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Food Price Inflation, GNPIP Policy, and Economics Growth in Indonesia

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Abstract

This study examines the impact of food inflation and the role of the National Food Inflation Control Movement (GNPIP) on regional economic growth measured through Gross Domestic Product (GDP) per capita, using the 2018–2023–time panel data with cross-section of 34 provinces in Indonesia. Using cross-regional panel data analysis, the results show that food inflation in general has a significant negative impact on GRDP per capita, with a delay in one period, especially through a decrease in household purchasing power, especially in low -income groups. Conversely, rice inflation shows a significant and delayed positive effect on economic growth, driven by revenue redistribution to rural producers and multiplier effects in the agricultural economy. However, corn and soybean inflation does not show a significant impact, which is caused by the limited role of these commodities in direct consumption, weak economic linkages, import dependence, and low supply elasticity. The GNPIP policy has proven to have a positive and significant influence on GRDP per capita, confirms its multiple roles in maintaining price stability while encouraging regional economic growth through increasing consumption and investment activities. Nevertheless, GNPIP is unable to moderate the relationship between rice inflation and economic growth, indicating its limited capacity in reducing the shocks of certain commodity prices. One of the important mechanisms of GNPIP is announcement effect, which helps prevent panic buying by giving positive signals to the public about food availability and price stability. This study confirms that GNPIP has a strategic role in maintaining economic stability by averting panic buying and bolstering the advancement of the domestic economy.

Keywords

GNPIP, GDP per capita, food inflation, announcement effect.

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Introduction

Indonesia as an agrarian country with a population of more than 280 million people, has a significant dependency on the agricultural sector to meet the food needs of its people (Afriyanti et al., 2023). Staple food ingredients such as rice, corn, and soybeans are strategic commodities that are not only a major source of consumption but also affect national economic stability (Mamat and Husen, 2021). These three commodities have an important role in sustaining food security and contributing directly to domestic inflation. Fluctuations in the price of food commodities are often one of the main factors that affect the level of inflation in Indonesia, which in turn can have an impact on the income of the community and overall economic growth.

One important indicator for measuring the economics growth of a country or a region is GDP per capita, which reflects the average income per individual in a country or a region. GDP per capita not only reflects the level of economic productivity but also the quality of life of the community. Per capita income (GDP per capita) is a very important indicator to measure the progress of development and economic potential of a region. This reflects people's purchasing power and shows how much the market is in an area. Regions with high GDP per capita usually have a large market, higher economic growth potential,

and a larger scale of production. Therefore, GDP per capita is often used as a proxy to measure economic growth and community welfare (Tatiana et al., 2015).

Food inflation is one of the macroeconomic indicators that is very important because it reflects changes in the price of goods and services in a country. High and unstable food inflation can reduce people's purchasing power, increase economic uncertainty, and hamper economic growth (Negi, 2022). In Indonesia, food inflation is often the main contributor to general inflation (headline inflation), mainly because of the dominance of commodities such as rice, corn, and soybeans in the pattern of public consumption. Inflation control is needed because inflation in the Indonesian economy can affect economic growth (Nuryati et al., 2006; Siregar & Ward, 2001). Therefore, food inflation controls economic stability and improves the welfare of the community.

Macroeconomic stabilization including food inflation can be done by implementing the supply side policies such as improving agricultural technology. (Siregar and Ward, 2002). As part of a strategic effort to overcome the challenges of food inflation, the Indonesian government launched the National Food Inflation Control Movement (GNPIP). This program aims to stabilize food prices through various policies, such as increasing local food production, optimizing distribution, and market interventions through cheap market operations. GNPIP is expected to reduce food price volatility, so that inflation can be controlled and its negative impacts on the economy can be minimized. The GNPIP program is implemented by the Bank Indonesia KPwDN (Domestic Representative Office) in 46 working areas of the domestic representative office of central bank during July to December 2022.

GNPIP program is an effort to control food inflation in terms of demand and supply so that it can support the purchasing power of the community and accelerate the recovery of the national economy. This effort is part of the TPIP/TPID program which is also an Extra Effort of Food Inflation Control as a follow-up to the directions of the President of the Republic of Indonesia at the National Coordination Meeting (Rakornas) Inflation Control 2022. The superior program implemented by the KPwDN (Domestic Representative Office) of Bank Indonesia. The seven excellent programs or strategies are: (i) Optimization of the K/L Budget (ministries/ institutions) and local governments for market operations (OP), cheap markets, availability of supply and price stabilization (KPSH) and maintaining people's purchasing power; (ii) Expansion of cooperation between regions (KAD) such as strengthening the role of regional - owned enterprises (BUMD) related to food; (iii) Optimization of the facilitation of strategic food distribution through the encouragement of subsidies for transportation costs; (iv) Strengthening the resilience of tubers and vegetables and other strategic food supplies by conducting a joint planting movement and replication of the best business models from upstream to downstream; (v) Increasing the use of agricultural machinery (Alsintan) and agricultural production facilities (saprotan) to encourage end-to-end food cluster increase and development; (vi) Strengthening Information and Communication Technology Infrastructure (ICT) such as EWS (Early Warning System) Regional Food Prices; and (VII) Strengthening coordination to control inflation expectations such as strengthening capacity building, socialization, and strengthening coordination and communication between related institutions. These superior programs are prepared by prioritizing structural price stability efforts, forward-booking, and digital-based to support the acceleration of the recovery of the national economy. Coordination with Bank Indonesia within the framework of the GNPIP program includes rice commodities as the main commodity, while other strategic commodities include cooking oil, sugar, broiler eggs, meat, fish, and other commodities that will be adjusted to the risk of inflation and characteristics of each region (Puspitasari et al., 2022).

Food inflation is the main component in general inflation, especially in developing countries where people have a significant proportion of expenses for food consumption. When food prices increase, people's purchasing power decreases, which can hamper household consumption and household income. This has the potential to slow down overall economic growth, reflected in the decline in GDP per capita. Food inflation has a negative influence on GDP per capita because the increase in food prices increases the burden of living costs, and reduces people's purchasing power (Bogmans et al., 2024). In Indonesia, high food inflation can hamper an increase in GDP per capita due to increased living costs and weakening purchasing power. Therefore, understanding the relationship between rice inflation, corn inflation, soybean inflation, and the effectiveness of GNPIP of GDP per capita becomes very relevant to formulate better economic policies.

