in the region and nationally (Albasyari & Priyadi, 2024). High inflation rates can disrupt price stability, which ultimately reduces consumer confidence and slows economic growth (Sekarsari et al., 2024).

During the period from January 2021 to June 2025, inflation in Central Java fluctuated up and down. In 2021, inflation was still low, and several months saw a decline in prices, namely deflation, such as the prices of curly red chili peppers, red cayenne peppers, tomatoes, chicken meat, gold jewelry, and mobile phones. In 2022, inflation began to rise, especially in the middle of the year. Inflation peaked in September 2022, reaching 6.4 percent. This decline was caused by increases in the prices of curly red chilies, shallots, cooking oil, broiler chicken meat, as well as fuel and transportation tariffs (BPS, 2023).

Additionally, as food supplies stabilised in 2023, the inflation rate steadily decreased. The government's various price control initiatives also helped to reduce inflation. This year, horticultural commodities contributed around 18.92 percent for red chilli peppers, about 14.48 percent for red cayenne peppers, and about 25.76 percent for shallots, according to data from the Central Statistics Agency. Overall, 13.28 percent of Central Java's Gross Regional Domestic Product came from the agriculture sector, which comprises cattle, horticulture, and food crops (BPS, 2023).

There are periods of fluctuation, particularly during Ramadan and Eid al-Fitr. As a result, there is a rise in consumer demand, which leads to more price hikes. Short-term price instability is a worry because this year's inflation rate has stabilised at about 4 percent.

Between 2024 and 2025, inflation will be less than 4 percent. Inflation began to decline in early 2025 and fell by 0.08 percentage points in February. This is due to a drop in the price of cell phones, rice, wheat, milk, and tomatoes. This stability is a result of coordinated strategic food price setting, improved distribution efficiency, and the effectiveness of regional inflation control measures (BPS Provinsi Jawa Tengah, 2025).

Because rising commodity prices reduce consumer spending and increase family insecurity, they are a significant cause of inflation (Durmaz et al., 2025). The current situation has altered consumer behaviour, with individuals choosing low-cost needs while other expenses increase (Rahbarinejad et al., 2025).

Therefore, inflation control efforts cannot rely solely on fiscal and monetary policies, but also require policy support and interregional coordination, improvement of logistics transportation infrastructure, establishment of regional commodity supply companies, control policies covering all commodities, utilization of technology, and management of capital and labor to ensure that the agricultural sector remains productive and absorbs labor (Purwono et al., 2020).

Several previous studies have shown the relevance of this research in examining the relationship between food commodity prices and inflation. Aliyu et al., (2021), using ARDL and ECM models in Nigeria, showed that food inflation and price fluctuations are major factors affecting the sustainability of food security.

The research by Hasanah et al., (2025) reveals that fluctuations in the prices of food commodities such as rice, curly red chili, red cayenne pepper, beef, chicken meat, and chicken eggs, have a positive and significant long term impact on inflation in North Kalimantan Province.

According to Faharuddin et al., (2023), rice, vegetables, and fish are the food groups that have the strongest influence on poverty levels. Meanwhile, Ahmed et al., (2025) found that in Dhaka, high-quality rice frequently experiences price hikes and substantial volatility, while even lower-quality varieties still tend to be sold at relatively high prices.

Septiani et al., (2024) found that production costs, demand variables, and government-implemented fiscal and monetary policies are internal factors that impact Indonesia's inflation rate. Indonesia's inflation rate is influenced by external factors such as global economic circumstances, currency fluctuations, and the dynamics of international commodity prices.

Muflikh et al., (2024) shows that seasonal production, regular market management, and high crop losses are factors that cause changes in chili prices in Indonesia. Similarly, Surbakti et al., (2022) used error correction model (ECM) analysis to show that prices at the red chili producer level are influenced by wholesale prices, consumer prices, red cayenne pepper prices, and fuel prices. Meanwhile, chili prices from producers in the previous month have a long-term influence.

