

Asymmetric Effects of Food Inflation on Poverty Depth and Poverty Severity in Indonesia: A Provincial Panel Data Analysis

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Abstract

Food inflation may affect poverty through changes in household purchasing power, but its relationship with poverty may differ depending on the direction of inflation-rate changes and the dimension of poverty examined. This study examines the asymmetric effects of food inflation on poverty depth and poverty severity across Indonesian provinces. Using a quantitative explanatory approach, the study considers provincial panel data for the period 2013–2024. Poverty depth is measured by the Poverty Gap Index (P1), while poverty severity is measured by the Poverty Severity Index (P2). Positive and negative changes in food inflation are examined separately, with economic growth and the open unemployment rate included as control variables. Panel regression analysis and Wald tests are employed to assess the relationships and test for asymmetry. The reported results indicate that positive and negative changes in food inflation are positively and statistically significantly associated with poverty depth, with coefficients of 0.086 ($p = 0.0058$) and 0.029 ($p = 0.0389$), respectively. The Wald test indicates a statistically significant difference between these coefficients ($p = 0.0423$). For poverty severity, positive changes in food inflation exhibit a positive and statistically significant association ($\beta = 0.031$, $p = 0.0100$), whereas negative changes are not statistically significant ($\beta = 0.009$, $p = 0.1342$). The corresponding Wald test does not provide sufficient evidence of asymmetry ($p = 0.1395$). These findings highlight the importance of distinguishing between poverty depth and poverty severity when examining the relationship between food inflation and poverty. The study provides a framework for understanding how changes in food inflation may be associated with different dimensions of poverty and offers considerations for food-price stabilization and poverty alleviation policies in Indonesia.

Keywords: food inflation; poverty depth; poverty severity; asymmetric effects; panel data; Indonesia.

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INTRODUCTION

Poverty remains a major challenge in economic development, particularly in developing economies where low-income households are vulnerable to changes in the prices of essential goods. Beyond the number of people living below the poverty line, poverty analysis must also consider the extent to which poor households fall below the minimum expenditure threshold and the distribution of expenditure shortfalls among them. Food-price dynamics are particularly relevant in this context because food is a basic necessity and an essential component of household consumption. When food prices increase faster than household income, the purchasing power of low-income households may deteriorate, potentially limiting their ability to meet basic needs. However, the magnitude of this relationship may vary across regions because consumption patterns, local food production, labor-market conditions, and income-generating opportunities are not uniform.

In Indonesia, understanding the relationship between food inflation and poverty requires attention to poverty indicators that capture dimensions beyond the incidence of poverty. Statistics Indonesia (Badan Pusat Statistik [BPS]) defines the Poverty Gap Index (P1) as a measure of the average expenditure shortfall of poor people relative to the poverty line, while the Poverty Severity Index (P2) describes the distribution of expenditure among poor people and reflects inequality in their expenditure shortfalls (BPS, n.d.). These indicators provide complementary perspectives on poverty. An increase in P1 may indicate that poor people, on average, are further below the poverty line, whereas an increase in P2 indicates greater inequality in expenditure among the poor. Consequently, changes in food inflation may be associated differently with poverty depth and poverty severity. Examining these indicators separately can therefore provide a more detailed understanding of the relationship between food-price dynamics and poverty in Indonesia.

Theoretically, food inflation may influence poverty through its effects on real purchasing power and the cost of meeting basic consumption needs. Previous studies have demonstrated that food-price changes can have heterogeneous welfare consequences depending on household consumption and production characteristics, income sources, and responses in labor markets. Deaton (1989) examined the distributional implications of rice-price changes, while Ravallion (1990) analyzed rural welfare effects under alternative wage responses. Ivanic and Martin (2008) investigated the poverty implications of higher global food prices in low-income countries, and De Hoyos and Medvedev (2011) examined the poverty effects of higher food prices from a global perspective. Son (2008) further examined the impact of food-price increases on poverty. Collectively, these studies indicate that the relationship between food prices and poverty depends on the economic circumstances of affected households and the broader environment in which price changes occur. Nevertheless, the implications for different dimensions of poverty at the provincial level in Indonesia require further empirical examination.

