



Factors Influencing Strategic Food Price Fluctuations Against Inflation in Pangkalpinang City

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Abstract. The research aims to analyze the influence of food prices on the development of inflation in Pangkalpinang. Analysis of the influence of food prices on the development of inflation is needed to evaluate changes in food prices that cause and contribute to inflation. The analytical method used is multiple linear regression. The data used in the multiple linear regression analysis is secondary data on food prices, namely the prices of rice, chicken meat, beef, chicken eggs, onions, garlic, red chilies, cayenne peppers, cooking oil, granulated sugar, and inflation for the period January 2022 to September 2023. The results of the analysis show that the food ingredient variables that have a significant effect are shallots, rice, garlic, beef, red chilies, cayenne pepper, and chicken eggs. Food items such as rice, garlic, cayenne pepper, and beef have a positive effect on inflation.

Keywords: Price; Food; Inflation.

1 Introduction

Inflation is a process where prices increase generally and continuously related to market mechanisms which can be caused by various factors, such as increased public consumption, excess liquidity in the market, or the consequences there is an irregularity in the distribution of goods. Inflation is a process of an event, isn't it? high and low price levels. The price level that is considered high is not necessarily high showing inflation. Inflation is an indicator to see the rate of change, and is taken into consideration occurs if the price increase process takes place continuously and mutually influences (Penangsang, Studiviany, and Wiwoho 2020).

The rate of change in inflation must always be low and stable. This is used to avoid possible macroeconomic problems of economic instability. Reflects high inflation and unstable increases in prices of goods and services in general and continuously over a certain period of time. Inflation that occurs in each region is likely caused by many different factors that influence supply, demand, and expectations. Inflation affects a nation's economy. Inflation describes a person's purchasing power of exchange rates during a period. Purchasing ability a further decline may indicate this Inflation is

increasing as the inability to pay consistent prices increases. Buy an item. The quantity obtained is less than the previous period at the same price.

Inflation can be used as an indicator of economic conditions that can be explained as positive and negative. The value of an asset can depend on the evolution of inflation. Inflation can be divided into three types, namely demand-pull inflation, cost-pull inflation, and aggregate inflation. Central Statistics Agency (BPS) Measures inflation in consumer goods and services, especially food; food, drinks, cigarettes, and tobacco; housing, water, electricity, gas, fuel; clothes; health; education, entertainment, and sports; transportation, communications, and financial services; and general. Changes in commodity and service prices may affect economic requirements, including changes in Food materials. Rising food prices can contribute to country inflation (Al-Shawarby and Selim, 2013).

Some previous research also found that food prices also play a role important for inflation. Research conducted by (Iddrisu and Alagidede, 2020) states that food prices are a particular challenge for low-income countries which requires the government to make monetary policy that is right on target for the welfare of its people and food prices the world has an important role in determining domestic food prices. Research conducted by (Durevall, Loening, and Birru, 2013) found that the amount of agricultural supply influences food inflation and causes price deviation thus showing that inflation in Ethiopia is closely related to the dominant role of agriculture and food in the economy.

The population structure of Pangkalpinang City in the population pyramid is classified as expansive, which shows that the dominant population is the young population. The population of Pangkalpinang City, based on the population projection from the LF SP2020 results in 2022, is 224,165 people with a growth rate for 2021-2022 of 1.46 percent. Source: BPS Pangkalpinang 2023. If you look at the population pyramid, Pangkalpinang City is dominated by people of productive age. The number of people of productive age that is twice as large indicates a "Demographic Bonus". However, if you look at developments, the proportion of the population aged 0-14 years in Pangkalpinang City is decreasing from 25.50 percent in 2020 to 25.19 percent in 2022. In the same period, the population aged 15-64 years also decreased from 69.13 percent to 68.83 percent. Meanwhile, the population aged 65 years and over increased from 5.38 percent to 5.98 percent.

The inflation rate is an indicator of the level of price changes in a region. Controlling inflation is necessary to maintain the stability of people's purchasing power. One way of recording price movements in calculating inflation is carried out in Pangkalpinang City, the capital of the Bangka Belitung Islands Province. Apart from that, Pangkalpinang is also the trade and economic center of Bangka Belitung. In 2022, the monthly inflation rate (2018=100) in Pangkalpinang City will be 6.07 percent after the previous year experienced much lower inflation, namely 3.60 percent. Overall, the highest inflation occurred in April, namely 1.8.