When food prices increase, producers and food exporters get higher income because they sell their products at more expensive prices (Bredenkamp and Bersch, 2012; Sen et al., 2024). Prabheesh and Laila (2020) found that the increase in the price of palm oil and cooking oil had a positive impact on GDP. Study by Headey (2018) that uses a simulation model to test the relationship between real food price increases and changes in poverty, concludes the relationship between food price increases and poverty reduction. One reason is that agricultural production tends to increase in response to the increase in food prices, which can increase farmers' income. In line with the results of these studies, the research by Headey and Hirvonen (2023) states that an increase in real food prices can reduce the number of poor people. However, this effect is less significant or not even in countries with large urban populations or with a high proportion of non-agricultural population, because this group is less directly involved in food production.

Research conducted by Ivanic et al. (2012) shows that the increase in principal food prices (such as seeds) can increase real income for food producers in poor countries. However, for consumers clean food (for example, families who buy more food than they produce), the impact is actually detrimental. The effect of poverty reduction due to increase in food prices tends to be less frequent and smaller than the effect of increasing poverty. Other studies even state that higher food prices generally increase poverty levels in sub-Sahara Africa, especially for community groups who depend on food purchases (Wodon and Zaman, 2010). Negi (2022) also found that households as consumers esxperienced a total decrease in staple consumption per capita, due to price increases, because household income was reduced even though they replaced purchases from the market with their own agricultural products or subsidized foodstuffs. Other studies have shown that the increase in main food prices significantly increases poverty because of decreased net income, especially in rural areas, because the impact of price increases there is greater than in urban areas (Faharuddin et al., 2023). Thus, we hypothesize that:

H1a: Food inflation has a significant effect on GDP per capita.

H1b: Rice price change (rice inflation) has significant effect on GDP per capita.

H1c: Corn price change (corn inflation) has a significant effect on GDP per capita.

H1d: Soybean price change (soybean inflation) has a significant effect on GDP per capita.

Previous research has provided statistical evidence that in all countries, strong government policy support has an impact on increasing per capita income and faster growth (Indrajaya and Iskamto, 2023; Li and Maskin, 2021). Research conducted by (Ismail and Houssein, 2020; Solihin et al., 2021) also concluded that fiscal policy has a short causal effect on per capita income. Fiscal policies in certain fields are very important and must continue to provide more opportunities for the people to develop better and as a result, get better jobs and improve living standards. According to (Yogi et al., 2025), the development of the agro industry, integrating added value products, and empowering women and youth in agriculture is all important approaches for economic growth. George (2020) states that the growth of strong GDP per capita and GDP occurs in efficient technological conditions, improving skills, and efficient markets. In line with George's results, research conducted by Grabowski and Self (2023) found that agricultural productivity is an important determinant of the extent of economic development. The results of research by Markus and Dietrich (2018) also concluded that there was a significant effect of improving agricultural technology on economic development.

The research by Eberhardt and Vollrath (2016) found that the elasticity of agricultural output (how responsive agricultural production to changes in GDP per capita) varies depending on the type of climate of a region. In countries with moderate or cold climate, this elasticity is lower, meaning that agricultural production is less responsive to increasing GDP per capita. Conversely, in countries with tropical climates or high mountainous areas, this elasticity is higher, meaning that agricultural production is more responsive to increasing GDP per capita. Based on explanation of previous research results, we hypothesize that:

H2: GNPIP policy has a significant effect on GDP per capita.

Research conducted by Tan et al. (2024) concluded that in ensuring food production stability and market price stability, and to ensure that the intervention policy does not distort the food market, the minimum purchase price policy of food and market regulations must be adjusted to be transferred to the income support policy. Other research using the household welfare model shows that government policies on prices

produce progressive welfare impacts and that anti-exploitation steps are successful in reducing the impact of regressive welfare from asymmetrical pass-through (Benzarti et al., 2024). Thus, we hypothesize that:

H3: GNPIP policy moderates the relationship between rice price changes and GDP per capita.

Materials and methods

This research applies to a deductive approach, which involves the formulation and testing of hypotheses. In this context, we use the Dataset Time Series Cross-Sectional (TS-CS) which includes periods from 2018 to 2023. This dataset allows us to analyze historical data to explore the impact of food inflation, public policy, and regional economic conditions on GDP per capita in various provinces in Indonesia. In addition, this study uses descriptive correlational design, which allows us to formulate hypotheses and estimate the relationship between variables such as food inflation, policies, and economic conditions that are modified, with GDP per capita. Descriptive correlational design can be used to develop theory, identify weaknesses in current practice, support existing practices, make evaluations, or study actions taken in similar situations (Bala et al., 2024). This design is very suitable for testing the relationship between two or more variables, as is the focus of this research.

This research is a study with a quantitative approach using secondary data. Secondary data in the form of GDP data per capita, rice prices, corn prices, soybean prices, food inflation, and regional GDP or Gross Regional Domestic Product obtained from the Central Statistics Agency. To test our hypotheses, we employed panel data from 34 provinces within the years, 2018 to 2023 consisting of 204 province-year observations.

The control variables in this study are Gross Regional Domestic Product (GRDP), realization of foreign investment (FDI), unemployment (UNEMP), and education (EDU) to achieve more accurate and reliable estimates of the relationship between GNPIP implementation and GDP per capita. Regional GDP or Gross Regional Domestic Product serves as a key factor to account for variations in economic performance across different regions in Indonesia. By including regional GDP as a control variable, the study aims to isolate the specific impact of the GNPIP program on GDP per capita, independent of the inherent economic disparities between regions. This ensures that the analysis reflects the true effect of GNPIP, rather than being confounded by differences in regional economic output. The inclusion of regional GDP as a control variable is particularly important given the cross-sectional nature of the data, which encompasses 34 provinces in Indonesia, each with varying levels of economic development and productivity.

