

ANALYSIS OF THE EFFECT OF SHALLOT AND CAYENNE PEPPER COMMODITY PRICES ON REGIONAL INFLATION: A CASE STUDY IN KOTABARU REGENCY, SOUTH KALIMANTAN**Thresiana Yuanita*, Hamdani and Muhammad Fauzi**

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ABSTRACT

This study analyzes the development of inflation and commodity prices of shallots and cayenne pepper, and examines the influence of these two commodities on inflation in Kotabaru, South Kalimantan, from January 2020 to July 2025. It uses secondary time series data on consumer-level prices and inflation rates, sourced from the Central Statistics Agency (BPS) of Kotabaru and the Kotabaru Food Security and Agriculture Office. Descriptive analysis addresses the first objective, while ARDL (Autoregressive Distributed Lag) is used to examine the price-inflation relationship. Results show cayenne pepper prices fluctuated sharply, with extreme, repeated spikes in 2020–2021 and another increase in 2024–2025. Shallot prices followed a more seasonal, temporary pattern, returning to equilibrium faster after price surges. Monthly inflation showed sharp fluctuations in 2024 and deflation in 2025, indicating short-term volatility but long-term stability. The ARDL results indicate that inflation in the previous two periods, current cayenne pepper prices, and current shallot prices significantly affect current inflation in the short term. In the long term, only cayenne pepper prices have a significant effect on inflation.

Keywords: Inflation, Price of Shallots, Cayenne Pepper Price, ARDL, Kotabaru.

1. INTRODUCTION

The price of food commodities, especially staple foods and food, which is a necessity for daily consumption by every household in Indonesia, is very important to maintain stability. If the stability of food prices is disturbed, it will cause price fluctuations. When fluctuations in food prices are volatile, this will certainly have an impact on the inflation rate in a certain country or region.

Based on BPS (Statistics Indonesia 2022) data, the contribution of volatile foods inflation to general inflation in Indonesia ranks first followed by core inflation and government-regulated prices. The food group has a large share in the CPI which is a calculation in the inflation rate. Food commodities that are often indicators of inflation are shallots and cayenne pepper due to the high dependence of the community, especially in Kotabaru, on the consumption of these two commodities. These two commodities are very susceptible to price volatility because of their perishable nature and are highly dependent on weather conditions.

When the production level of shallots and cayenne pepper in Kotabaru, South Kalimantan Province decreases significantly, while the need for shallot commodities tends to remain, the increase in the price of shallots becomes inevitable. The low local production capacity and the absence of shallot and cayenne pepper production centers cause Kotabaru to be highly dependent on supplies from outside the region with long and vulnerable distribution lines due to the

geographical characteristics of the Kotabaru area which is the southernmost of South Kalimantan Province.

The purpose of this study is to (1) analyze the development of inflation and commodity prices of shallots and cayenne pepper in Kotabaru, South Kalimantan Province during the period January 2020 to July 2025; (2) analyze the effect of the commodity price of shallots and cayenne pepper on the inflation value in Kotabaru, South Kalimantan Province during the period from January 2020 to July 2025.

2. RESEARCH METHODS

2.1 Place and Time of Research

The research was carried out in Kotabaru Regency, South Kalimantan Province, starting in December 2025 until completion, starting from preparation, data collection, data analysis to the preparation of the final report.

2.2 Types and Data Sources

The study used secondary data (time series) on the price of shallots and cayenne pepper at the consumer level and the inflation rate from January 2020 to July 2025. Secondary data was obtained from the Central Statistics Agency of Kotabaru Regency, South Kalimantan Province and the Food Security and Agriculture Office of Kotabaru Regency, South Kalimantan Province.

2.3 Data Analysis Methods

The analysis method used to answer the first objective uses descriptive statistical analysis presented in the form of data, tables and graphs. The second objective is to use *the Auto Regressive Distributed Lagged* (ARDL) Model analysis because of its ability to address problems such as cointegration and heteroscedasticity in regression analysis. The analysis of the ARDL model includes several stages, including:

Stationariness Test. The stationarity test uses *the Augmented Dickey Fuller* (ADF) test. The results of the t-statistics will be compared with the t-values of the Mackinon Critical Value table. The formulation of the ADF test in this study is:

a. Inflation variables:

$$\Delta INFL_t = \alpha + \beta t + \delta INFL_{t-1} + \sum_{i=1}^k \phi_i \Delta INFL_{t-i} + \varepsilon_t \quad (1)$$

b. Shallot price variables (LnHBamer):

$$\Delta LnHBAMER_t = \alpha + \beta t + \delta LnHBAMER_{t-1} + \sum_{i=1}^k \phi_i \Delta LnHBAMER_{t-i} + \varepsilon_t \quad (2)$$

c. Variable price of cayenne pepper (LnHCawit):

$$\Delta LnHCAWIT_t = \alpha + \beta t + \delta LnHCAWIT_{t-1} + \sum_{i=1}^k \phi_i \Delta LnHCAWIT_{t-i} + \varepsilon_t \quad (3)$$

Testing rules:

- If the statistical ADF is greater than the critical ADF, then minus Ho, meaning that the time series data for the price of shallots and cayenne pepper is stationary.
- If the statistical ADF is smaller than the critical ADF, then it fails to subtract Ho, meaning that the time series data of the prices of shallots and cayenne pepper are not stationary.