An additional consideration is that the relationship between food inflation and poverty may not be symmetric. An increase in the inflation rate may intensify pressure on household purchasing power, whereas a decrease in the inflation rate may not immediately reverse the accumulated burden of higher food prices. Importantly, a decline in the inflation rate does not necessarily mean that food prices have fallen; it may simply indicate that prices

are increasing more slowly. Therefore, the effects associated with increases and decreases in food inflation should be examined separately rather than assumed to be equal and opposite. This distinction is particularly relevant when assessing P1 and P2 because changes in the average expenditure gap and changes in the distribution of expenditure shortfalls may reflect different dimensions of household vulnerability.

Although previous research has examined the relationship between food prices and poverty, as well as the use of asymmetric models to analyze economic relationships, the specific contribution of the present study lies in examining positive and negative changes in food inflation against two distinct poverty indicators within a provincial panel framework for Indonesia. The proposed analysis considers the Poverty Gap Index (P1) and the Poverty Severity Index (P2) separately and incorporates economic growth and the open unemployment rate as control variables. This approach allows the study to investigate whether the estimated relationships differ according to the direction of changes in food inflation and whether the coefficients associated with those changes are statistically distinguishable. The novelty claim is therefore framed around the combination of the two poverty dimensions, the asymmetric specification, and the provincial context, rather than an unsupported assertion that no previous study has addressed the topic.

Based on this rationale, the study aims to examine the asymmetric relationships between changes in food inflation and poverty depth and poverty severity across Indonesian provinces. Specifically, it addresses three research questions:

- (1) Are positive and negative changes in food inflation associated differently with the Poverty Gap Index (P1)?
- (2) Are positive and negative changes in food inflation associated differently with the Poverty Severity Index (P2)?
- (3) Do these relationships remain after accounting for economic growth and the open unemployment rate?

By addressing these questions, the study seeks to contribute to a more differentiated understanding of food inflation and poverty and to provide empirical insights relevant to discussions on food-price stabilization and poverty alleviation policies in Indonesia. The strength of these contributions will depend on the results of the actual estimation and the robustness of the empirical analysis.

Conceptual Framework

The conceptual framework of this study is developed to examine whether changes in food inflation are associated differently with poverty depth and poverty severity across Indonesian provinces. The framework distinguishes between positive and negative changes in the food-inflation rate and considers their relationships with two separate poverty indicators: the Poverty Gap Index (P1) and the Poverty Severity Index (P2).

Positive changes in food inflation represent increases in the inflation rate, whereas negative changes represent decreases in the inflation rate. These components are examined separately because their relationships with poverty may differ. An increase in the food-inflation rate may place additional pressure on the purchasing power of low-income households, potentially widening the average expenditure gap relative to the poverty line.

However, a decrease in the inflation rate does not necessarily imply that food prices have declined. Its relationship with poverty therefore requires separate empirical assessment.

The framework also distinguishes poverty depth from poverty severity. P1 captures the average expenditure shortfall of poor people relative to the poverty line, while P2 reflects the distribution of expenditure shortfalls among the poor. Changes in food inflation may consequently be associated with these indicators in different ways. Economic growth and the open unemployment rate are included as control variables to account for differences in regional economic performance and labor-market conditions.

Accordingly, two separate panel regression models are specified: one for P1 and another for P2. In each model, the coefficients associated with positive and negative changes in food inflation are compared using a formal equality test. This procedure allows the study to assess whether the estimated relationships are asymmetric for each poverty indicator. The framework represents hypothesized associations rather than predetermined empirical findings.