Table 1. Contribution of Main Commodities to Inflation or Deflation in Pangkalpinang City 2022

Comodity	Share of Inflation (%)
Gas	1,1988
Air Freight	1,0762
Household Fuel	0,5183
Fulter Kretek Cigarettes	0,3722
Rice	0,3304
Comodity	Share of Inflation (%)
Selar Fish	-0,2407
Cooking oil	-0,2394
Motorcycle	-0,0847
Mackerel	-0,0819
Cayenne pepper	-0,0489

Source: BPS Pangkalpinang (2023)

Several commodities that dominantly contribute to y-on-y inflation in December 2022 include gasoline (1.1988 percent), air transportation (1.0762 percent), household fuel (0.5183 percent), filtered clove cigarettes (0.3722 percent), and rice (0.3304 percent). On the other hand, commodities that contributed to y-on-y deflation include: trevally fish (-0.2407 percent), cooking oil (-0.2394 percent), motorbikes (-0.0847 percent), mackerel (-0.0819 percent), and cayenne pepper (-0.0489 percent).

Food prices are one of the factors that contribute to the development of national inflation. Research inflation problem because it is a macro indicator that explains the country's economic condition. This research aims to analyze the impact of food prices. The main foods include rice, chicken and beef, eggs, onions, garlic, red chilies, cayenne peppers, cooking oil, and granulated sugar so that we can find out which factors can be taken into account as controls.

2 Literature Review

2.1 Food

The increase in demand for food commodities will continue in line increase in population. On the other hand, the condition of food commodities is vulnerable to climate which ultimately results in disruption of the supply of agricultural commodities. Demand continues to increase without being followed by developments in supply. Instability will have an impact on price increases to reach a new balance. Food price instability occurs due to an imbalance between demand and offers on food commodities (Siregar, 2020).

The food crop subsector is often also called the people's agriculture subsector. Called this is because food crops are usually cultivated by the people and not by company or government. This subsector includes food commodities such as rice, corn, cassava, yam, peanuts, soybeans, vegetables, and fruit (Demmatadju, 2012).

Food is defined as anything that comes from biological sources and water, whether processed or unprocessed. UU No.18 of 2012 concerning Food defines food as anything that comes from biological sources, agricultural products, plantations, forestry, fisheries, animal husbandry, waters, and water, whether processed or unprocessed, intended as food or drink for human consumption, including ingredients, food additives, food raw materials, and other materials used in the process of preparing, processing, and/or making food or drinks.

Food commodities are one of the important commodities in life man. The important role of food is the basis for world development businesses related to food commodities and processed ingredients from each food ingredient that exists. There is a shortage of supply and high public demand for food causes fluctuating food prices, thus having an impact on the economy of a region. This can be seen from its contribution to inflation. Food commodities are of concern because they are included in the group of foodstuffs that are a sizable contributor to inflation.

2.2 Food Price Fluctuations

Fluctuation is a phenomenon that shows the rise and fall of the prices of goods or services. Prices themselves play a very important role in a market economy, especially in directing production and consumption. Price can be interpreted as an agreement on the value that is the terms of exchange in a buying and selling transaction. Food commodity prices are greatly influenced by the stability of the distribution of demand and supply. The phenomenon of food price fluctuations is an important concern for discussion by the government and economic actors.

According to Rizaldy's research, food commodities have a significant role big in various aspects of life. Food prices themselves are affected by supply and demand often fluctuates due to various things such as weather, pests, and other factors that interfere with broadcast distribution activities. In Indonesia, commodity prices that often experience price fluctuations are; rice, chili, eggs, cooking oil, chicken, milk, soybeans, corn, etc.(Rizaldy, 2017).

Food price fluctuations are caused by an imbalance between supply and demand of food. Demand for food will continue to increase as it increases population, standard of living and community welfare. From the supply side, food is very vulnerable to fluctuations such as climate and natural conditions, restrictions on agricultural land, and changes in function, as well as geopolitical conditions international. (Ardiyanti and Juliprijanto, 2020). This will result in frequent disruption in the supply of agricultural products. Demand is growing rapidly high and continues to soar without complying with the supply development balance causing the price to rise to reach a new equilibrium. Change Food product prices are the biggest contributor to inflation nationally (Fadhilah et al. 2020).

2.3 Inflation Concept

Inflation is a classic problem in an economy that can result in a decline in people's real income. Inflation that occurs continuously has a negative impact on the macro economy. This places the issue of inflation as a very important indicator in maintaining the economic stability of a region. According to Suseno, inflation is a tendency for prices to increase generally and continuously. An increase in the price of an item cannot be said to be inflation.