Lag Order Selection. The lag selection stage begins with selecting the maximum possible lag using the Akaike Information Criterion (AIC) test. The model with the optimal lag is the one with the least AIC, or the most negative.

Bound Test. The cointegration test in this study uses the *Bound Test* cointegration test. The independent variable in this study is said to have a long-term relationship (cointegration), if the result of the F test is calculated to be greater than the upper limit of the critical value (Pesaran, 2001).

From the ARDL model equation:

$$\Delta INFL_t = \beta_0 + \beta_1 \Delta LnHBAMER_t + \beta_2 \Delta LnHCAWIT_t + \sum_{i=1}^p \delta_i \Delta INFL_{t-i} + \sum_{j=1}^{q_1} \theta_j \Delta LnHBAMER_{t-j} + \sum_{k=1}^{q_2} \gamma_k \Delta LnHCAWIT_{t-k} + \varepsilon_i \quad (4a)$$

with:

$\Delta INFL_t$: Change in the value of inflation in the third period

$\Delta LnHBAMER_t$: change in the price of shallots in the current period

$\Delta LnHCAWIT_t$: Changes in the price of cayenne pepper in the current t/current period

$\beta_1, \dots, \beta_4$: Long-term coefficients

$\delta_i, \theta_j, \gamma_k$: Short-term coefficients

$\mu_l, \lambda_n, \zeta_n$: Short-term coefficients

β_0 : konstanta

ε_i : residual

If subtracted, then the long-term equation becomes: H_0

$$INFL_t = \beta_0 + \beta_1 LnHBAMER_t + \beta_2 LnHCAWIT_t + \varepsilon_i$$

with:

$INFL_t$: inflation in period t (percent)

$LnHBAMER_t$: The price of shallots in the current period

$LnHCAWIT_t$: The price of cayenne pepper in the current period

β_0 : konstanta

β_i : Coeficin (i=1,2,3,4,5)

ε_i : residual

ARDL Model Specifications ($p, q_1, q_2, \dots, q_r$). The process begins with determining the optimal amount of lag for each variable in the model, which is then fed into the appropriate regression model. After the model was estimated using regression techniques such as *Ordinary Least Squares* (OLS), the estimated coefficients for each variable were obtained, as well as inferential statistics such as t-statistical values and p-values that helped in the interpretation of the results.

Good estimation allows for a more in-depth analysis, taking into account the statistical significance and econometric interpretation of the coefficient. More appropriate decision-making in identifying factors that affect the long-term and short-term relationships between variables in the ARDL model that has been developed.

ARDL Model Assumption Test. Once the ARDL model is formed, the model is tested for assumptions. The testing of model assumptions includes normality tests, homoskedasticity assumptions, autocorrelation, and multicollinearity.

Assumption of Homoskedasticity:

In testing the assumption of homokedasticity, the *Breusch-Pagan-Godfrey* test is used. This test is included in the category of *Lagrange Multiplier* (LM) tests that use the idea of regression between residual squares and all variables in the ARDL model. This test statistic follows the

distribution of Chi-Square with a free degree of, which is the number of free variables in the selected ARDL model. **p**

Autocorrelation Assumptions:

The method used to detect autocorrelation in residuals is the Breusch-Godfrey test, especially in dynamic models or with lagged variables. This test statistic follows the distribution of Chi-Square with a free degree of, which is the number of free variables in the selected ARDL model.

Normality Assumption Test:

Normality assumption testing is performed using the Jarque-Bera Test to check whether the residuals in the regression model follow the normal distribution by testing for the skewness and kurtosis of the residual resulting from the selected ARDL model. The Jarque-Bera (JB) statistic follows the chi-square distribution with a free degree of 2.

Parameter stability. After the Inflation model estimation stage in Kotabaru Regency, South Kalimantan Province, then the model fit and parameter stability of the model were checked. At this stage, *cummulative sum of recursive (CUSUM)* and *cummulative sum of squares of recursive residuals (CUSUM Q)* are used to see the stability of parameters whether they are suitable for use in the short term or in the long term. With the help of *evIEWS software*, the output of the CUSUM and CUSUM Q test will be seen whether the line is out of line or not, meaning a *robust* model, and can be used for inflation forecasting in Kotabaru Regency, South Kalimantan Province.