To test the hypothesis submitted previously empirically and handle challenges related to the Dataset Time Series Cross-sectional (TS-CS) (Beck, 2001). This study uses panel data regression to analyze the relationship between independent and dependent variables by utilizing cross-individual observations (entities) and time. The panel data regression model approaches are applied: Common Effect model (CE), Fixed Effect model (FE), and Random Effect model (RE). The Fixed Effect model (FE) is used to control the heterogeneity of individuals who are not observed but fixed by entering the variable dummy for each entity. Meanwhile, the Random Effect model (RE) assumes that the individual effect is random and does not correlate with the explanatory variable, so it is more statistically efficient if this assumption is met. The selection between FEM and brakes is carried out through the Hausman test. The Common Effect model (Pooled OLS) assumes the absence of cross-individual heterogeneity. Before the main analysis, the classic assumption test includes multicollinearity, heteroskedasticity, and autocorrelation tests. Model validity is selected based on the results of the Multiplier Lagrange test (to compare CE vs. RE) and thirst test (to select between FE vs. RE). The best model is chosen based on the consistency of estimation and parameter efficiency. The equation of values-relevance is modeled as follows:

Baseline model:

$$\begin{aligned} GDPC_{i,t} = {} & \alpha_0 + \alpha_1 FINF_{i,t} + \alpha_2 FINF_{i,t-1} + \alpha_3 FINF_{i,t-2} + \\ & + \alpha_4 GDPR_{i,t} + \alpha_5 RINF_{i,t} + \alpha_6 RINF_{i,t-1} + \\ & + \alpha_7 RINF_{i,t-2} + \alpha_8 CINF_{i,t} + \alpha_9 \text{CINF}_{i,t-1} + \\ & + \alpha_{10} CINF_{i,t-2} + \alpha_{11} SINF_{i,t} + \alpha_{12} SINF_{i,t-1} + \\ & + \alpha_{13} SINF_{i,t-2} + \alpha_{14} GNPIP_{i,t} + \alpha_{15} FDI_{i,t} + \\ & + \alpha_{16} UNEMP_{i,t} + \alpha_{17} EDU_{i,t} + \varepsilon_{it} \end{aligned}$$

Interaction model:

$$GDPC_{i,t} = \alpha_0 + \alpha_1 FINF_{i,t} + \alpha_2 FINF_{i,t-1} + \alpha_3 FINF_{i,t-2} + \alpha_4 GDPR_{i,t} + \alpha_5 RINF_{i,t} + \alpha_6 RINF_{i,t-1} + \alpha_7 RINF_{i,t-2} + \alpha_8 CINF_{i,t} + \alpha_9 CINF_{i,t-1} + \alpha_{10} CINF_{i,t-2} + \alpha_{11} SINF_{i,t} + \alpha_{12} SINF_{i,t-1} + \alpha_{13} SINF_{i,t-2} + \alpha_{14} GNPIP_{i,t} + \alpha_{15} FDI_{i,t} + \alpha_{16} UNEMP_{i,t} + \alpha_{17} EDU_{i,t} + \alpha_{18} FINF_{i,t} * GNPIP_{i,t} + \varepsilon_{it}$$

where $GDPC_{i,t}$ = Gross Domestic Product per capita of a province i at time year t, $FINF_{i,t}$ = Food inflation of a province i at time year t, $GRDP_{i,t}$ = Gross regional domestic product of a province i at time year t, $RINF_{i,t}$ = Rice inflation (Rice's change of price) of a province i at time year t, $CINF_{i,t}$ = Corn inflation (Corn's change of price) of a province i at time year t, $SINF_{i,t}$ = Soybeans inflation (Soybeans' change of price) of a province i at time year t, $GNPIP_{i,t}$ = Dummy of GNPIP policy of a province i at time year t, $FDI_{i,t}$ = Realization of foreign investment of a province i at time year t, $UNEMP_{i,t}$ = Unemployment number of a province i at time year t, $EDU_{i,t}$ = The level of education completion according to high school level of a province i at time year t , and ε_{it} = stochastic error term.

Results and discussion

The first step in data analysis to understand the main characteristics of the dataset before conducting further analysis is to analyze descriptive statistics. Descriptive statistics help describe the basic patterns in data, such as the average value (mean), middle value (median), the value most often arises (mode), as well as the dissemination of data (variance and standard deviation). This provides insight into data distribution (Table 1).

Variable	Mean	Std.dev	Min	Max
GDPC	68538.78	53377	18417.5	322615
FINF	3.973228	1.688706	-0.041182	8.603353
RINF	2.992786	521.028	-8.968773	2.174061
CINF	3.406696	8.498263	-4.483734	6.159879
SINF	4.322454	9.357972	-2.051082	3.815894
GRDP	506929	717899.9	36468.8	3443026
FDI	1039.222	1539.752	5.9212	8283.746
UNEMP	241.1729	419.138	15.38	2533.076
EDU	63.47554	10.98419	27.44	90.12

Note: GDPC Per Capita Gross Domestic Product, FINF Food Inflation, GRDP Regional Gross Domestic Product, RINF Rice Inflation, CINF Maize Inflation, SINF Soybeans Inflation, GNPIP Dummy of GNPIP Policy (0 = Period before applying policy, 1 = Period of policy application)
Source: Stata 17.0 Output

Table 1: Descriptive statistics.

High deviation standards in several variables such as GDPC and GRDP indicate a significant variation between provinces in terms of regional domestic products and GDP per capita. With significant variation, further analysis such as regression can provide deeper insights into the factors that affect GDP per capita and other variables. In general, the average GDP per capita and regional domestic product are quite high, but with significant variations. Food inflation, rice, corn, and soybeans also tend to be stable but with significant variations between provinces (Table 2).

Based on the correlation table presented, the correlation between GNPIP (Dummy of GNPIP Policy) and GDP per capita (GDPC) is 0.1440 with a significance level of 0.1. That is, there is a significant positive relationship between the GNPIP and GDP per capita policy. In other words, the period of implementing GNPIP policy tends to have a higher GDP per capita compared

	GDPC	FINF	GRDP	RINF	CINF	SINF	GNPIP	FDI	UNEMP	EDU	VIF
GDPC	1.0000										
FINF	0.0831	1.0000									1.60
GRDP	0.4722*	0.0988	1.0000								4.73
RINF	-0.1027	0.1929*	-0.0080	1.0000							2.42
CINF	-0.0019	0.0520	0.0718	-0.1598*	1.0000						1.33
SINF	-0.0191	0.0206	0.0752	0.0458	0.0172	1.0000					1.24
GNPIP	0.1440*	0.4869*	0.0756	0.4426*	0.0156	0.0768	1.000				2.38
FDI	0.3509*	0.1022	0.5922*	0.0133	0.0311	0.0540	0.0967	1.000			2.16
UNEMP	0.0320	0.0835	0.6683*	0.0303	0.0628	0.1367	-0.0073	0.3934*	1.000		3.38
EDU	0.3887*	0.1782*	0.2773*	0.0494	-0.0691	0.1360	0.1144	0.1381*	0.3608*	1.000	1.32