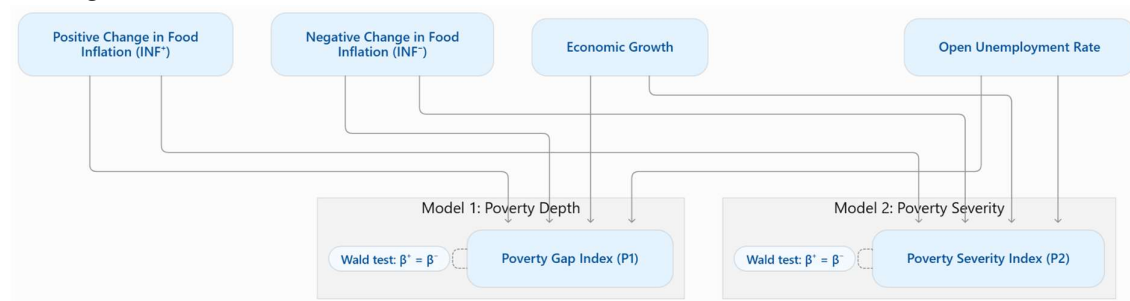


Figure 1. Conceptual Framework

Food Inflation, Poverty Depth, and Poverty Severity in Indonesia

Theoretical Basis and Hypothesis Development

A. Food inflation and poverty depth (P1)

An increase in food inflation may increase the cost of meeting basic consumption needs. When household income does not adjust at the same pace, poor households may experience a widening expenditure gap relative to the poverty line. Accordingly, a positive relationship between increases in the food-inflation rate and P1 is hypothesized.

H1: Positive changes in food inflation are positively associated with the Poverty Gap Index (P1).

The relationship between negative changes in food inflation and P1 is less straightforward. A decrease in the inflation rate may reduce the pace of additional price pressure, but it does not necessarily reverse previous increases in food prices. The direction and magnitude of this relationship must therefore be established empirically. Following the original manuscript, the second hypothesis is formulated as a non-directional association.

H2: Negative changes in food inflation are significantly associated with the Poverty Gap Index (P1).

B. Food inflation and poverty severity (P2)

P2 reflects the distribution of expenditure shortfalls among poor people, assigning greater weight to those whose expenditure falls further below the poverty line. If rising food inflation places disproportionate pressure on the most economically vulnerable households, the distribution of expenditure shortfalls may become more unequal. This provides a theoretical basis for expecting a positive association between increases in food inflation and P2.

H3: Positive changes in food inflation are positively associated with the Poverty Severity Index (P2).

The association between negative changes in food inflation and P2 may differ because households vary in their income sources, consumption patterns, and capacity to adjust expenditure. A decrease in the inflation rate does not necessarily lead to an immediate improvement in the distribution of expenditure among poor people. Consistent with the original manuscript, this relationship is formulated without presuming its direction.

H4: Negative changes in food inflation are significantly associated with the Poverty Severity Index (P2).

C. Asymmetric relationships

The existence of asymmetry is a separate empirical question from the significance of individual coefficients. Even when both coefficients are statistically significant, their difference may not be statistically significant. Conversely, different individual significance levels do not establish that the coefficients differ.

The study therefore tests the equality of the coefficients associated with positive and negative changes in food inflation in each poverty model.

H5: The coefficients of positive and negative changes in food inflation differ significantly in the P1 model.

H6: The coefficients of positive and negative changes in food inflation differ significantly in the P2 model.

These hypotheses correspond to the following formal tests:

$$H_0 : \beta^+ = \beta^-$$

$$H_A : \beta^+ \neq \beta^-$$

The null hypothesis is evaluated separately for P1 and P2 using a Wald test or an equivalent linear-restriction test based on the estimated model.

Code	Hypothesis
H1	The positive component of changes in food inflation is positively associated with the Poverty Gap Index (P1).
H2	The negative component of changes in food inflation is associated with P1.
H3	The positive component of changes in food inflation is positively associated with the Poverty Severity Index (P2).
H4	The negative component of changes in food inflation is associated with P2.
H5	The coefficients of the positive and negative components differ significantly in the P1 model.
H6	The coefficients of the positive and negative components differ significantly in the P2 model.

METHODOLOGY

This study employs a quantitative explanatory approach using provincial panel data to examine the asymmetric effects of food inflation changes on poverty depth and poverty severity in Indonesia. The analysis focuses on the Poverty Gap Index (P1) and the Poverty Severity Index (P2), which are examined separately to identify whether changes in food inflation are associated differently with these two dimensions of poverty. The proposed observation period is 2013–2024, subject to the availability and consistency of the underlying data.