3. RESULTS

3.1 Development of Inflation and Commodity Prices of Shallots and Cayenne Pepper in Kotabaru Regency, South Kalimantan Province During 2020-2025

The development of inflation values in Kotabaru from January 2020 to July 2025 is highly fluctuating but can still be controlled. This is reflected in the inflation rate which ranges from -1.0% to +1.0% every month. The development of the CPI (Consumer Price Index) in Kotabaru in 2020-2021 shows price stability as shown by the movement of the CPI at 105-108. This movement shows that price conditions in Kotabaru are relatively stable with a fairly moderate price increase. The stability of the CPI in 2020-2021 was influenced by several things such as limited economic activities due to the Covid-19 pandemic and low pressure on production and distribution costs at the local level.

The development of the CPI at the time of entering 2022 experienced a more prominent and significant increase compared to the previous year. This significant increase is shown by the movement of the CPI from 108 to 111-115. This incident indicates pressure from stronger inflationary movements. Some of the things that cause pressure on inflation are increased energy and transportation prices, disruptions in the supply of food commodities and economic activities that are still in the process of recovery after the Covid-19 pandemic, thus encouraging an increase in demand. In 2023, the CPI will continue to increase again to reach the range of 120-125, which is the highest number in the observation period in this study. This drastic increase in CPI can be caused by several things, namely an increase in the price of staple foods as a result of increased trade activities and public consumption. However, at the beginning of 2024, the CPI in Kotabaru, South Kalimantan Province, experienced a significant decline, from the range of 120 moving to 105-108. Then throughout mid-2024 to July 2025, the CPI returned to stability in the range of 106-109. This condition indicates that the price has gone towards equilibrium. The graph of the development of inflation and CPI values in Kotabaru can be seen in Figure 3. If compared between the inflation value in Kotabaru and the inflation value in South Kalimantan,

the average monthly inflation value in South Kalimantan is less than 1%, which means that price fluctuations are quite moderate or still within reasonable limits.

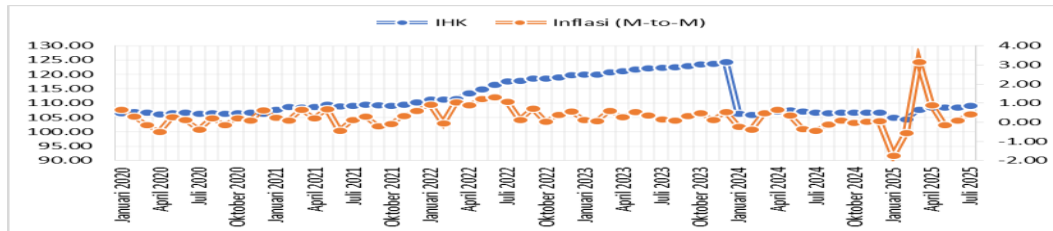


Figure 3. Inflation and CPI (Consumer Price Index) in Kotabaru, South Kalimantan Province 2020-2025

Sources: Central Statistics Agency of Kotabaru Regency (2025)

The development of shallot prices in Kotabaru, South Kalimantan Province can be seen in Figure 5. The price of shallots showed quite sharp fluctuations from year to year throughout 2020 to 2025.

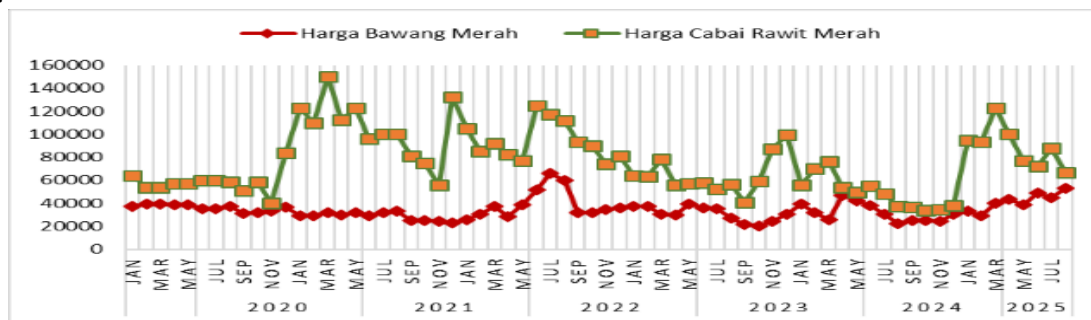


Figure 5. Development of shallot and cayenne pepper prices in Kotabaru, South Kalimantan Province in 2020 – 2025

Sources: Central Statistics Agency of Kotabaru Regency (2025)