Source: Stata 17.0 Output
Note: GDPC Gross Domestic Product Per Capita, FINF Food Inflation, GRDP Gross Regional Domestic Product, RINF Rice Inflation, CINF Maize Inflation, SINF Soybeans Inflation, GNPIP Dummy of GNPIP Policy (0 = Period before applying policy, 1 = Period of policy application); Prov-year obs. = 204, ****p < 0.01, **p < 0.05 and *p < 0.1

Table 2: Pairwise correlation matrix and VIF among all the variables.

to the period before the implementation of the policy. However, to show a statistical relationship and the causal relationship between the two variables, as well as to find out whether the GNPIP policy really affects the GDP per capita or not, further regression analysis is needed as done in this study.

The table also shows a significant positive correlation between GDPs per capita and regional domestic product with a correlation coefficient of 0.4722. This shows that provinces with higher GDP per capita tend to have a larger regional domestic product. A significant negative correlation is found between rice, corn, and soybean inflation with GDP per capita. This shows that when food prices generally rise, GDP per capita tends to go down.

The VIF test results show that all variables in this study are within acceptable thresholds. This shows that there is no significant multicollinearity problem in the regression model used. Thus, the estimated results of regression parameters can be relied upon.

The data used in this study are panel data (combined time-series and cross-sectional data), so that there are possibilities of some statistical problems that must be considered so that the estimation results are not biased or wrong. Therefore, first diagnostic tests are carried out to identify these problems. The diagnostic test results aim to support the validity of the selected method so that the research conclusions can be relied upon.

Based on Table 3, the results indicate no evidence of heteroskedasticity or autocorrelation, satisfying key assumptions of the regression model. The error variant is constant in each group of individuals or time, and there is no inter-sector correlation in a cross-sectional unit over time. Residual distribution has no extreme skewness or kurtosis, which shows that the residual may approach the normal distribution.

Based on the results of the systematic model selection test, the Fixed Effect model (FE) was chosen as the most appropriate specifications for data panel analysis in this study. This decision is supported by the results of the Hausman test, which shows statistically ($p<0.05$), indicating that the individual effect is correlated with the explanatory variable in the model. Thus, the assumption of independence between random effects and regressors, which underlies the Random Effect model (RE) is not fulfilled, thus making FE a more consistent and unbiased approach. In addition, the multiplier Lagrange test (Breusch-Pagan) also confirms that the Pooled OLS (CE) specifications are inadequate, because there are significant variations between individuals that need to be controlled. By utilizing the transformation of within, FE effectively isolates variations in time for each entity, so that it can control unobserved heterogeneity that is constant with time-such as institutional or structural characteristics that are unique for each observation unit. The selection of FE is not only supported by statistical considerations, but also substantive relevance in the context of research, where differences in cross-entity (34 provinces) are expected to affect results systematically. Therefore, this model provides a more reliable estimation and a stronger interpretation of the causal relationship between the variables in the setting of the panel data used.

In addition, to test the resistance of research results, Generalized Least Squares (FGLS) is used as an alternative method. The FGLS method considers the more complex covarian structure, so that it can provide more robust results to violations of classic assumptions in linear regression (Bala et al., 2024).

Table 4 shows the results of the panel data regression analysis on GDP per capita (GDPC) using two models: Baseline Model and Interaction Model. This analysis was carried out with two standard error estimation methods, namely Fixed Effect Model and Feasible Generalized Least Squares (FGLS) for robustness test.

Diagnostics test	Statistics	p-value	Remark
Time (years) fixed effect	1.59	0.2105	Absent
Provinces (units) fixed effect	644.38	0.0000	Present
Group-wise Heteroskedasticity	3.48	0.0621	Absent
Contemporaneous correlation	1736.97	0.0000	Present
Panel serial correlation	2.138	0.1531	Absent
Normality Test Skewness/ Kurtosis			No Skewness and No Kurtosis
Shapiro–Wilk			Normally distributed
Shapiro-Francia			Normally distributed

Source: Author's Compilation, 2025

Table 3: Summary of diagnostic test.

Variables	FE		FGLS for Robustness Test	
	Baseline Model	Interaction Model	Baseline Model	Interaction Model
Constant	-0.8836504*	-1.006984*	3.601475***	3.51056***
	(0.5350122)	(0.5470057)	(0.0027016)	(0.5470057)
$FINF_{i,t}$	-0.0004898	-0.000881	0.0017175	0.0015633
	(0.0016729)	(0.0017115)	(0.0025958)	(0.0027484)
$FINF_{i,t-1}$	-0.0037535**	-0.0040182**	-0.0054589**	-0.0055257**
	(0.0015998)	(0.0016178)	(0.003696)	(0.0026192)
$FINF_{i,t-2}$	-0.0014247	-0.0017931	-0.0019726	-0.002094
	(0.0022729)	(0.0022973)	(0.0495453)	(0.0037262)
$GRDP_{i,t}$	0.9432101***	0.9553757***	0.646036***	0.6531412***
	(0.0407487)	(0.0422904)	(0.0010332)	(0.0513631)
$RINF_{i,t}$	-0.0004255	0.0015907	0.0001741	0.0008598
	(0.0006374)	(0.0019983)	(0.0017766)	(0.0032229)
RINFi,t-1	0.0044087***	0.0047751***	0.0063346***	0.0064487***
	(0.0011115)	(0.0011627)	(0.0012786)	(0.0018677)
$RINF_{i,t-2}$	0.001383	0.0012058	0.0014821	0.0014181
	(0.0007858)	(0.0008026)	(0.0008661)	(0.0013024)
$CINF_{i,t}$	-0.0005807	-0.0005581	-0.0003372	-0.0003276
	(0.0005342)	(0.0005342)	(0.0005917)	(0.000864)
$CINF_{i,t-1}$	0.0000286	-0.0000588	0.0002027	0.0001684
	(0.0003638)	(0.0003727)	(0.000488)	(0.0006042)
$CINF_{i,t-2}$	-0.0004327	-0.0003217	-0.0001659	-0.0001313
	(0.0003004)	(0.0003178)	(0.0004484)	(0.0005153)
$SINF_{i,t}$	0.0004605	0.0004101	0.0009614	0.0009402
	(0.0002799)	(0.0002836)	(0.000399)	(0.0004516)
$SINF_{i,t-1}$	0.000031	0.0000172	-0.0000667	-0.0000705
	(0.0002453)	(0.0002454)	(0.0004177)	(0.0003981)
$SINF_{i,t-2}$	0.0000973	0.0001251	0.00018	0.0001894
	(0.0002567)	(0.0002578)	(0.0152805)	(0.0004184)
$GNPIP_{i,t}$	0.0201898*	0.0198701*	0.0577151***	0.0573513***
	(0.0102651)	(0.0102615)	(0.0060892)	(0.0152551)
$FDI_{i,t}$	-0.01669***	-0.0168923***	-0.019897***	-0.01993***
	(0.0037627)	(0.0037647)	(0.0371774)	(0.0060764)
$UNEMP_{i,t}$	0.0367937	0.0319347	-0.130756***	-0.12962***
	(0.0265357)	(0.026905)	(0.0015375)	(0.038007)
$EDU_{i,t}$	0.0003544	0.0003761	0.0006034	0.0005893
	(0.0009615)	(0.0009609)	(0.6029539)	(0.0015325)
$RINF_{i,t} * GNPIP_{i,t}$		-0.0024016		-0.000822
		(0.0022561)		(0.0036233)
R^2	0.9741	0.9745		
F-value/Wald Chi^2	188.26	178.15	1172.78	1182.14
F-sign/Prob Chi^2	0.0000	0.0000	0.0000	0.0000