Keynesian theory, which emphasizes the importance of aggregate demand and government policy in maintaining economic stability, can be used to explain inflation in Central Java, particularly that caused by food prices. Based on this foundation, this study aims to analyze the effect of changes in food commodity prices on inflation in Central Java from 2021 to 2025. The results of this study are expected to be useful as input for local and

central governments in formulating food inflation control policies, while also contributing academically to the development of Keynesian-based regional economic studies.

RESEARCH METHODS

This study uses secondary data in the form of monthly inflation data for Central Java obtained from the Central Java Statistics Agency (BPS) and monthly food commodity price development data in Central Java Province sourced from the National Food Agency (BPN) and other official publications. The data covers the period from January 2021 to June 2025, with a total of 54 observations. The variables used in this study are monthly food commodity prices, namely the prices of rice, shallots, curly red chilies, red cayenne peppers, and cooking oil, as well as the monthly inflation rate in Central Java.

Table 1. Research Variable Specifications

No	Variable	Notation	Operational Definition	Unit of Measurement	Data Source
1	Inflation	INFL	The percentage change in the monthly Consumer Price Index (CPI) in Central Java Province illustrates the overall rate of change in the prices of goods and services.	Percent (%)	Central Java Statistics Agency (BPS)
2	Rice price	RICE	Average consumer price of rice per kilogram in Central Java.	IDR/kg	National Food Agency (Food Price Panel)
3	Price of Shallots	SHA	Average consumer price of shallots per kilogram in Central Java.	IDR/kg	National Food Agency (Food Price Panel)
4	Price of Curly Red Chili Peppers	CRC	Average consumer price of curly red chili peppers per kilogram in Central Java.	IDR/kg	National Food Agency (Food Price Panel)
5	Price of Red Cayenne Pepper	RC	Average consumer price of red cayenne pepper per kilogram in Central Java.	IDR/kg	National Food Agency (Food Price Panel)
6	Cooking Oil Prices	COIL	Average consumer price of bulk cooking oil per liter in Central Java.	IDR/liter	National Food Agency (Food Price Panel)

Source: Data processed, 2025

This study employs the Autoregressive Distributed Lag (ARDL) – Error Correction Model (ECM) approach. The choice of the ARDL-ECM method is justified by the characteristics of the data, which are non-stationary at the level but become stationary after the first difference. Although theoretically ECM can be used when all variables are I(1), the ARDL-ECM method was chosen because it is more flexible in handling combinations of I(0) and I(1)(Mohamud et al., 2025). This method is also more efficient with a relatively small

number of observations (2021-2025), does not require all variables to have the same lag length, and is capable of estimating long-term relationships as well as short-term dynamics. Therefore, the use of ARDL-ECM is considered more appropriate methodologically and provides more comprehensive results.

ARDL-ECM analysis is conducted in several stages. The first step is to test the stationarity of the data to determine the integration order of the variables. This test can be performed using the Unit Root Test, which includes Augmented Dickey-Fuller (ADF) and Phillips Perron (PP).

The advantage of ARDL is that it can still be used even if the variables have different integration levels, as long as they are at level I(0) or I(1). After the stationarity test, the ARDL model is estimated by selecting the lag length using the Akaike Information Criterion (AIC). Next, a cointegration test is performed using the Bound Testing Approach is employed to examine the long-term relationship, where as the short-term relationship is analyzed using the Error Correction Model (ECM)(Nugroho & Afandi, 2024). The basic equation used in this study are as follows,

$$INFL_t = \beta_0 + \beta_1 RICE_t + \beta_2 SHA_t + \beta_3 CRC_t + \beta_4 RC_t + \beta_5 COIL_t + e$$

Where $INFL_t$ represents inflation in period t, $RICE_t$ represents rice price in period t, SHA_t represents shallot price in period t, CRC_t represents curly red chili price in period t, RC_t represents red cayenne pepper price in period t, $COIL_t$ represents cooking oil price in period t and *et* represents error term.