From figure 5, it can be concluded that the development of shallot prices in Kotabaru, South Kalimantan Province during the period of 2020-2025 is quite fluctuating from year to year. The highest peak of shallot prices during this period was in July 2022, which was Rp. 66,250/kg. Meanwhile, the lowest price of shallots in that period was in early 2023, which was Rp. 21,600/kg. The upward trend in the price of shallots in Kotabaru, South Kalimantan Province shows a gradual upward trend after the highest price fluctuations in 2022. So the government needs to prepare a policy to stabilize the price of shallots in Kotabaru, namely by providing buffer stocks when availability decreases in the market and demand increases, as well as with a transportation subsidy policy in alleviating the transportation costs of farmers in bringing shallots to the market for sale.

3.2 The Effect of Shallot and Cayenne Pepper Commodity Prices on Inflation Values in Kotabaru Regency, South Kalimantan Province during 2020-2025

Data Stationarity Test. The results of the data stationarity test on the variables of onion price (LnBAMER), cayenne pepper price (LnHCAWIT), and inflation value (INFL) in Kotabaru in 2020-2025 can be seen in Table 1.

Table 1. Data stationary test results

Variabel	Testing Rate	ADF Statistic	Critical Values 5%	p-value	Test Results	Conclusion
INFL	Level	-6.3924	2.88696	0.0000	Tolak Ho	Stasions
	Level	-2.4684		0.612	Failed to Reject Ho	Not Stationary
LnHBAMER	1st difference	-8.0319	-2.9062	0.000	Tolak Ho	Stasions
LnHCAWIT	Level	-3.289	-2.9055	0.019	Tolak Ho	Stasions

Sources: Data processed (2025)

The results of the data stationarity test in Table 1 show that the variable price of shallots (LnHBAMER) in Kotabaru, South Kalimantan Province is not stationary at the *level*. This result is shown by the ADF-statistical value which is smaller than the critical value at the level of 5% at the level of $-2.4684 < -2.9062$ and *P-value* greater than 0.05, which is 0.612. So the stationarity test for the variable price of shallots (LnHBAMER) needs to be continued to the *first difference stage*. After a stationarity test was carried out at the *first difference level*, the price of the shallot commodity has been stationary. This result is shown by the ADF-statistical value of the variable price of shallots (LnHBAMER) which is greater than the critical value at the level of 5%, namely $-8.0319 > -2.9062$. Meanwhile, the variables of cayenne pepper commodity prices (LnHCAWIT) and inflation values (INFL) in Kotabaru, South Kalimantan Province are stationary at the level. These results are shown by ADF-statistical values greater than *critical values of 5%* and *P-values* greater than 0.05 for each variable.

Selection of the Maximum Lag Order. The results of the maximum *lag order selection* test for the three variables in this study show that the best ARDL (*Autoregressive Distributed Lag*) model is the ARDL (2,0,1) model. Each number of 2,0,1 in the ARDL model (2,0,1) is the maximum value of the lag on each variable. Figure 2 shows the maximum lag for the inflation variable as an independent variable in the model. The number 0 indicates the maximum value of lag for the price variable of cayenne pepper (LnHCAWIT), and the number 1 indicates the maximum value of lag in the variable price of the shallot commodity (LnHBAMER).

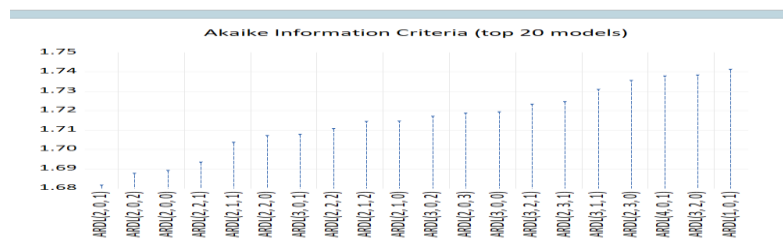


Figure 6. Election results word *maximum Law* on the variables LnHBAMER, LnHCAWIT, and INFL

Sources: Data processed (2025)

Bound Test.

Table 2. Cointegration test results *Bound-Test*

Test Statistic	Value	Significance	I(0)	I(1)
F-Statistic	14.79386	10%	2.63	3.35
K	2	5%	3.1	3.87
		2.50%	3.55	4.38
		1%	4.13	5

Sources: Data processed (2025)

The results of the cointegration test on the variable inflation value (INFL), cayenne pepper commodity price (LnHCAWIT), and shallot commodity price (LnHBAMER) in Kotabaru, South Kalimantan Province using the *Bound Test cointegration test* can be seen in Table 2. The results of the bound-test cointegration test in Table 2 show that the F-statistical value is greater than the I (0) and I (1) values at each level of significance, namely 1%, 2.5%, 5%, and 10%. This result is shown by the F-statistical value at a significance level of 5% which is greater than the values in I (0) and I (1) of $14.79386 > 3.1$ and $14.79386 > 3.87$. Therefore, it can be concluded that there is a cointegration relationship (balance in the long term) in the variable inflation value (INFL), the price of cayenne pepper commodity (LnHCAWIT), and the price of the shallot commodity (LnHBAMER) in Kotabaru, South Kalimantan Province in the period of January 2020 – July 2025.