Source: Stata 17.0 Output

Note: GDPC Gross Domestic Product Per Capita, FINF Food Inflation, GRDP Gross Regional Domestic Product, RINF Rice Inflation, CINF Maize Inflation, SINF Soybeans Inflation, GNPIP Dummy of GNPIP Policy (0 = Period before applying policy, 1 = Period of policy application); Prov-year obs. = 204, ****p < 0.01, **p < 0.05 and *p < 0.1

Table 4: Panel Data Regression Results on GDP per capita (GDPC).

The effect of food inflation on GDP per capita

Hypothesis 1a (H1a) is that food inflation has a significant effect on GDP per capita. Based on table 4, it can be concluded that in the baseline model and the interaction model, food inflation in the previous 1 period shows a significant negative effect, indicating that the impact of food inflation appears delayed.

People and economic actors may not directly adjust their consumption or investment when food prices rise in a certain period. However, after one period (for example one year), the increase in food prices began to erode the purchasing power of the household, especially low-income groups that allocated most of the expenses for food. The decline in purchasing power then reduces aggregate demand, decreases production, and eventually inhibits regional economic growth (GDP per capita).

These results are in accordance with the theory of Phillips curves and short-term trade-off vs. long-term. In the short term, inflation may not immediately reduce output (because of "money illusion"). But in the medium term, the community adjusts expectations, and inflation begins to interfere with the allocation of resources, causing a decrease in productivity and growth. These results are also in line with the results of research by (Headey, 2018; Heady and Hirvonen, 2023; Prabheesh and Laila, 2020; Sen et al., 2024) which states that food inflation has a significant effect on the GDP per capita.

The effect of rice inflation on GDP per capita

Hypothesis 1b (H1b) is that rice inflation has a significant effect on GDP per capita. Based on the Table 4, it can be concluded that in the baseline model and the interaction model, rice inflation in the previous 1 period shows a significant positif effect, indicating that the impact of food inflation appears delayed.

Rice price increases can increase the income of rice farmers and agricultural businesses (grinding, distributors). This higher income is spent back in rural areas (multiplier effects), encouraging local consumption and micro economic activity. However, this effect takes time to spread throughout the economic chain, so the impact is only seen in the next period. In areas with a strong agricultural base, the increase in rice prices diverts income from urban consumers to rural producers. If farmers have a tendency to consume high marginal, then their income increases quickly circulating in the local economy, encouraging growth. However, this positive effect is limited and contextual, meaning that it only occurs if the increase in rice prices is not too high or does not trigger broad inflation, and if the market remains controlled (not speculative). These results are in line with the results of research by (Headey, 2018; Heady and Hirvonen, 2023; Prabheesh and Laila, 2020; Sen et al., 2024) which states that food inflation has a significant effect on the GDP per capita.

The effect of corn inflation on GDP per capita

Hypothesis 1c (H1c) is that corn inflation has a significant effect on GDP per capita. Based on the table above (output stata), it can be concluded that in the baseline model and the interaction model, corn inflation (CINF) in the current period (t), one year earlier (t-1), and two years earlier (t-2) did not have a significant effect on GDP per capita.

There is no statistical evidence that corn inflation (both at this time and delayed) can affect regional economic growth. Corn is not a major consumption commodity, widely used as input, and the sector has not been integrated, so the price fluctuations do not create a strong multiplier effect. These results are consistent with the theory of consumption structure and income elasticity (Engel's Law) which states that non staple food commodities have low-income elasticity. Changes in the price of corn do not significantly change the pattern of consumption or savings, so it does not trigger economic growth.

The effect of soybean inflation on GDP per capita

Hypothesis 1d (H1d) is that soybean inflation has a significant effect on GDP per capita. Based on the Table 4, it can be concluded that in the baseline model and the interaction model, there is no significant relationship between soybean inflation (currently or delayed) with regional economic growth. This is due to import dependence, small production scale, and limited economic linkage, so that the fluctuations in soybean prices do not create measurable multiplier effects.

These results are consistent with the market theory of import commodities. Soybean inflation in Indonesia is mostly influenced by external factors, namely global prices, exchange rates, and logistics costs. In this theory, price increases do not create domestic added value. In addition, based on the theory of market structure and supply elasticity, soybean farmers include smallholder farmers with low supply elasticity. That is, they do not quickly respond to price increases by increasing production, so there is no growth effect from the supply side side.

The effect of GNPIP policy on GDP per capita

Hypothesis 2 (H2) is that GNPIP policy has a significant effect on GDP per capita. Based on the Table 4, it can be concluded that in the baseline model and the interaction model, the results were received both for FE and FGLS

for Robustness Test. This shows that GNPIP has a direct influence on GDP per capita.