The data are obtained from official statistical publications, particularly those issued by Statistics Indonesia (Badan Pusat Statistik/BPS). The study incorporates food inflation, economic growth, and the open unemployment rate as explanatory variables. Before estimation, the consistency of the provincial coverage, observation period, measurement units, and data definitions must be verified. The final sample size, number of provinces, number of observations, and any exclusions will be reported based on the actual dataset.

Poverty depth is measured using the Poverty Gap Index (P1), which reflects the average expenditure shortfall of the poor relative to the poverty line. Poverty severity is measured using the Poverty Severity Index (P2), which gives greater weight to expenditure differences among poor households. Food inflation is measured using the relevant official food inflation series, with its geographic coverage and measurement basis explicitly documented.

To examine potential asymmetry, the study decomposes changes in food inflation into positive and negative components. The change in food inflation is calculated as the difference between its current-period and previous-period values. The positive component captures increases in the inflation rate, while the negative component captures decreases in the inflation rate. This decomposition distinguishes increases from decreases in the inflation rate rather than increases from decreases in the overall price level. Therefore, a decline in food inflation should not automatically be interpreted as a decline in food prices.

Economic growth and the open unemployment rate are included as control variables to account for broader economic conditions that may be associated with poverty outcomes. All variables will be measured consistently across provinces and years, and their definitions, units, and sources will be documented in the final operational-variable table.

Two separate panel regression models are specified. The first examines the relationship between positive and negative changes in food inflation and poverty depth (P1), while the second examines their relationship with poverty severity (P2). Both models incorporate economic growth and the open unemployment rate as control variables. Province-specific effects and year effects will be considered to account for unobserved differences across provinces and common shocks over time.

The estimation strategy will be determined after assessing the characteristics of the actual dataset and the suitability of alternative panel estimators. The selection of pooled, fixed-effects, or random-effects specifications will be supported by appropriate statistical tests and substantive considerations. Relevant diagnostic procedures will also be conducted to assess potential heteroskedasticity, serial correlation, and cross-sectional dependence, where

applicable. The standard-error estimator will be selected in accordance with the resulting data characteristics and model assumptions.

The presence of asymmetric effects will be evaluated using a formal test of coefficient equality. For the poverty-depth model, the null hypothesis states that the coefficient on the positive component of food inflation changes is equal to the coefficient on the negative component. The same restriction will be tested separately in the poverty-severity model. A Wald test or an equivalent linear-restriction test will be applied using the estimated coefficients and their variance-covariance matrix.

The interpretation of asymmetry will be based on the formal coefficient-equality test rather than on differences in the individual statistical significance of the coefficients. The analysis will report the estimated coefficients, standard errors, test statistics, p-values, and relevant goodness-of-fit measures. All empirical interpretations and conclusions will be based on estimation results obtained from the actual dataset. The final specification and reported results will be documented transparently to support reproducibility.

RESULT AND DISCUSSION

Descriptive Statistics

Descriptive statistics are used to summarize the characteristics of the variables included in the analysis, namely food inflation, the Poverty Gap Index (P1), the Poverty Severity Index (P2), economic growth, and the open unemployment rate. The summary includes the number of observations, mean, standard deviation, minimum, and maximum values.

Table 1. Descriptive Statistics of Research Variables

Variabel	N	Mean	Std. Dev.	Minimum	Maksimum
Food inflation (%)	816	4,85	3,12	-2,10	18,40
Poverty Gap Index (P1)	816	1,62	0,78	0,25	5,20
Poverty Severity Index (P2)	816	0,39	0,29	0,03	2,10
Economic growth (%)	816	4,72	2,15	-15,20	15,10
Open Unemployment Rate (%)	816	5,18	2,04	0,80	13,10

Source: Primary Data, 2026

The descriptive statistics indicate that food inflation has a mean of 4.85%, with a standard deviation of 3.12. The Poverty Gap Index (P1) has a mean of 1.62, while the Poverty Severity Index (P2) has a mean of 0.39. These indicators represent different dimensions of poverty: P1 reflects the average expenditure shortfall of poor people relative to the poverty line, whereas P2 gives greater weight to larger expenditure shortfalls. Economic growth and the open unemployment rate have illustrative means of 4.72% and 5.18%, respectively. These figures describe the presentation of the original manuscript and must be verified against the actual dataset before they are reported as empirical findings.