The equation explains that inflation will increase if the price of one food commodity rises and the resulting coefficient is significant and positive. Meanwhile, the coefficient value provides an indication of how much the variable contributes to changes in inflation.

$$\Delta INFL_t = \varphi_0 + \varphi_1 INFL_{t-1} + \varphi_2 RICE_{t-1} + \varphi_3 SHA_{t-1} + \varphi_4 CRC_{t-1} + \varphi_5 RC_{t-1} + \varphi_6 COIL_{t-1} + \sum_{i=1}^{n} \pi_{1i} \Delta INFL_{t-1} + \sum_{i=1}^{n} \pi_{2i} \Delta RICE_{t-1} + \sum_{i=1}^{n} \pi_{3i} \Delta SHA_{t-1} + \pi_{4i} \Delta CRC_{t-1} + \sum_{i=1}^{n} \pi_{5i} \Delta RC_{t-1} + \sum_{i=1}^{n} \pi_{6i} \Delta COIL_{t-1} + e_t$$

This equation shows that changes in inflation (ΔY_t) are influenced by changes in independent variables (ΔX_t) in the short term, while also incorporating long-term components through Y_{t-1} and X_{t-1}. The equation for ECM ARDL can be written as follows,

$$\Delta INFLt = \alpha o \sum_{i=1}^{n} \alpha_{1i} \Delta INFL_{t-1} + \sum_{i=1}^{n} \alpha_{2i} \Delta RICE_{t-1} + \sum_{i=1}^{n} \alpha_{3i} \Delta SHA_{t-1} + \sum_{i=1}^{n} \alpha_{4i} \Delta CRC_{t-1} + \sum_{i=1}^{n} \alpha_{5i} \Delta RC_{t-1} + \sum_{i=1}^{n} \alpha_{6i} \Delta COIL_{t-1} + v_{1i} CointEq_{t-1} + \mu_t$$

Meanwhile, for short-term ECM, the equation can be written as follows,

$$\Delta INFL_t = \alpha_0 + \alpha_1 \Delta RICE_t + \alpha_2 \Delta SHA_t + \alpha_3 \Delta CRC_t + \alpha_4 \Delta RC_t + \alpha_5 \Delta COIL_t + v_1 CointEq_{t-1} + \mu_t$$

This ECM model links short-term dynamics with long-term equilibrium. This equation explains the impact of food price changes on inflation in Central Java in the short term. The value of the CointEqt – 1 coefficient in this study has a result correction method. This is to gradually return to long-term equilibrium (Nugroho & Lakner, 2025).

The equation below is for long-term conditions, and it illustrates the relationship between inflation and food prices in the long term. The values of coefficients α1–α5 indicate the impact of various commodities. The effect of

commodity price increases on inflation is indicated by positive and significant coefficients. Negative and significant coefficients show how changes in commodity prices affect inflation.

$$INFL_t = \alpha_0 + \alpha_1 RICE_t + \alpha_2 SHA_t + \alpha_3 CRC_t + \alpha_4 RC_t + \alpha_5 COIL_t + \mu_t$$

Classical assumption tests were also applied to the generated regression model. This was done to ensure the validity of the model and prevent bias. Among the analyses performed were tests for autocorrelation, heteroscedasticity, multicollinearity, linearity, and normality. The linearity test was applied to determine whether the relationship between the variables followed a linear pattern.

The normality test was then conducted to confirm that the residuals were normally distributed. The multicollinearity test was used to detect any linear relationships that might exist among the independent variables. The heteroscedasticity test is used to assess the consistency of residual variables. The autocorrelation test is used to determine whether the residuals are related across different time periods (Kalas et al., 2024). In this study, the ARDL–ECM model is capable of explaining how changes in food commodity prices influence inflation in Central Java, provided that all classical assumptions are satisfied.

RESULTS AND DISCUSSION

This section provides a detailed description of the data analysis outcomes for this investigation. Descriptive statistics of the variables are followed by the results of the Autoregressive Distributed Lag-Error Correction Model (ARDL-ECM). This information is presented step-by-step to facilitate understanding of the characteristics of the data, the direct and long-term correlations between the variables, and the influence of food prices on inflation in Central Java. Before examining the model, many basic statistics will be used to describe the distribution of the data from January 2021 to June 2025.