The results show that the GNPIP policy has a positive and significant effect on GRDP per capita indicates that the government's efforts in controlling food inflation do not only have an impact on price stability, but also make a significant contribution to regional economic growth. The GNPIP program can help maintain community purchasing power, especially in low-income groups, most of whose expenses are allocated for food needs. Increasing aggregate purchasing power has the potential to encourage household consumption, which is the main component of the Gross Regional Domestic Product (GRDP). Furthermore, food price stability creates a more conducive business climate, thus encouraging investment and production activities in the agricultural and food sector. This contributes to increasing productivity and regional economic growth. In addition, the GNPIP policy that is collaborative between the central and regional governments, as well as involving various stakeholders such as Bulog, Bank Indonesia, and other institutions, strengthens coordination in inflation control. Efficiency and effectiveness in implementing the policy also supports the achievement of significant results on GRDP per capita. The results of this study are in line with studies conducted by Eberhardt and Vollrath (2016) which states that food price stabilization policies can increase economic growth through increasing domestic consumption. In addition, these results also support the research of George (2020) and Grabowski and Self (2023) who found that coordinated food policy interventions have a positive impact on regional economic performance. Furthermore, research by Li and Maskin (2021) and Markus and Dietrich (2018) also emphasized the importance of cross-sectoral and integrated policies in creating a sustainable macroeconomic impact. This shows that GNPIP, as a policy that integrates various aspects of inflation control and local economic development, has the potential to become an important instrument in regional economic development.

The role of GNPIP policy in moderating the effect of rice inflation on GDP per capita

Hypothesis 3 (H3) is that GNPIP policy moderates the relationship between rice price changes and GDP per capita. Based on the Table 4, it can be concluded that in the baseline model and the interaction model, GNPIP is unable to moderate the effect of rice inflation on GDP per capita. These results are contrary to the results of research by (Benzarti et al., 2024; Tan et al., 2024). Although GNPIP does not affect directly through moderation with rice inflation, there are other mechanisms that explain how GNPIP can increase GDP per capita.

Although GNPIP does not have significant indirect effects through moderation with rice inflation, this program can still increase GDP per capita through other mechanisms such as controlling general inflation, increased production efficiency and food distribution, other supporting policies, and "Announcement Effect". Announcements about the implementation of GNPIP can increase market and public confidence in food price stability. Higher confidence can encourage investment and consumption, which in turn can increase GDP per capita. The announcement of GNPIP policy that guarantees food availability continuously can provide positive signals to market participants that they do not need to worry about supply lack.

For example, if the government announces that national rice stocks are sufficient to meet the needs for the next few months, people tend not to do "panic buying". Thus, the announcement helps maintain price stability because excessive demand (due to panic buying) can be avoided. This price stability then has a positive impact on people's purchasing power and household consumption, which in turn increases GDP per capita. The cheap market movement initiated by GNPIP also has a strong announcement effect. If the government announces that there will be cheap market operations in various regions, people will feel calmer because they know that they can still get important commodities at affordable prices. This announcement can prevent price speculation and panic buying, because people believe that prices will remain stable or even down in the short term. This helps keep general inflation under control and increases people's purchasing power. In addition, the announcement of this program can also encourage coordination between related parties in managing food inflation, to produce a broader and more sustainable impact. Therefore, GNPIP still has an important role in increasing GDP per capita even though it does not go through the path tested in this model.

The "announcement effect" of the GNPIP program can increase GDP per capita through several major mechanisms: (1) Increasing public confidence and stability of inflation expectations, (2) encouraging investment and economic activity, (3) increasing people's purchasing power, (4) strengthening food security and local

production, (5) increasing market efficiency through digitalization, and (6) encouraging coordination between institutions. All these factors are interrelated and contribute to increasing economic stability, productivity, and community income, which in turn increases GDP per capita significantly. Announcement of GNPIP gives a strong signal to the public and economic actors that the government and Bank Indonesia are committed to maintaining food price stability. When inflation expectations are stable, consumers and producers tend not to react excessively to changes in short -term prices. For example, people will not rush to hoard food or reduce consumption for fear of rising prices. The stability of inflation expectations helps to maintain public purchasing power (purchasing power), so that household consumption remains stable or even increased. Stable consumption or increased contributions directly to economic growth, which in turn can increase GDP per capita. Announcement of the GNPIP program which includes concrete steps such as optimizing food distribution, subsidies for transportation costs, and increasing agricultural production gives positive signals to domestic and foreign investors about macroeconomic stability in Indonesia.

ICT infrastructure (information and communication technology) can encourage the adoption of digital technology, which increases market efficiency (Indrajaya et al., 2023). Investors tend to be more confident to invest in sectors related to food production and distribution, such as agriculture, logistics, and information technology, for example the development of the EWS (Early Warning System) to monitor food prices in real-time. Distributors can further respond to supply and demand imbalances, while consumers can buy products at more competitive prices. Increasing market efficiency contributes to reducing transaction costs and increasing productivity, which in turn can increase overall economic output.

One of the main objectives of GNPIP is to maintain the affordability of food prices, which is a priority in the 4K strategic framework (price affordability, availability of supply, smooth distribution, effective communication). When the price of food is stable or down due to the announcement of the GNPIP program, people's purchasing power increases. This allows households to allocate their income to other goods and services, such as education, health, or recreation. The overall increase in household consumption will encourage local and national economic growth, which in turn increases GDP per capita. Announcement of GNPIP which includes programs such as joint planting movements, optimization of agricultural machine tools (Alsintan), and replication of the best business models provide encouragement to farmers and micro, small and medium businesses (MSMEs) to increase production. When local production increases, dependence on food imports can be reduced, which in turn can save the country's foreign exchange. These foreign exchange savings can be diverted to support domestic economic development. In addition, an increase in local production also creates a longer economic value chain, ranging from upstream (production) to downstream (distribution and sales). Policy synergy between Bank Indonesia as cenral bank and the Indonesia government's fiscal policy has the potential to increase people's income along the value chain (Wardani, 2022).