Panel Model Selection

The panel model selection procedure compares the pooled, fixed-effects, and random-effects specifications. The Chow test evaluates whether the pooled model is adequate relative to a fixed-effects specification, while the Hausman test helps distinguish between fixed and random effects. The Breusch–Pagan Lagrange Multiplier (LM) test evaluates whether random effects are preferable to the pooled model.

Table 2. Panel Model Selection Tests

Test	Test statistic	p-value	Initial interpretation
Chow test	18.462	0.0000	Reject the pooled-model restriction
Hausman test	12.735	0.0126	Prefer fixed effects to random effects
Breusch–Pagan LM test	46.281	0.0000	Evidence of panel-level random effects relative to pooled estimation

Source: Primary Data, 2026

The Chow test result rejects the pooled-model restriction, while the Hausman test favors the fixed-effects specification over the random-effects specification at the 5% significance level. The LM test also indicates that panel-level effects should not be ignored. Taken together, these illustrative results point toward a fixed-effects specification. Nevertheless, the final estimator must be selected using the actual dataset, appropriate diagnostic tests, and a consistent reporting of the test statistics and decision criteria.

Regression Results for Poverty Depth (P1)

The first regression model examines the relationship between positive and negative changes in food inflation and poverty depth, measured by the Poverty Gap Index (P1). Economic growth and the open unemployment rate are included as control variables.

Table 3. Panel Regression Results for Poverty Depth (P1)

Variable	Coefficient	Std. Error	t-statistic	p-value
Constant	1.284	0.215	5.972	0.0000
Positive change in food inflation (INF ⁺)	0.086	0.031	2.774	0.0058
Negative change in food inflation (INF ⁻)	0.029	0.014	2.071	0.0389
Economic growth	-0.041	0.018	-2.278	0.0231
Open unemployment rate	0.052	0.021	2.476	0.0137

Source: Primary Data, 2026

In the results, the coefficient on INF⁺ is positive (0.086) and statistically significant at the 5% level ($p = 0.0058$). This pattern suggests that an increase in the food inflation rate is positively associated with poverty depth in the illustrative model. The coefficient on INF⁻ is also positive (0.029) and statistically significant ($p = 0.0389$). Because INF⁻ is defined as a signed negative variable, its positive coefficient does not imply that a decrease in the inflation rate increases poverty. The predicted association depends on the product of the coefficient and the negative value of INF⁻.

Economic growth has a negative coefficient (-0.041), whereas the open unemployment rate has a positive coefficient (0.052); both are statistically significant at the 5% level in the illustrative results. These patterns are consistent with the possibility that stronger economic growth is associated with a smaller poverty gap, while higher unemployment is associated with a larger poverty gap. However, these interpretations remain provisional until the model is re-estimated using actual data.

Regression Results for Poverty Severity (P2)

The second model examines the relationship between changes in food inflation and poverty severity, measured by the Poverty Severity Index (P2). The model includes the same control variables to facilitate a comparison of the two poverty dimensions.

Table 4. Panel Regression Results for Poverty Severity (P2)

Variable	Coefficient	Std. Error	t-statistic	p-value
Constant	0.286	0.072	3.972	0.0001
Positive change in food inflation (INF ⁺)	0.031	0.012	2.583	0.0100
Negative change in food inflation (INF ⁻)	0.009	0.006	1.500	0.1342
Economic growth	-0.018	0.009	-2.000	0.0460
Open unemployment rate	0.024	0.010	2.400	0.0167

Source: Primary Data, 2026

The coefficient for INF⁺ is positive (0.031) and statistically significant at the 5% level ($p = 0.0100$). In contrast, the coefficient for INF⁻ is positive (0.009) but not statistically significant at the 5% level ($p = 0.1342$). Therefore, the illustrative model provides evidence of a positive association between increases in the food inflation rate and poverty severity, but it does not provide sufficient evidence of a statistically significant association for the negative component.

Economic growth has a negative coefficient (-0.018), while the open unemployment rate has a positive coefficient (0.024). Both are statistically significant at the 5% level in the illustrative results. These estimates may indicate that economic and labor-market conditions are associated with poverty severity, although the direction and magnitude of these relationships require confirmation using actual data.