Table 2. Descriptive Statistics of Research Variables (2021-2025)

Variable	Mean	Std. Dev	Min.	Max.
Inflation (%)	2.79	1.59	-0.08	6.40
Rice Prices (IDR/kg)	11.516	1.561	9.386	14.671
Price of Shallots (IDR/kg)	32.347	7.511	20.116	52.039
Price of Curly Red Chili Peppers (IDR/kg)	37.954	13.579	15.239	72.508
Price of Red Cayenne Pepper (IDR/kg)	47.788	18.368	18.589	101.731
Cooking Oil Prices (IDR/liter)	15.393	1.682	12.628	19.000

Source: Data processed, 2025

According to Table 2, the average inflation rate in Central Java from January 2021 to June 2025 was 2.79%, with a standard deviation of 1.59. This suggests that the region's inflation rate is generally stable with only minor fluctuations. With a standard deviation of 1.561, the average price of rice throughout the study period was

IDR 11,516 per kilogram, with a price range of IDR 9,386 to IDR 14,671 per kilogram.

In comparison to other commodities, this suggests that rice prices are unlikely to fluctuate considerably. This is because rice is a staple food with a relatively stable and reliable supply. In contrast, the average price of shallots is around IDR 32,347 per kilogram, with a standard deviation of 7,511. This indicates that there have been moderate fluctuations in shallot prices over time.

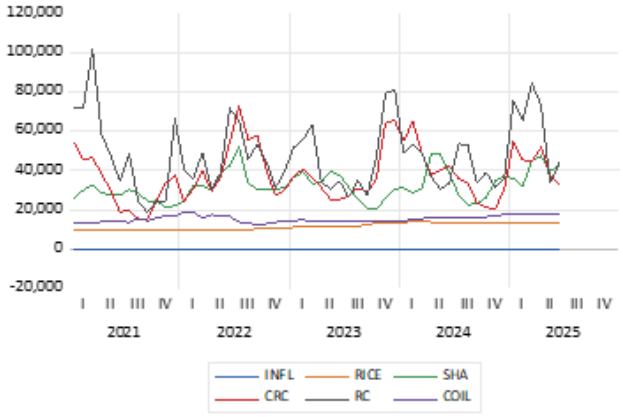

Figure 2. Descriptive Statistics Graph of Research Variables (2021-2025)
Source: Data processed, 2025

Horticultural products such as curly red chillies and red cayenne peppers show the greatest price volatility among all the variables analysed. The average price of curly red chillies is IDR 37,954 per kilogram, with a standard deviation of 13,579. Meanwhile, red cayenne peppers have an average price of IDR 47,788 per kilogram and a standard deviation of 18,368.

The price of red cayenne peppers, in particular, fluctuates widely from as low as IDR 18,589 to as high as IDR 101,731 per kilogram. These large variations illustrate how sensitive these commodities are to seasonal factors, including weather conditions, stock availability, and shifts in harvest periods.

Table 3. Stationarity Test Results (ADF Test)

Variable	Level	First Difference	Description
Inflation (INFL)	Non-stationary	Stationary	I(1)
Rice Prices (RICE)	Non-stationary	Stationary	I(1)
Price of Shallots (SHA)	Stationary	-	I(0)
Price of Curly Red Chili Peppers (CRC)	Stationary	-	I(0)
Price of Red Cayenne Pepper (RC)	Stationary	-	I(0)
Cooking Oil Prices (COIL)	Non-stationary	Stationary	I(1)

Source: Data processed, 2025

In the meantime, cooking oil prices an average of IDR 15,393 per liter. The price per liter ranges from IDR 12,628 to IDR 19,000, a difference of 1,682. Changes in the price of cooking oil are typically not very noticeable when considering horticulture commodities. But occasionally, the price may still go up, particularly if the price of crude palm oil spikes on the international market.