Classic Assumption Test. Classical assumption tests need to be carried out to find out that the ARDL model formed, namely the ARDL model (2,0,1) at the stage of interpretation of the long-term and short-term relationships between the research variables (INFL, LnHBAMER, and LnHCAWIT) is reliable and does not become biased.

Residual Normality Test. The residual normality test is a test conducted to determine the residual distribution formed by the ARDL model (2,0,1). The residual normality test is seen from the *Jarque Berra value* and the *p-value*. The results of the residual normality test in the ARDL model (2,0,1) can be seen in Table 5. The results shown in Table 5 are that the *p-value* of the ARDL model is greater than 0.05, namely 0.676892 and the *Jarque Berra value* is 0.782546, meaning that the residual in the ARDL model (2.0.1) for the variable inflation value (INFL), the price of cayenne pepper commodity (LnHCAWIT), and the price of the shallot commodity (LnHBAMER) has been distributed normally.

Table 5. The result of the VECM estimate (*Vector Error Correction Model*)

Variabel	Niai <i>Jarque-Bera</i>	<i>p-value</i>	Verdict
Residual (2,0,1)	ARDL 0,782546	0,676892	Failed to Reject Ho

Sources: Data processed (2025)

Homoskedasticity test. This test is to find out if the variance or variety of the residual model of the ARDL (2,0,1) is constant or not. The homocedasticity test uses the *Breusch-Pagan-Godfrey test*. If the *P-value* has a value of more than 0.05, then the ARDL model (2,0,1) is free of heteroscedasticity. The results of the homocedasticity test can be seen in Table 4.

Table 4. Homokedasticity test results *Breusch Pagan Godfrey*

Dependent Variable	Test Statistics	Statistical Value	p-value	Verdict
Residual (2,0,1)	ARDL F-statistics	2.035988	0.0863	Failed to Reject Ho
	<i>Obd*R-Squared</i>	9.573621	0.0883	

Source: Data processed (2025)

Autocorrelation test. This test is to find out whether the residual in the observed time period has an autocorrelation relationship or not. A good ARDL model is an ARDL model in which the residual over the observed time period has no autocorrelation relationship. The autocorrelation test in this study uses the *Breusch-Godfrey* test and is seen from the *Langrange Multiplier* and *p-value* values. If the *p-value* is more than 0.05, there is no autocorrelation to the residual model ARDL (2,0,1) in the observed interval period. The results of the autocorrelation test on the ARDL model (2,0,1) are shown in Table 5.

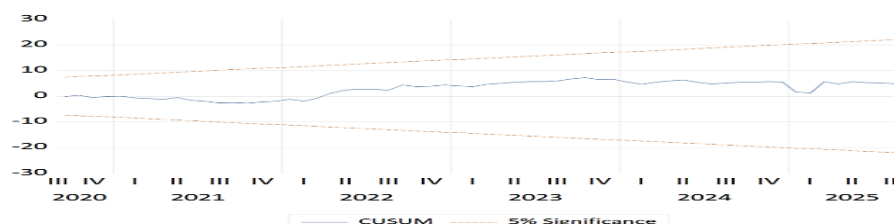
Based on the results of the *Breusch-Godfrey serial correlation LM Test* in Table 5, the *F-statistical* probability value was 0.4991 and the *Obs-R-squared* probability was 0.4578 which is greater than 0.05 at the significance level of 5%. Thus, hypothesis 0 is rejected, which can be concluded that the ARDL model (2,0,1) does not experience residual autocorrelation.

Table 5. Autocorrelation test results

Dependent Variable	Test Statistics	Statistical Value	p-value	Verdict
Residual (2,0,1)	ARDL F-statistics	0.703363	0.4991	Failed to Reject Ho
	<i>Obd*R-Squared</i>	1.562853	0.4578	

Source: Data processed (2025)

Parameter stability test. Parameter stability tests performed on the ARDL model (2,0,1) to determine if the model is stable or not. The stability of the ARDL model (2,0,1) will be measured by the *CUSUM* and *CUSUM-Squares* tests. The results of the stability test on the ARDL model (2,0,1) can be seen in Figure 7. Based on parameter stability tests using *CUSUM* and *CUSUM of squares* in the observation period from January 2020 to July 2025, it was obtained that the two lines were within the significance limit of 5%. So the ARDL model (2,0,1) can be concluded to produce a stable model.