Inflation occurs when an increase in the price of one good spreads and is followed by an increase in the price of other goods. Bank Indonesia stated that inflation is an increase in the prices of goods and services in general, which are high and will be a burden for many parties. Keynesian economists argue that inflation is a monetary phenomenon. In the long term, there is a close relationship between inflation and the amount of money in circulation (Rahmanta and Maryunianta, 2020).

The increase is one or two prices Only commodities are not considered inflationary unless the increase extends to Lead to (or raise) most other commodity prices.(Nasution and Asbur, 2022).

Inflation is caused by 3 factors;

a. Cost pressure inflation. This inflation is caused by the devaluation of the exchange rate

and the influence of external inflation, especially by producers, commodity prices are regulated by the government and negative supply shocks that are caused by the existence of

natural disasters and distribution disruptions.

b. Demand-pull inflation is when aggregate demand increases more fast with production.

c. Inflation expectations, Inflation that is influenced by economic actions or behavior

of household. This can be seen in the pricing during celebrations and holidays such as Idul Fitri, Christmas, etc. (Irawati, 2018)

In this case, inflation is experienced by many developing countries and is described as a macroeconomic challenge that must be faced by every developing country. The results of research conducted by (Jongwanich and Park, 2008) on 9 developing countries, namely: China, India, Indonesia, Korea, Malaysia, Philippines, Singapore, Thailand, and Vietnam said the cause of inflation is due to fluctuations in food commodities.

2.4 The Relationship between Food Price Fluctuations and Inflation

Food commodity prices have a very important role in controlling inflation. The Central Statistics Agency (BPS) also classifies the increase in food prices as a component of volatile inflation. This is based on the nature of food commodities which are easily influenced by the harvest period, natural disturbances, domestic and international food commodity prices. Its significant contribution to inflation and its quick response to various shocks make it worthy of being used as a leading indicator for inflation (Jusar, Bakce, and Eliza, 2017).

According to Christanty, when inflation in a region enters a crisis phase, it will also be followed by the commodity market which also enters a crisis phase. The financial crisis is considered more likely to create fluctuations in self-esteem than speculation. However, when speculative activities occur in the commodity market, it can indirectly reveal a relationship between the financial crisis and the commodity market (Siam, Laili, and Khairi, 2014). Price changes that occur in food commodities are the largest contributor to the inflation rate in Indonesia. The demand for food will continue to increase in line with population growth, the greater the population of an area, the greater the demand. In some cases, the supply of food is not able to meet the needs that must be met. This will then trigger inflation due to increasing market prices (Rahmanta and Maryuniata, 2020).

3 Method

3.1 Multiple Regression Analysis

The data used in the multiple linear regression analysis is secondary data consisting of food prices, namely rice, chicken meat, beef, chicken eggs, onions, garlic, red chilies, cayenne peppers, cooking oil, granulated sugar, and inflation. The unit of food price is Rupiah per kilogram, while inflation is expressed in percent. Data sources were obtained from the National Strategic Food Price Information Center and Bank Indonesia with a period of January 2022 to September 2023. Data analysis used reviews 12.0 software.

Multiple linear regression is an analytical method for estimating the relationship between more than one independent variable (X) and the dependent variable (Y). The multiple linear regression model is as follows:

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \dots + \beta_p X_{pi} + e_i$$

$$Y = X\beta + e$$

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + e_i$$

Keterangan:

Y : Inflation

β_0 : Constanta

β_1 - β_{10} : Independent variable regression coefficient

X_1 : Rice

X_2 : chicken meat

X_3 : beef

X_4 : egg

X_5 : red onion

X_6 : white onion

X_7 : red chili pepper

X_8 : Cayenne pepper

X_9 : cooking oil

X_{10} : Sugar

: residu

4 Result and Discussion

August 2023, the y-on-y inflation rate and y-to-d inflation rate will be 3.45 percent and 2.13 percent respectively. The y-on-y and y-to-d inflation rates in the same period in 2022 are 6.38 percent and deflation 4.04 percent respectively; while in 2021 they will be 2.86 percent and 1.47 percent respectively.

Table 2. Inflation Rates Month (m-to-m), Year to date (y-t-d), and Year on Year (y-on-y) Combined 2 cities in Bangka Belitung 2021-2023 (percent)

Inflation Rate	2021	2022	2023
Month to Month (m-to-m) Agustus	-0,07	-1,36	-0,10
Year to Date (y-t-d) Agustus	2,13	4,04	2,13
Year on Year (y-on-y) Agustus	2,86	6,38	3,45

Sources: BPS Pangkalpinang (2023)

In 2022, Pangkalpinang City's y-on-y inflation was highest in July 2022, reaching 7.88 percent, while the lowest was in February at 3.44 percent. This high inflation is caused by a quite large increase in prices in July 2022 because it coincides with the school holidays and the new academic year, as well as the start of post-COVID-19 economic activities. January-August 2023, the highest y-on-y inflation in Pangkalpinang City was observed in February 2023, which reached 4.92 percent. Meanwhile, in August 2023, y-on-y inflation was recorded at 3.14 percent, with y-on-y inflation contributed mainly by the commodities gasoline, rice, filtered clove cigarettes, air transport, and white cigarettes.