It seems that prices differ between commodities based on the descriptive statistics shown above. The graph below displays changes in food prices to further highlight this. It displays trends and shifts for every commodity between January 2021 and June 2025.

The complete results of the descriptive statistics show that changes in food prices vary greatly for each commodity. Chili peppers have the highest level of fluctuation, while rice and cooking oil tend to be more stable. These differences in price variation have the potential to be one of the factors causing regional inflation variation in Central Java during the period January 2021–June 2025. After conducting descriptive statistical analysis, the next step is to test for stationarity to ensure that the data is stable and suitable for use in analysis.

Table 4. ARDL Estimation Results

Variable	Coefficient	Prob
C	-0.334693	0.6960
INFL(-1)	0.893295***	0.0000
RICE	-0.000179	0.3756
RICE(-1)	0.000784***	0.0095
RICE(-2)	-0.000755***	0.0004
SHA	7.33E-06	0.5387
CRC	3.62E-05***	0.0001
CRC(-1)	-4.07E-05***	0.0001
CRC(-2)	2.74E-05***	0.0002
RC	-5.49E-06	0.2538
COIL	3.48E-05	0.6339
COIL(-1)	-0.000170**	0.0497
COIL(-2)	0.000233***	0.0027
R-Squared	0.955600	

Source: Data processed, 2025

Based on the unit root test results in Table 3 using ADF, only three variables are stationary at the level, namely shallots, curly red chilies, and red cayenne peppers. Meanwhile, three variables are stationary at the first difference, namely inflation, rice, and cooking oil. Based on the stationarity test results obtained, no variables are stationary at the second difference level, so the autoregressive distributed lag (ARDL) model is appropriate to use.

ARDL estimation requires the selection of the optimal lag length. This study uses the Akaike Information Criterion (AIC) to select the optimum lag length with a maximum lag length criterion of 2. This is because the data used in this study is monthly data with a short time span and a small number of observations (<60 observations).

Table 5. Cointegration Test Results (Bound Test)

F-Bound Test	Null Hypothesis : No levels relationship			
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	3.662177	10%	2.08	3
K	5	5%	2.39	3.38
		2.5%	2.7	3.73
		1%	3.06	4.15

Source: Data processed, 2025

The ARDL model for this study is the ARDL (1, 2, 0, 2, 0, 2) model. Note that ***, **, and * means they are significant at 1%, 5%, and 10%The coefficient of determination (R2) is (0.955600), indicating that approximately 95.56% of the variation in inflation in Central Java during the study period can be explained by the independent variables in the model, namely the prices of rice, shallots, curly red chilies, red cayenne peppers, and cooking oil.

Meanwhile, 4.44% of inflation variation is influenced by other factors not included in the model. Based on the R2 value, the ARDL model as a time series regression model can explain the effect of changes in food commodity prices on inflation in Central Java.

After confirming the stationary data and selecting the optimal lag, the next step is to test for cointegration. The cointegration test in the ARDL model in this study was conducted using the bound test method. The existence of cointegration was determined by comparing the F-statistic value with the critical values of the Lower Bound (I(0)) and Upper Bound (I(1)). If the F-statistic is greater than the critical value of the Upper Bound, then cointegration exists. Conversely, if it is smaller than the Lower Bound, then cointegration is not found. If the F-statistic value is between the two, then the test results are inconclusive. The existence of cointegration also indicates the presence or absence of a long-term equilibrium relationship in the model (Forgenie et al., 2025).

Table 6. ECM Test Results (*CointEq*)

Variable	Coefficient	Prob.
D(RICE)	-0.000179	0.2660
D(RICE(-1))***	0.000755	0.0001
D(CRC)***	3.62E-05	0.0000
D(CRC(-1))***	-2.74E-05	0.0000
D(COIL)	-3.48E-05	0.5743
D(COIL(-1))***	-0.000233	0.0005
CointEq(-1)***	-0.106705	0.0000

Source: Data processed, 2025

Based on Table 5, the F-statistic value can be calculated as 3.662177. This value is greater than the Upper Bound I(1) value at a significance level of 5%, which is 3.38. This means rejecting the null hypothesis (Ho), which means there is cointegration in the model. Therefore, the ARDL (1, 2, 0, 2, 0, 2) model in this study has a long-term equilibrium relationship.