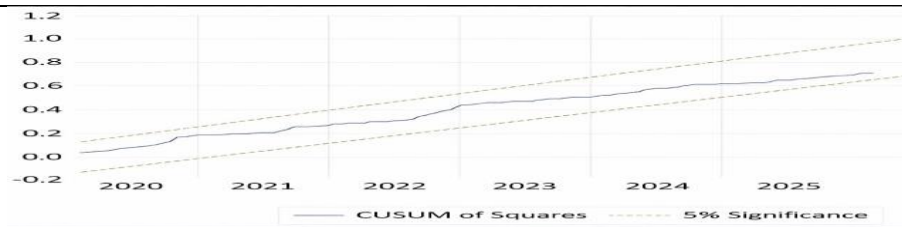


Figure 7. ARDL model stability test results (2,0,1)

Source: Data processed (2025)

3.3 Short-Term Effect Between Inflation and Commodity Prices of Shallots and Cayenne Pepper in Kotabaru, South Kalimantan Province.

The results of the short-term relationship estimates formed in the ARDL model (2,0,1) can be seen in detail in Table 6.

Table 6. Results of the estimated short-term relationship of the ARDL model (2,0,1)

Variabel	Estimation Coefficients	Standar Error	<i>t</i> -statistic	<i>p</i> -value
$INFL_{t-1}$	0.123230	0.119398	1.032093	0.3062
$INFL_{t-2}$	-0.282300	0.118481	-2.382662	0.0204*
$LnHCAWIT_t$	0.530714	0.190870	2.780504	0.0072*
$LnHBAMER_t$	0.891460	0.392217	2.272876	0.0266*
$LnHBAMER_{t-1}$	-0.631973	0.394900	-1.600335	0.1148**
C	-8.319460	3.890179	-2.138580	0.0366
<i>R</i> -squared	0.47553			

Remarks : *significant at a significance level of 5%

Sources: Data processed (2025)

Based on the specifications of the short-term ARDL model above, the short-term influence equation formed between the variables INFL (inflation), LnHCAWIT (cayenne pepper commodity price), and LnHBAMER (shallot commodity price) in Kotabaru, South Kalimantan Province is as follows:

$$INFL_t = \beta_0 + 0,12323 INFL_{t-1} - 0,2823 INFL_{t-2} + 0,530714 LnHCAWIT_t + 0,89146 LnHBAMER_t - 0,631973 LnHBAMER_{t-1} + \varepsilon_t$$

4. DISCUSSION

4.1 The effect of inflation in the previous period on inflation in the current period in Kotabaru, South Kalimantan Province in the 2020-2025 Period.

From the results of the short-term relationship estimate in the ARDL model (2,0,1) in Table 6, it shows that the inflation variable in the previous period ($INFL_{t-1}$) has a positive coefficient of 0.1232 which shows that the increase in inflation in the previous period tends to increase inflation in the current period. However, this effect is not statistically significant at the level of 5% significance because the *p*-value of 0.3062 is greater than 0.05. So that the inflation value of the previous one period in Kotabaru has not been proven to have a strong and significant effect

on the current inflation rate. Meanwhile, the variable of the inflation value at the 2nd lag ($INFL_{t-2}$) has a significant effect on inflation in the current period ($INFL_t$). This result is supported by the inflation variable at the 2nd lag ($INFL_{t-2}$) having a p -value of 0.0204 which is less than 0.05 and significant at the significance level of 5%. The estimation coefficient on the variable has a negative value of -0.282300. So, it can be interpreted that if the inflation rate has increased in the past 2 periods, then the current inflation rate will decrease. This shows that the increase in inflation in the previous two periods actually reduced inflation in the current period in Kotabaru, South Kalimantan Province. The results of this study indicate that there is an adjustment mechanism in inflation dynamics where the surge in inflation in the past period was followed by adjustment efforts so that inflation tended to decline in the next period. $INFL_{t-2}$

4.2 The effect of cayenne pepper commodity prices on inflation in the current period in Kotabaru, South Kalimantan Province in the 2020-2025 period.