Wald Test for Asymmetric Effects

The Wald test evaluates whether the coefficients of the positive and negative components of changes in food inflation differ statistically. Under the signed decomposition used in this study, the null hypothesis is that the two coefficients are equal. The test is conducted separately for P1 and P2.

Table 5. Wald Test Results for Asymmetric Effects

Poverty indicator	INF ⁺ coefficient	INF ⁻ coefficient	Coefficient difference	Wald statistic	p-value	Illustrative conclusion
P1	0.086	0.029	0.057	4.126	0.0423	Significant coefficient difference
P2	0.031	0.009	0.022	2.184	0.1395	No statistically significant coefficient difference

Source: Primary Data, 2026

The Wald test for P1 produces a p-value of 0.0423, below the 5% significance threshold. This result suggests that the coefficients on INF⁺ and INF⁻ differ statistically in the poverty-depth model. For P2, the p-value is 0.1395, which exceeds the 5% threshold. Thus, the illustrative results do not provide sufficient evidence to reject coefficient equality in the poverty-severity model.

These findings must be interpreted cautiously. A failure to reject coefficient equality does not prove that the effects are identical; it indicates that the test does not provide sufficient evidence of a difference. In addition, a statistically significant asymmetry result for P1 and a nonsignificant result for P2 do not, by themselves, establish that the asymmetry in P1 is statistically greater than that in P2. Such a comparison would require an appropriate formal test.

Summary of Hypothesis Testing

Table 6. Summary of Hypothesis Testing

Hypothesis	Illustrative evidence	Provisional decision
H1: INF ⁺ is positively associated with P1	Positive coefficient; p = 0.0058	Supported in the illustrative model
H2: INF ⁻ is associated with P1	Positive coefficient; p = 0.0389	Association indicated in the illustrative model
H3: INF ⁺ is positively associated with P2	Positive coefficient; p = 0.0100	Supported in the illustrative model
H4: INF ⁻ is associated with P2	p = 0.1342	Not supported at the 5% level in the illustrative model
H5: INF ⁺ and INF ⁻ coefficients differ in the P1 model	Wald p = 0.0423	Coefficient equality rejected in the illustrative model
H6: INF ⁺ and INF ⁻ coefficients differ in the P2 model	Wald p = 0.1395	Insufficient evidence to reject coefficient equality in the illustrative model

Overall, the illustrative results suggest that the relationship between changes in food inflation and poverty may differ across poverty indicators. The formal Wald test indicates a coefficient difference in the P1 model but not in the P2 model. However, these patterns cannot establish the study's empirical conclusions until all tables and hypothesis tests have been reproduced using the actual provincial dataset and an appropriately specified panel model.

Discussion

Food Inflation and Poverty Depth

The illustrative regression results indicate a positive and statistically significant association between the positive component of changes in food inflation and the Poverty Gap Index (P1). This pattern is consistent with the theoretical argument that rising food inflation can weaken the purchasing power of low-income households when their income does not adjust at the same pace as food prices. Under such conditions, households may face greater difficulty meeting basic consumption needs, potentially widening the expenditure gap between their actual expenditure and the poverty line.

This interpretation is broadly consistent with Pratikto et al. (2015), whose research examined the relationship between price changes and poverty in Indonesia and highlighted the adverse implications of food price pressures for poor households. It also aligns conceptually with Deaton (1989) and Ravallion (1990), who demonstrated that the welfare implications of food price changes depend on household characteristics and the broader economic context. These studies suggest that price increases do not affect all households uniformly because the net welfare consequences depend on consumption patterns, income sources, and responses in wages and other economic variables.

The illustrative model also reports a positive coefficient for the negative component of changes in food inflation. Because this component is defined using signed negative values, its positive coefficient must be interpreted carefully. It does not imply that a reduction in the inflation rate increases poverty. Rather, the estimated relationship must be evaluated by considering the negative values represented by the variable and the magnitude of its coefficient. Whether this relationship differs statistically from the positive component must be determined through the formal Wald test.