The GNPIP announcement shows that the government and Bank Indonesia work together in an integrated manner to overcome the problem of food inflation. This synergy gives a positive signal to the public and economic actors that the policies taken are comprehensive and sustainable. Good coordination between institutions can accelerate the implementation of inflation control programs, so that the positive impact can be felt faster by the community. This contributes to the acceleration of the national economy recovery, which in turn increases GDP per capita. Thus, GNPIP does not only function as a means of controlling inflation, but also as a catalyst to support sustainable national economic growth.

Conclusion

Conclusion

Based on the results of the discussion and analysis of the effect of food inflation and GNPIP policy on GRDP per capita, it can be concluded as follows. Food inflation has a significant negative impact on GRDP per capita, but the effect is only seen in a delayed manner (one period). The increase in food prices erodes people's purchasing power, especially low-income groups that allocate most of their expenses for food needs. This decrease in purchasing power reduces aggregate demand, decreases production, and ultimately inhibits regional economic growth.

Rice inflation is different from food inflation in general, rice inflation shows a significant

positive effect on GRDP per capita, although it is also delayed for a period. This is caused by multiplier effects in the agricultural and rural sectors, where the increase in rice prices increases the income of farmers and agricultural businesses, which then encourages consumption and local economic activities. However, this positive effect is contextual and only occurs if the price increase is not too high and does not trigger broad inflation or market speculation.

Corn and soybean inflation does not have a significant effect on GRDP per capita, both in the current period and the previous period. This is caused by the limited role of the commodity as the main consumption material, import dependence (especially soybeans), and weak economic linkages and low supply elasticity. Thus, the price fluctuations in the two commodities do not create a broad impact on regional economic growth.

GNPIP Program has proven to have a positive and significant influence on GRDP per capita. This policy not only plays a role in maintaining food price stability, but also encourages economic growth through the maintenance of people's purchasing power, increasing household consumption, and a conducive business climate creation in the agricultural and food sector. The effectiveness of GNPIP is also strengthened by collaboration between the central government, regions, and various institutions such as Bulog and Bank Indonesia.

Although GNPIP does not have significant indirect effects through moderation with rice inflation, this program can still increase GDP per capita through other mechanisms such as controlling general inflation, increased production efficiency and food distribution, other supporting policies, and "Announcement Effect". It can provide positive signals to market participants that they do not need to worry about supply lack.

Recommendations

The government needs to continue to strengthen the policy of food price stabilization, especially for strategic commodities such as rice and other staple foods. The GNPIP program must be maintained and expanded in scope, with a focus on distribution efficiency, speculation control, and timely price intervention.

Considering that food inflation greatly affects the purchasing power of low-income people, social assistance programs such as food assistance or subsidies must be increased, especially when there is a significant increase in food prices.

In order to strengthen the positive effects of rising rice prices, the government needs to encourage the development of the local commodity-based agricultural sector through increased productivity, access to credit, and strengthening the supply chain. Thus, price increases can be truly utilized to encourage rural economic growth.

Commodity such as soybeans is very dependent on imports, so there needs to be a strategic effort to increase domestic production or find local alternatives (substitution). In addition, food diversification campaigns can reduce pressure on certain commodities and increase national food security.

GNPIP has not been able to moderate the impact of rice inflation on economic growth, so it is necessary to conduct an in-depth evaluation of the policy implementation mechanism. The government can consider a more proactive incentive scheme or market intervention so that the increase in rice prices does not have a negative impact on consumer groups, as well as still benefit producers.

The success of GNPIP shows the importance of coordination between institutions. For the future, collaboration between the central government, regional governments, BI, Bulog, and business actors must be strengthened through an integrated and responsive monitoring and evaluation system of market dynamics.

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References

[1] Afriyanti, G., Mariya, A., Natalia, C., Nispuana, S., Wijaya, M. and Phalepi, M. (2023) "The role of the agricultural sector on economic growth in Indonesia", *Indonesian Journal of Multidisciplinary Sciences (IJoMS)*, Vol. 2, No. 1, pp. 167-179. E-ISSN 2808-6724, ISSN 2808-5957.

[2] Bala, A., Hassan, A. and Muhammad, M. (2024) "Do board characteristics matter in the relationship between intellectual capital efficiency and firm value? Evidence from the Nigerian oil and gas downstream sector", *Future Business Journal*, Vol. 10, No. 1, pp. 74. E-ISSN 2314-7210. DOI 10.1186/s43093-024-00351-3.

[3] Beck, N. (2001) "Time-series-cross-section data: What have we learned in the last few years?", *Annual Review of Political Science*, Vol. 4, pp. 271-293. ISSN 1094-2939. DOI 10.1146/annurev.polisci.4.1.271.

[4] Benzarti, Y., Garriga, S. and Tortarolo, D. (2024) "Can VAT cuts and anti-profiteering measures dampen the effects of food price inflation?", *National Bureau of Economic Research*, NBER Working Paper. No. w32241, 60 p. ISSN 0077-3611. DOI 10.2139/ssrn.4762948.

[5] Bogmans, C., Pescatori, A. and Prifti, E. (2024) "How do economic growth and food inflation affect food insecurity?", *IMF Working Papers*, No. 2024/188, 57 p. ISSN 1018-5941. ISBN 9798400287336, DOI 10.5089/9798400287336.001.

[6] Bredenkamp, H. and Bersch, J. (2012) "Chapter 4 Commodity price volatility: Impact and policy challenges for low-income countries", International Monetary Fund, pp. 55-67. ISBN 9781616353797. DOI 10.5089/9781616353797.071.ch004.

[7] Eberhardt, M. and Vollrath, D. (2018) "The Effect of Agricultural Technology on the Speed of Development", *World Development*, Vol. 109, pp. 483-496. ISSN 0305750X. DOI 10.1016/j.worlddev.2016.03.017.

[8] Faharuddin, F., Yamin, M., Mulyana, A. and Yunita, Y. (2023) "Impact of food price increases on poverty in Indonesia: Empirical evidence from cross-sectional data", *Journal of Asian Business and Economic Studies*, Vol. 30, No. 2, pp. 126-142. ISSN 2515-964X. DOI 10.1108/JABES-06-2021-0066.

[9] George, T. (2020) "A new look at agricultural development and the non-agriculture economy in low-income countries", *Global Food Security*, Vol. 26, p. 100449. ISSN 2211-9124. DOI 10.1016/j.gfs.2020.100449.