From the results of the short-term relationship estimate in the ARDL model (2,0,1) in Table 6, it shows that the variable price of cayenne pepper commodities in the current period or in the current period ($LnHCAWIT_t$) has a significant effect on the inflation value in the current period also with a p -value of 0.0072 which is less than 0.05 and statistically significant at a significance level of 5%. The coefficient of $LnHCAWIT_t$ 0.530714 shows that an increase in the price of cayenne pepper commodities in the current period by 1% will increase the inflation value in the current period by 0.53% assuming other variables are constant. The results of this study indicate that the increase in the price of cayenne pepper commodities contributes to encouraging an increase in the inflation value in Kotabaru, South Kalimantan Province. The price of cayenne pepper commodities often experiences sharp increases or fluctuations due to an imbalance between demand and supply (supply). One of the causes of the supply imbalance of the cayenne pepper commodity is because cayenne pepper is sensitive to climate and weather changes so that production is easily disrupted by extreme weather such as high rainfall or drought. An imbalance between demand and supply of cayenne pepper with low supply elasticity will result in large price changes in the event of a supply disruption or demand surge.

4.3 The effect of shallot commodity prices on inflation in the current period in Kotabaru, South Kalimantan Province in the 2020-2025 Period

The results of the short-term relationship estimate in the ARDL model (2,0,1) in Table 6 show that the variable price of shallots in the current period (has a significant effect on the inflation value ($LnHBAMER_t$) $INFL_t$). This result is shown by the p -value of the variable of $LnHBAMER_t$ 0.0266 which is less than 0.05 and significant at the significance level of 5%. So it can be interpreted that the increase in the price of shallots in the current period will also increase the inflation value in the current period in Kotabaru, South Kalimantan Province. The coefficient $LnHBAMER_t$ shows the number 0.891460 which means that an increase in the price of shallots by 1% will increase the inflation value by 0.89%. Meanwhile, the variable price of shallots in the previous period (1 month ago) had a significant effect on the inflation value in the current period (. This result is shown by a $LnHBAMER_{t-1}INFL_t$) p -value of 0.1148 which is smaller than 0.12 and significant at a significance level of 12%. The coefficient in the variable of -0.631973 means that when the price of shallots increased by 1% in one period ago, the inflation value will decrease by 0.63% in the current period. The shallot commodity is one of the commodities that

often contributes to inflation, especially through the $LnHBAMER_{t-1}$ volatile food inflation component in the Consumer Price Index (CPI). The main cause of this is caused by fluctuations in the price of the shallot commodity due to price increases that occur due to high demand but are not balanced with suitable supply to meet this demand. The results of research from Dwi Lestari, et al (2024) also state that rice, onions, and chili peppers are the main food commodities. The increase in commodity prices can cause an increase in inflation. The commodity price of shallots is a commodity that contributes significantly to inflation. The commodity price of shallots also has a significant impact on inflation in both the short and long term. Lestari, et al (2024) also stated that fluctuations in the price of shallots contribute significantly to the rate of inflation, especially in the short term because sharp price changes in this commodity will be directly reflected in the Consumer Price Index.

4.4 Long-Term Effect Between Inflation and Commodity Prices of Cayenne Pepper and Shallots in Kotabaru, South Kalimantan Province

The estimated long-term relationship in the ARDL (*Autoregressive Distributed Lag*) model (2,0,1) formed between inflation and commodity prices of shallots and cayenne pepper can be seen in Table 7.

Table 7. Results of the estimated long-term relationship of the ARDL model (2,0,1)

Variabel	Estimation Coefficients	Standar Error	t-statistic	p-value
LnHCAWIT	0.457879	0.164404	2.785084	0.0072*
LnHBAMER (-1)	0.223875	0.280296	0.798708	0.4276
C	-7.177698	3.053176	-2.350896	0.022
ECT	-0.907014			

Source: Data processed (2025)

Based on the results in Table 7, it shows that the variable price of cayenne pepper commodity (LnHCAWIT) has a significant effect on inflation in the long term in Kotabaru, South Kalimantan Province at a significance level of 5%. This result is shown by the *LnHCAWIT* p-value which is less than 0.05, which is 0.0072. As for the variable price of shallots (LnHBAMER), it shows that the price of shallots does not have a significant effect on inflation in Kotabaru, South Kalimantan Province in the long term.

So that the specifications of the ARDL model (2,0,1) that can be formed in a long-term relationship with the variable inflation (INFL), the price of cayenne pepper commodity (LnHCAWIT) and the price of the shallot commodity (LnHBAMER) in Kotabaru, South Kalimantan Province are as follows:

$$INFL = -7.177698 + 0.457879 LnHCAWIT + 0.223875 LnHBAMER + \varepsilon$$

with:

INFL : Inflation Rate (percent)

LnHCAWIT : price of cayenne pepper commodity (Rp/kg)

LnHBAMER : price of shallots (Rp/kg)