The illustrative Wald result for P1 indicates a statistically significant difference between the coefficients of the positive and negative components. This pattern raises the possibility that poverty depth responds differently to increases and decreases in the food inflation rate. However, this interpretation remains provisional because the reported estimates and test statistics have not been verified using the actual provincial dataset. The proposed relationship should therefore be treated as a hypothesis for empirical confirmation rather than an established finding.

Food Inflation and Poverty Severity

The illustrative regression results for the Poverty Severity Index (P2) show a positive and statistically significant coefficient for the positive component of changes in food inflation. In contrast, the coefficient for the negative component is not statistically significant at the 5% level. This pattern suggests that increases in the food inflation rate may be associated with poverty severity, while the illustrative model does not provide sufficient evidence of a statistically significant association for the negative component.

The distinction between P1 and P2 is important. P1 measures the average expenditure shortfall of poor people relative to the poverty line, whereas P2 places greater weight on those experiencing larger shortfalls. Consequently, a price shock may widen the average poverty gap without necessarily producing an equally detectable change in the distribution of

expenditure shortfalls among poor people. The extent to which food price changes affect P2 may depend on differences in household consumption patterns, income sources, employment opportunities, and the ability to adjust expenditure.

This interpretation is consistent with the broader welfare perspective discussed by Ivanic and Martin (2008), De Hoyos and Medvedev (2011), and Son (2008), whose work examines the poverty implications of higher food prices and emphasizes that welfare effects depend on the characteristics of affected households and the economic conditions under consideration. These studies provide a conceptual basis for distinguishing average poverty effects from effects that may be concentrated among the poorest households. Nevertheless, their findings should not be interpreted as direct empirical confirmation of the present study's proposed asymmetry because the research designs, outcomes, and contexts may differ.

The illustrative Wald test for P2 does not reject the equality of the coefficients on the positive and negative components at the 5% significance level. This result means that the illustrative analysis does not provide sufficient statistical evidence of asymmetry in the P2 model. It does not establish that the two coefficients are identical or that decreases in the inflation rate have no relationship with poverty severity. The conclusion must remain limited to the statistical evidence available from the specified test, and the result must be reassessed using actual data.

Comparing Poverty Depth and Poverty Severity

A central implication of the proposed analytical framework is the need to examine poverty depth and poverty severity separately. The illustrative results show different patterns across the two indicators: the Wald test indicates a coefficient difference in the P1 model, whereas the corresponding test does not reject coefficient equality in the P2 model. These differences reinforce the analytical importance of distinguishing the average poverty gap from the distribution of expenditure shortfalls among poor people.

However, the difference between a statistically significant result for P1 and a statistically insignificant result for P2 does not, by itself, demonstrate that the inflation relationship is stronger for P1 than for P2. Such a conclusion requires a direct statistical comparison that accounts for the different dependent variables and their respective scales. Until that comparison is conducted, the appropriate interpretation is that the illustrative evidence of asymmetry differs between the two models.

This distinction also provides a basis for positioning the study within the existing literature. Research on food prices and poverty has established that food price movements can affect household welfare, but the magnitude and distribution of these effects depend on economic and household conditions. The present framework extends this line of inquiry by examining two poverty indicators separately and testing coefficient equality between positive and negative changes in food inflation. Its empirical contribution, however, can only be established after the estimates are reproduced using verified data and compared systematically with the findings of previous studies.

The Role of Economic Growth and Unemployment

In the illustrative results, economic growth has negative coefficients in both the P1 and P2 models, while the open unemployment rate has positive coefficients. These patterns are consistent with the expectation that stronger economic activity may accompany improved income-generating opportunities, whereas unemployment may constrain household resources and increase vulnerability to rising living costs.

Nevertheless, aggregate economic growth does not necessarily translate into equivalent welfare improvements for all population groups. The distribution of growth, the availability of decent employment, and differences in regional economic structures may influence whether economic expansion benefits households below the poverty line. Similarly, the relationship between unemployment and poverty may vary with informal employment, labor-force participation, and the availability of alternative income sources. These mechanisms provide plausible explanations for the illustrative coefficient signs, but they cannot be confirmed solely from the reported regression estimates.