According to Table 6, the estimation results of the Error Correction Model (ECM) indicate that, in the short term, three variables significantly influence inflation in Central Java. Note that ***, **, and * are significant at 1%, 5%, and 10%. The current rice price variable has a coefficient of -0.000179 (not significant), while the price of rice one period before (D(RICE(-1))) has a positive and significant effect with a coefficient of 0.000755.

The price of curly red chilies (D(CRC)) has a positive and significant effect with a coefficient of 3.62E-05, while in the previous period (D(CRC(-1))) has a negative and significant effect with a coefficient of -2.74E-05. The current cooking oil price variable (D(COIL)) has a coefficient of -3.48E-05 and is not significant, while in the previous period (D(COIL(-1))) has a negative and significant effect with a coefficient of -0.000233.

Table 7. Long-Term ARDL Model Estimation Results

Variable	Coefficient	Prob.
C	-3.136603	0.7291
RICE*	-0.001402	0.0537
SHA	6.87E-05	0.4963
CRC*	0.000215	0.0560
RC	-5.14E-05	0.2227
COIL	0.000916	0.2689

Source: Data processed, 2025

All three of these variables are significant at the 1% level. The significant CointEq(-1) coefficient of -0.106705 indicates a correction mechanism towards long-term equilibrium. The significant CointEq(-1) coefficient of -0.106705 indicates a correction mechanism towards long-term equilibrium. This value indicates that approximately 10.67% of the inflation deviation from its equilibrium in the previous period can

be corrected in the current period. Therefore, despite short-term deviations, the ARDL-ECM model still has a tendency to return to its equilibrium path. The relatively small coefficient shows that it takes several periods to achieve long-term equilibrium. What this shows is that efforts to keep prices stable or manage inflation will not be immediately successful. Instead, they must be carried out continuously in order for improvements to take effect.

Based on Table 7, the long-term ARDL results show that the price of rice with a coefficient value of -0.001402, prob. 0.0537, and the price of curly red chili with a coefficient value of 0.000215, prob. 0.0560, have a significant effect on inflation in Central Java. Both variables are significant at the 10% level.

These figures show that when rice prices rise, inflation usually falls over time. However, when curly red chili prices rise, inflation also rises. Then, the price of shallots with a coefficient value of 0.0000687, prob. 0.4963, the price of red cayenne pepper with a coefficient value of -0.0000514, prob. 0.2227, and the price of cooking oil with a coefficient value of 0.000916, prob. 0.2689, do not significantly affect inflation. These three variables do not significantly change long-term inflation.

Short-term analysis shows that changes in rice prices in the previous period still had a positive and significant effect on inflation in Central Java in the current period. This finding indicates a delay in price transmission, whereby food price pressures are not only temporary but also continue to affect inflation in the short term. Inflation went up by 0.87% in February 2024 because rice prices went up.

This went on until March 2024, when inflation went up 0.94% from the year before. This happened because more and more people wanted rice as Ramadan got closer. Even if prices went down a little, rice was still the main reason for inflation in April (BPS Provinsi Jawa Tengah, 2025).

The outcomes are not consistent with short-term observations. The long-term coefficient indicates that Central Java inflation is significantly and negatively impacted by rice prices. The price of rice has a coefficient of -0.001402. This figure means that over time, if the price of rice increases by IDR 1, the inflation rate will decrease by 0.001402 percent, assuming no changes in all other variables.

This negative sign indicates an inverse relationship between rice prices and inflation, which occurs due to changes in consumption patterns or the relatively small contribution of rice to inflation in the long term(Hasanah et al., 2025). In 2024, rice prices increased. This increase was triggered by a decline in rice supply in the market and a decrease in rice production of 19,281 quintals or around -2.12% compared to the previous year (BPS Provinsi Jawa Tengah, 2025).