ε : Standard Error

Long-Term Effect Between Inflation and Cashiness Commodity Prices. Based on the results of the estimated long-term relationship in Table 7 between the variable of the inflation value and

the price of the cayenne pepper commodity, there is a long-term equilibrium relationship between the two variables. The existence of a long-term equilibrium relationship that is formed shows that when the price of cayenne pepper commodities rises, the inflation value in Kotabaru, South Kalimantan Province will also increase in the long term. The positive coefficient possessed by the variable price of cayenne pepper commodity of 0.457879 shows that if the price of cayenne pepper increases by 1%, then the inflation value in Kotabaru will also increase by 0.46% in the long term. So, this makes the Kotabaru Regional Government of South Kalimantan Province have to be careful if there is an increase in the price of cayenne pepper commodities in the long term because it will result in an increase in inflation also in the Kotabaru area, South Kalimantan Province. Theoretically, this condition is a reflection of the *cost-push inflation mechanism* where the increase in cayenne pepper prices in the market due to production costs will increase household consumption costs in a sustainable manner. This can happen because the cayenne pepper commodity is one of the strategic food commodities that is widely and routinely consumed in the Kotabaru area, South Kalimantan Province, so that the price increase is difficult to avoid and be substituted by other commodities. If the increase in cayenne pepper prices is left uncontrolled properly in Kotabaru, then this will be able to encourage internalization in people's inflation expectations. The point is that the increase in the price of cayenne pepper will no longer be perceived by the community, traders and producers of cayenne pepper in Kotabaru as a temporary event, but will be considered a natural occurrence and will continue to recur and will happen again in the future. Usually this happens when the experience experienced continues to be repeated, for example when the price of cayenne pepper continues to rise every year and the price spike occurs at the same moment (rainy season and big holidays), then the increase in the price of cayenne pepper is no longer considered a momentary shock, but as a pattern that will be predictable. The impact of these expectations finally made cayenne pepper traders increase prices early in order to maintain *profit margins and be reluctant to lower prices even though the supply of cayenne pepper commodities has begun to return to normal*.

Long-Term Effect Between Inflation and Shallot Commodity Prices. The estimated long-term relationship in the ARDL model (2,0,1) formed between inflation and the price of shallots can be seen in Table 9. Based on the results of the estimate, it is shown that the increase in the price of shallot commodities (LnHBAMER) does not have a significant effect on the increase in inflation (INFL) in Kotabaru, South Kalimantan Province in the long term. This result is supported by the *LnHBAMER p-value* which has a value greater than 0.05, namely 0.4276 so that it is not significant at the level of significance of 5% or 10%. In other words, although the shallot commodity is a commodity included in *volatile food*, its role in the formation or increase of inflation in the long term is relatively weaker when compared to the cayenne pepper commodity. This shows that the impact of onion prices on inflation is more temporary or short-term and tends to be readjusted in the long term.

The ECT (*Error Correction Term*) value in the ARDL model (2,0,1) in Table 7 shows a figure of -0.907. ECT shows the speed and direction of adjustment of a variable towards long-term equilibrium after a short-term aberration (*shock*). The ECT coefficient serves to correct imbalances in the short term so that the system returns to long-term equilibrium. In other words, ECT explains how quickly inflation returns to its equilibrium path after a shock to independent variables, namely the price of the shallot commodity (LnHBAMER) and the price of the cayenne pepper commodity (LnHCAWIT).

A negative sign on the ECT value of -0.907 means that the adjustment is moving towards balance or stability. A value of 0.907 means that about 90.7% of the inflation imbalance will be adjusted back towards its long-term equilibrium.

5. CONCLUSION

The conclusions of this study are:

1. The development of cayenne pepper commodity prices has fluctuated quite sharply by showing extreme and repeated price spikes, especially in 2020-2021 and Panjang increasing in 2024-2025. On the other hand, the development of the price of Panjang shallots¹²⁹ is stable and fluctuates moderately. This is shown by a pattern of more subtle fluctuations, price increases that tend to be seasonal and temporary, and after experiencing a spike, the price of long shallots¹²⁹ is faster to reach equilibrium. The development of monthly inflation shows quite sharp upward and downward fluctuations, as shown by high inflation in 2024 and deflation in early 2025. Inflation is volatile in the short term but long is¹²⁹ stable and controlled in the long term.
2. The inflation rate in the past two periods, the current price of cayenne pepper commodity, and the price of shallot commodities in the current period have a significant effect on the inflation value in the current period in the short term. Meanwhile, only the price of cayenne pepper commodities has a significant effect on the value of inflation in the long term.

6. SUGGESTIONS

The suggestion that can be given by the author based on this study is to strengthen the price control of cayenne pepper as one of the key commodities for controlling food inflation in Kotabaru, South Kalimantan Province because cayenne pepper has proven to be the main determinant of inflation formation in the long term. The development of cultivation technology and increasing post-harvest storage capacity are very important to maintain supply during production disruptions. Meanwhile, the price control policy of shallots is directed to reduce price fluctuations in the short term through effective stock management and distribution.

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