[10] Grabowski, R. and Self, S. (2023) "Agricultural productivity growth and the development of manufacturing in developing Asia", *Economic Systems*, Vol. 47, No. 2. ISSN 0939-3625. DOI 10.1016/j.ecosys.2023.101075.

[11] Headey, D. (2018) "Food Prices and Poverty", *The World Bank Economic Review*, Vol. 32, No. 3, pp. 676-691. ISSN 1564-698X. DOI 10.1093/wber/lhw064.

[12] Headey, D. and Hirvonen, K. (2023) "Higher food prices can reduce poverty and stimulate growth in food production", *Nature Food*, Vol. 4, No. 8, pp. 699-706. E-ISSN 2662-1355. DOI 10.1038/s43016-023-00816-8.

[13] Indrajaya, D. and Iskamto, D. (2023) "Do fund's village, economic growth, inequal income distribution, unemployment rate, and human development index affect poverty in Indonesia?", *Proceedings of the International Conference on Sustainable Collaboration in Business, Technology, Information, and Innovation (SCBTII 2023),* Atlantis Press. ISSN 2352-5428. DOI 10.2991/978-94-6463-292-7_15.

[14] Indrajaya, D., Wardoyo, D. U., Santoso, T. I. and Iskamto, D. (2023) "Do Foreign Direct Investment and Innovation Influence ICT Goods Imports in ASEAN 6?", *2023 International Conference on Digital Business and Technology Management (ICONDBTM)*, pp. 1-6. E-ISBN 979-8-3503-2802-8. DOI 10.1109/ICONDBTM59210.2023.10327231.

[15] Ismail, N. and Houssein, A. (2020) "The impact of fiscal policy on GDP per capita: Evidence from Malaysia", *International Journal of Politics, Publics Policy and Social Works (IJPPSW)*, Vol. 2, No. 5, pp. 14-25. E-ISSN 2637-0980. DOI 10.35631/IJPPSW.25002.

[16] Ivanic, M., Martin, W. and Zaman, H. (2012) "Estimating the short-run poverty impacts of the 2010-11 surge in food price", *World Development*, Vol. 40, No. 11, pp. 2302-2317. ISSN ISSN 0305-750X. DOI 10.1016/j.worlddev.2012.03.024.

[17] Li, D. and Maskin, E. (2021) "Government and economics: An emerging field of study", *Journal of Government and Economics*, Vol. 1, p. 100005. ISSN 2667-3193. DOI 10.1016/j.jge.2021.100005.

[18] Mamat, H. and Husen, E. (2021) "Socio-economic aspect and carrying capacity of agricultural land resources to support the development of strategic agricultural commodities", *IOP Conference Series: Earth and Environmental Science*.,Vol. 648, p. 012019. ISSN 1755-1315. DOI 10.1088/1755-1315/648/1/012019.

[19] Negi, D. (2022) "Global food price surge, in-kind transfers and household welfare: Evidence from India", *World Development*, Vol. 158, p. 106009. ISSN 0305-750X. DOI 10.1016/j.worlddev.2022.106009.

[20] Nuryati, Y., Siregar, H. and Ratnawati, A. (2006) "Dampak kebijakan inflation targeting terhadap beberapa variabel makroekonomi di Indonesia", *Bulletin of Monetary Economics and Banking*, Vol. 9, No. 1, pp. 113-134. E-ISSN 2460-9196. DOI 10.21098/bemp.v9i1.153. (In Indonesian).

[21] Prabheesh, K. and Laila, N. (2020) "Asymmetric effect of crude oil and palm oil prices on economic growth: Evidence from Indonesia", *Bulletin of Monetary Economics and Banking*, Vol. 23, No. 2. E-ISSN 2460-9196. DOI 10.21098/bemp.v23i1.1304.

[22] Sen, A., Akpolat, A. and Balkan, I. (2024) "Commodity prices and economic growth: Empirical evidence from countries with different income groups", *Heliyon*, Vol. 10. ISSN 2405-8440. DOI 10.1016/j.heliyon.2024.e34038.

[23] Siregar, H. and Ward, B. D. (2001) "Sources of fluctuations in the Indonesian macroeconomy: An application of a simple structural VAR model", *Singapore Economic Review*, Vol 45, No. 1, pp. 73-98. ISSN 02175908.

[24] Siregar, H. and Ward, B. D. (2002) "Were aggregate demand shocks important in explaining Indonesian macroeconomic fluctuations?", *Journal of the Asia Pacific Economy*, Vol. 7, No. 1, pp. 35-60. ISSN 13547860. DOI 10.1080/13547860120110461.

[25] Solihin, A., Wardana, W., Fiddin, E. and Sukartini, N. (2021) "Do government policies drive economic growth convergence? Evidence from East Java, Indonesia", Cogent Economics & Finance, Vol. 9, No. 1. E-ISSN 2332-2039. DOI 10.1080/23322039.2021.1992875.

[26] Tan, Y., Yue, R., Chen, L., Li, C. and Chen, K. Z. (2024) "Grain price support policy and the distortion of market price", *China Agricultural Economic Review*, Vol. 16, No. 3, pp. 507-526. ISSN 1756-137X. DOI 10.1108/CAER-06-2023-0159.

[27] Tatiana, Y., Firdaus, M., Siregar, H. and Hariyoga, H. (2015) "Determinant factors of agricultural industry investment in province Bengkulu, Indonesia", *International Journal of Sciences: Basic and Applied Research (IJSBAR)*, Vol. 23, No. 2, pp. 312-323. ISSN 2307-4531.

[28] Wardani, V. (2022) "The role of Bank Indonesia in stabilizing Indonesia's economy through inflation control", *International Journal of Economics, Business and Innovation Research (IJEBIR)*, Vol. 1, No. 1. ISSN 2964-0865.

[29] Wodon, Q. and Zaman, H. (2010) "Higher food prices in sub-saharan Africa: Poverty impact and policy responses", *The World Bank Research Observer*, Vol. 25, No. 1, pp. 157-176. ISSN 1564-6971. DOI 10.1093/wbro/lkp018.

[30] Yogi, L., Tara, T. and Sarada, B. (2025) "The role of agriculture in Nepal's economic development: Challenges, opportunities, and pathways for modernization", *Heliyon*, Vol. 11, No. 2. ISSN 2405-8440. DOI 10.1016/j.heliyon.2025.e41860.