These results are in line with the research by Hasanah et al., (2025) which shows that rice prices have a positive and significant effect on inflation in North Kalimantan Province in the long term. Research by Putri et al., (2022), shows that the inflation rate in Padang City in the short term is influenced by the rice price variable from the previous period. Furthermore, Sha & Wu, (2025) showed that rice significantly increases China's inflation rate in the short term, but not significantly in the medium to long term.

The price of shallots does not show a significant influence on inflation in Central Java, either in the short or long term. This suggests that fluctuations in shallot prices are not large enough to meaningfully affect the overall

inflation rate. One possible explanation is that public consumption of shallots is relatively limited. In addition, the market tends to adjust quickly when price changes occur (Ardiyanti & Juliprijanto, 2020).

The results of this study are in line with the findings of Hafied et al., (2022), who reported that shallot prices do not affect inflation in Makassar City. Similarly, research by Ardiyanti & Juliprijanto, (2020) also shows that shallot prices have minimal impact on both short-term and long-term inflation in Magelang City.

Short-term inflation has significantly increased as a result of the present price increase for curly red chilli peppers. However, in the past, when the price of curly red chilli peppers increased, this actually helped to lower inflation in Central Java. This demonstrates how the market may right itself. If the price of chilli suddenly increases, actions can be made to either maintain prices steady or alter what consumers purchase.

This mitigates the effect on inflation in the future (Surbakti et al., 2022). Due to frequent fluctuations in the quantity available, curly red chillies have become more expensive. Changes in the producing season and pest issues are the causes of this circumstance. Seasonal variations, such as consumers' preference for transient fresh chillies, exacerbate price volatility (Muflikh et al., 2024). This disease was discovered in December 2023. Despite a -0.32% decline from the previous year, curly red chillies remained the main commodity causing the greatest inflation (BPS, 2023).

The long-term coefficient for curly red chili peppers is 0.000215. This figure means that if the price of curly red chili peppers increases by IDR 1, inflation will increase by 0.000215 percent, if other factors remain constant. A positive number means that there is a direct relationship between the price of curly red chilies and inflation. When the price of curly red chilies increases, the inflation rate also tends to increase. This shows that curly red chilies are an important food commodity that is easily affected by price changes.

In addition, it can also change the inflation rate in the long term (Putri et al., 2022). Entering November 2023, the price of curly red chili peppers showed an upward trend again, although it has not exceeded the highest price ever recorded in 2022. As of December 2023, the price of this commodity is IDR 65,480 per kilogram. Meanwhile, in July 2022, the highest price was IDR 72,500 per kilogram (Badan Pangan Nasional, 2022).

According to Putri et al., (2022), the price of curly red chillies has a long-term influence on the inflation rate in Padang. However, the findings of this study differ from those of Hasanah et al., (2025), who reported that curly red chilli prices do not have a noticeable short-term or long-term effect on inflation in North Kalimantan Province. Similarly, research by Ardiyanti & Juliprijanto (2020) shows that curly red chilli prices have only a minimal influence on inflation in Magelang, with little impact in either the short or long run.

In Central Java, the price of red cayenne peppers does not have a significant impact on inflation, either in the short term or the long term. This indicates that fluctuations in red cayenne pepper prices are not substantial enough to influence the overall inflation rate. The effect of this commodity on inflation is relatively small, allowing both consumers and markets to adjust quickly to price changes (Muflikh et al., 2024). Although monthly data

from 2021 to 2025 show considerable seasonal variation in red cayenne pepper prices, these shifts do not consistently align with inflation trends. This suggests that, despite occasional price spikes, red cayenne peppers do not play a major role in driving overall inflation in Central Java.

The results of Hasanah et al., (2025), which likewise demonstrate that red cayenne pepper has no appreciable short-term or long-term impact on inflation in North Kalimantan Province, are in line with this study. According to research by Hafied et al., (2022), Makassar City's inflation is not significantly impacted by the price of red cayenne pepper. This contrasts with the study by Ardiyanti & Juliprijanto (2020) which found that red cayenne pepper prices have a significant effect on inflation in Magelang City in both the short and long term.