Table 3. Eviews Descriptive statistics, 2023

Foodstuffs	Mean	Median	Maximum	Minimum	Jarque-Bera	Probability
Red onion	38365.38	36250.00	65750.00	22150.00	1.697.788	0.000000
White Garlic	29884.74	29000.00	43250.00	22900.00	4.550.163	0.000000
Rice	12084.62	11500.00	14300.00	11100.00	4.295.898	0.000000
Red chili pepper	55562.53	50000.00	98150.00	30750.00	3.588.048	0.000000
Cayenne pepper	61549.89	57500.00	125000.0	38000.00	3.335.801	0.000000
Chicken meat	37365.26	37150.00	48500.00	29000.00	1.205.465	0.002412
Beef	130960.4	131250.0	150000.0	118150.0	1.363.489	0.001095
Sugar	14414.92	14500.00	15650.00	13350.00	1.381.731	0.000000
Cooking oil	18745.22	18400.00	25650.00	14000.00	1.333.497	0.000000
Chicken eggs	27879.61	27000.00	35100.00	22500.00	3.637.279	0.000000

Source: Secondary data Analysis, 2023

The Jarque-Bera normality test in Table 1 is used to see the normality of data distribution by considering skewness and kurtosis. If the Jarque-Bera probability value is not significant or more than alpha then the variable is normally distributed. Basen on Tble Jarque-bera probability values that are greater that alpha are onions, garlic, cooking oil, chicken eggs, red chilies, chicken meat chilies, and inflation. The variables rice and granulated sugar have significant Jarque Bera probability values. Basen on the Central Limit Theorem (A. Barri 2019), the number of data samples continues to increase or is more than 30, the data is getting closer to normality. This condition is seen from the population (N) which is unlimited, the standard deviation is limited, and the standardized mean of the sample approaches a normal distribution with the average value (mean) the same as the mean value in the population.

Table 4. Classic Assumption Test and R-Squared Value for Multiple Linear Regression Analysis

R-squared	0.851
Adjusted R-squared	0.844
S.E. of regression	1.199
F-statistic	79.85
Serial Correlation LM Tes Prob.	0.00000
Chi-Square (10)	1.754
Heteroskedasticity; Breusch-Pangan-Godfrey (BPG) Probb. Chi-Square (5)	0.659
Multicollinearity; Variance Inflation Factors (VIF)	

Red onion	2.49542
Rice	3.24906
White Garlic	1.38953
Red chili pepper	3.78923
Cayenne pepper	1.87345
Chicken meat	2.90743
Sugar	1.84653
Cooking oil	3.15392
Chicken eggs	3.34859

Source: Secondary data Analysis, 2023

The R-squared value based on Table 2 is an indicator of goodness of fit which shows the proportion of total variation in the dependent variable explained by the independent variable of 85.41%. Serial Correlation LM Test is used as an autocorrelation indicator with Prob Chi-Square at lag 10, namely 1,754. The Prob Chi-Square value is greater than alpha 0.05 so it is not significant, meaning that the estimate is free from autocorrelation. The heterocedasticity test using Breusch Pagan-Godfrey (BPG) shows the value of Prob. Chi-Square is not significant, namely 0.659, so the estimate is free from heteroscedasticity. The Variance Inflation Factors (VIF) value for all variables is smaller than 10, so there is no multicollinearity problem in the estimation.

Table 5. Effect of Food Price Variables on Inflation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Red onion	-1.692	1.197	-1.412	0.158
Rice	0.0011	0.00017	6.8825	0.0000
Garlic	0.000155	3.25116	4.79040	0.0000
Red chili	-9.04997	7.97595	-11.3465	0.0000
Cayenne pepper	6.849070	7.55149	9.06981	0.0000
Chicken meat	-2.55898	2.02052	-1.26649	0.2060
Beef	0.00015	2.24203	6.81201	0.0000
Sugar	-0.00030	0.0003	-0.88770	0.37520
Cooking oil	5.90107	5.90107	-0.8389	0.40196
Egg	-0.00027	3.20434	-8.5445	0.0000

Source: Secondary Data Analysis, 2023

Table 4 shows the effect of food on inflation. The independent variable has a significant influence if the value of Prob. smaller than the alpha significance value used. The food ingredient variables that have a significant effect are shallots, : rice, garlic, red chili cayenne pepper, beef, and chicken eggs. Food items such as rice, garlic, cayenne pepper, and beef have a positive effect on inflation. An increase in the price of garlic, chicken meat, and granulated sugar by 1% will increase inflation. The coefficients for the food ingredients onions, red chilies, chicken meat, sugar, cooking oil, and eggs have a negative sign, so the influence on the increase in inflation is slower than other food ingredients which have a significant effect.