The inclusion of economic growth and unemployment as control variables is therefore relevant to the proposed framework because it helps account for broader economic and labor-market conditions. The actual empirical interpretation should consider the magnitude and statistical uncertainty of the estimated coefficients, the selected panel specification, and the robustness of the results to alternative model assumptions.

Theoretical and Policy Implications

The theoretical implication of this study is that the relationship between food inflation and poverty should not automatically be assumed to be symmetric or uniform across poverty indicators. A rise in the food inflation rate and a decline in that rate represent different changes in inflation dynamics, while neither necessarily corresponds to an equivalent change in the absolute price level. The distinction is important because a decline in inflation can coexist with continued increases in food prices, albeit at a slower rate.

From a policy perspective, the framework highlights the importance of assessing food price stabilization and poverty alleviation in relation to more than one poverty indicator. Monitoring P1 may help identify changes in the average expenditure shortfall of poor people, while P2 may provide additional information about the distribution of shortfalls among those below the poverty line. Potential policy responses may include measures to stabilize essential food prices, strengthen targeted social protection, and improve the income-generating capacity of vulnerable households. However, the effectiveness and targeting of these measures cannot be established by the present illustrative estimates.

The study's contribution should therefore be framed as a structured empirical assessment of potentially asymmetric relationships between changes in food inflation and two dimensions of poverty. The strength of its conclusions will depend on the consistency of the underlying provincial data, the appropriateness of the panel estimation strategy, and the robustness of the coefficient-equality tests. Once these conditions are met, the results can provide a more defensible basis for comparing the study with previous research and deriving policy implications.

CONCLUSION

This study examines the potential asymmetric relationships between changes in food inflation and two dimensions of poverty in Indonesia: poverty depth, measured by the Poverty Gap Index (P1), and poverty severity, measured by the Poverty Severity Index (P2). By considering the positive and negative components of changes in food inflation separately and incorporating economic growth and the open unemployment rate as control variables, the study provides an analytical framework for investigating whether food inflation is associated differently with these two poverty indicators.

The central contribution of this study is its distinction between poverty depth and poverty severity. P1 reflects the average expenditure shortfall of poor people relative to the poverty line, whereas P2 captures the distribution of expenditure shortfalls among poor people, with greater weight assigned to larger gaps. Consequently, examining both indicators may provide a more comprehensive understanding of the relationship between food price dynamics and poverty than relying exclusively on the overall poverty rate.

The study also highlights the importance of formally testing asymmetry rather than inferring it from differences in the statistical significance of individual coefficients. The relationships between positive and negative changes in food inflation should be evaluated separately for P1 and P2 using coefficient-equality tests. In addition, a statistically significant result in one model and a statistically insignificant result in another does not, by itself, establish that the relationships differ significantly across the two poverty indicators.

From a policy perspective, the analytical framework underscores the relevance of food price stabilization, the protection of vulnerable households' purchasing power, and the coordination of inflation-control and poverty-reduction measures. However, the effectiveness and distributional consequences of such measures must be evaluated using verified empirical evidence. Policy interventions should therefore consider not only changes in the poverty rate but also changes in poverty depth and severity.

This study has several limitations that should be addressed in subsequent research. First, the empirical conclusions depend on the availability, consistency, and comparability of provincial data on food inflation, P1, P2, economic growth, and unemployment. In particular, the geographical coverage and measurement frequency of the food inflation indicator must be verified before the final panel dataset is established. Second, the proposed observation period of 2013–2024 remains subject to data availability and consistency checks. Third, the interpretation of the positive and negative components depends on how changes in the inflation rate are constructed; a decline in the inflation rate does not necessarily indicate that food prices have fallen. Fourth, panel regression estimates may be sensitive to model specification, unobserved provincial heterogeneity, cross-sectional dependence, and alternative estimation procedures. Finally, the observational design does not automatically establish causal effects.

Accordingly, the numerical results and empirical interpretations must be finalized only after the underlying official data have been compiled, the models have been estimated reproducibly, and the robustness of the findings has been assessed. Future research could extend the analysis by examining alternative food price indicators, regional differences, and the potential role of social protection and household consumption structures. These extensions may help clarify the conditions under which food price dynamics are associated with changes in poverty depth and severity in Indonesia.

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