In the short term, the negative and significant coefficient of cooking oil indicates that the increase in cooking oil prices in the previous period actually reduced inflation in Central Java in the current period. Meanwhile, in the long term, this variable has no significant effect on inflation in Central Java.

This can be interpreted as meaning that cooking oil price shocks are temporary, whereby after a price surge, consumers and the market make adjustments in the subsequent period, such as reducing consumption, substituting other commodities, or implementing price stabilization policy interventions (Rofatunnisa et al., 2024). Therefore, the impact of cooking oil price increases does not continue indefinitely but tends to be corrected in the previous period.

The increase in cooking oil prices was one of the key factors driving inflation in Central Java, contributing 1.91% in January 2022. Although the government has set a maximum retail price (HET) of IDR 14,000 per liters, the actual price of cooking oil on the market is still higher, at around IDR 19,000 per liters (Badan Pangan Nasional, 2022). In December 2022, inflation fell by -0.18% from the previous year. Despite this decline, cooking oil remained the main contributor to inflation.

In January 2025, inflation declined by -0.39% (Y on Y) from the previous month, with a contribution of 0.20% (BPS Provinsi Jawa Tengah, 2025). The increase in cooking oil prices cannot be separated from the pricing of crude palm oil (CPO), which is essentially highly influenced by international standard price movements, causing domestic cooking oil prices to fluctuate (Kharin et al., 2024).

In contrast to the results of research conducted by Rofatunnisa et al., (2024) which showed that cooking oil prices have a significant effect on changes in the CPI in West Kalimantan in the short and long term. Research by Handayani et al, (2025) concluded that cooking oil prices have a positive and significant relationship with inflation, indicating that increases in cooking oil prices contribute significantly to rising inflation rates.

Furthermore, Ramadhani & Rosiana (2025) showed that in the short term, the price of bulk cooking oil at the wholesale and retail levels affects the price of bulk cooking oil at the producer level in the previous period and has a significant effect at the producer level in the long term.

According to this research, it is critical that the government implement stability-promoting policies in order to control expenses. Increasing food supplies, keeping an eye on distribution, and promptly resolving supply problems are some of these actions. For now, these measures are necessary to reduce rapid price increases and

protect people's purchasing power. At the same time, plans are needed for the future to increase production, improve the agricultural system, and strengthen food distribution.

In addition, better coordination between fiscal and monetary policies is crucial to maintaining price stability and controlling food price changes that affect inflation in Central Java Province. Coordination in this regard can greatly help to keep food supplies more secure in the long term and help the economy grow more stably and inclusively.

CONCLUSION

Based on the results of the study, it can be concluded that inflation in Central Java is significantly and positively influenced by rice prices in the previous period and curly red chili prices in the current period in the short term. Meanwhile, curly red chili prices in the previous period and cooking oil prices in the previous period have a significant and negative effect. This explains the price adjustments in the market.

The value of the CointEq(-1) coefficient of -0.106705 is significant, indicating that the model in this study has a result correction method. This is to gradually return to long-term equilibrium. In the long term, there are two variables that significantly affect inflation in Central Java, namely the price of curly red chili peppers, which has a positive impact, and the price of rice, which has a negative impact. The classical premise of this study's ARDL-ECM model shows that the coefficient estimates are objective, which makes the analysis accurate and reliable.

Within the Keynesian perspective, which views food commodity prices as part of household consumption that directly reflects aggregate demand and strongly influences inflation, the findings of this study align well with the applied model.

The rising price of curly red chillies, which continues to push inflation upward, further highlights ongoing concerns about price volatility. The delayed effects observed in rice, cooking oil, and curly red chilli prices also show that economic adjustments take time to work through the system.

Given this, it is imperative that the government implement price stability measures by increasing food supplies, monitoring distribution, and responding quickly to shortages. Moreover, to maintain price stability and better manage fluctuations in food commodity prices that affect regional inflation, stronger coordination between monetary and fiscal policies is essential.

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