The increase in rice prices was caused by various things, including reduced domestic rice supplies due to the end of the harvest period and decreased output due to the El Nino phenomenon which caused drought in power generating areas. The increase in rice prices occurred for medium and high quality rice types. The price of medium-quality rice rose 3.33% (MT) and the price of premium rice rose 2.72% (MT). The price of red chilies has increased as the chili planting season arrives at the farmer level.

Commodity price fluctuations can occur and contribute to inflation due to warming prices will disrupt price estimates (future prices) and supply and demand conditions (Moreira, 2014). According to (De Gregorio, 2012), food ingredients have a greater proportion than the non-food needs of total household expenditure. With so if there is a change in price then will affect the value of real household wages that can be spent. Price matters food based on research (Tule, Salisu, and Chiemeke 2019), becomes a variable that can analyze inflation forecasts from variations changes in food prices. Besides that, the use of a lot of labor in the agricultural sector could be one of the causes of the increase in wage levels, so that the cost of production factors increases which is cost-pull inflation.

The price of chicken meat has decreased in line with the increase in chicken supply as a result of the easing of the early cull or culling-cutting policy. The decline in the price of purebred chicken eggs was influenced by an increase in supply from outside the region while demand was relatively stable. The price of shallots has decreased in line with the increase in supply in areas affected by the ongoing harvest season. The price of garlic commodities experienced a decline due to the increasing availability of supplies nationally in line with the increase in the realization of garlic import procurement.

The results of this research are in line with research (Ardiyanti and Juliprijanto, 2020) that broiler chickens are the biggest and most important response against inflation, both short and long-term in Bangka Belitung.

The results of this research are in line with research (Rahmanta and Maryunianta, 2020) which said that in the short term period the prices of rice, fresh breed chicken eggs, and curly red chilies have a significant impact. Then in the term period, only the price of rice contributes to inflation Bangka Belitung province, this research is supported by the Structuralist Theory which explains that the cause of inflation is due to the economic structure, especially material commodities food. This activity started from an increase in the need for products that were not available coupled with increased production. This will increase the cost shortage material and foreign exchange shortages. Apart from that, food commodity prices rose over time which can swell and cause inflation. This kind of inflation cannot be easily overcome by reducing the amount of money in circulation, but it needs to be addressed by Increasing productivity and sector development of food/export goods. Therefore, this theory is a term inflation theory long.

5 Conclusion, Implication and Limitation

The inflation rate is an indicator of the rate of change in prices in a country region. Inflation control is necessary to maintain purchasing power stability public. Movement recording prices in calculating inflation are wrong the other is done in the City of Pangkalpinang, as the provincial capital of Bangka Belitung Islands. Besides that, Pangkalpinang is also a center of trade and economy in Bangka Belitung. In 2022, the inflation rate monthly (2018=100) in the City of Pangkalpinang was 6.07 percent after experiencing the previous year's much lower inflation namely 3.60 percent. Overall, the highest inflation occurred in April namely 1.82.

The development of national inflation is caused by the experience of price fluctuations. Causes of fluctuations in food material prices are sometimes included in crop supply, weather, demand levels, standard raw material prices and international prices. Reduced purchasing power also causes inflation. Low people's purchasing power and the influence of EL NINO to meet people's needs.

Judging from the size of the contribution to y-on-y inflation in December 2022 (during 2022), all groups' spending contributes to inflation. Groups that contribute to inflation. The largest is the food group, drinks, and tobacco, namely 2.2596 percent. Some commodities that dominantly contribute to y-on-y inflation in December 2022, including: gasoline (1.1988 percent), air transportation (1.0762 percent), household fuel (0.5183 percent), filtered clove cigarettes (0.3722 percent), and rice (0.3304 percent). On the other hand, commodities contributed to y-on-y deflation between others: trevally (-0.2407 percent), oil fried (-0.2394 percent), motorbikes (-0.0847 percent), mackerel (-0.0819 percent), and cayenne pepper (-0.0489 percent).

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