

Food Price Volatility and Agricultural Welfare in Emerging Economies: Evidence from Provincial Indonesia

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ABSTRACT: Food price volatility has emerged as one of the most pressing challenges for emerging economies, with Indonesia representing a critical case where agriculture sustains rural livelihoods and food accounts for more than 50% of household spending. This study addresses a gap in the literature by examining how food inflation and its volatility shape the agricultural terms of trade (NTP) across 34 provinces from 2017 to 2023. The research employs a mixed method econometric design, combining Vector Error Correction Models (VECM) and Two Stage GARCH models. VECM is used to explore both short run and long run relationships between inflation components and NTP, while GARCH captures the volatility effects of food prices and macroeconomic shocks, including exchange rate fluctuations and climate anomalies. Data were collected monthly from official Indonesian statistical sources, including BPS, Bank Indonesia, and BMKG. Results reveal that food inflation significantly influences NTP in both the short and long run, while core inflation remains statistically insignificant. Although farmers may initially gain from rising food prices, these gains are offset in the long term by rising input costs and supply chain constraints. The GARCH analysis confirms that volatility in food inflation undermines farmer welfare, with heterogeneous effects across provinces depending on agricultural structure and resilience to shocks. These findings highlight the limitations of Indonesia's Inflation Targeting Framework (ITF) in addressing food price volatility and call for more inclusive policy strategies. Non-monetary interventions such as strategic food reserves, subsidies, and food distribution programs are recommended, alongside stronger coordination between monetary and agricultural institutions. Case studies from Brazil and Ghana further support integrated approaches that combine food security with macroeconomic planning. The study contributes to the literature by offering empirical insights into how inflation volatility affects agricultural welfare in an emerging economy. It advocates for a multi-dimensional policy framework to ensure rural resilience, equitable economic development, and food system stability in the face of growing macroeconomic uncertainties.

Keywords: Food Price Volatility, Agricultural Terms of Trade, Inflation Targeting, GARCH, VECM, Indonesia, Rural Welfare.



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INTRODUCTION

The volatility of food prices in emerging markets remains a critical area of concern due to its far reaching implications for food security, economic stability, and societal welfare. In economies like

Indonesia, where a substantial portion of household income is allocated to food expenditures and a significant share of the labor force is engaged in agriculture, fluctuations in food prices exert a disproportionate influence on the livelihoods of both producers and consumers. These price movements are not merely reflective of market supply and demand imbalances but are often amplified by external macroeconomic shocks, policy shifts, and climatic uncertainties.

Global and domestic factors jointly fuel this volatility. Oil price shocks, currency depreciation, and weather-related production risks all transmit into food markets Zmami & Ben-Salha (2023). The competing demand from biofuel production further links energy and agricultural prices in a two-way relationship (Oláh et al., 2017). These dynamics highlight that food prices in emerging economies are highly sensitive to external shocks.

The consequences of such volatility are especially dire in developing nations. Households often respond to rising food prices by reducing dietary diversity and shifting consumption toward cheaper, less nutritious options, which adversely affects nutrition levels and overall welfare (Uduji et al., 2020). The World Bank has reported that surges in food prices can push millions into poverty, underscoring the regressive nature of food inflation. Baumeister & Kilian (2014) echo this concern, noting the heightened vulnerability of low income populations in countries where food constitutes a major share of household spending. Uduji et al. (2020), studying Nigeria, illustrate how inflationary pressures on food drastically curtail consumers' access to basic nutritional needs.

In response to inflationary pressures, many emerging economies, including Indonesia, have adopted inflation targeting frameworks (ITF) aimed at achieving macroeconomic stability. While ITF has succeeded in stabilizing headline inflation, its effectiveness in addressing food price volatility remains contested. Sekhar et al. (2018) point out that in agriculture based economies, the responsiveness of food prices to monetary policy is often weak due to fragmented market structures and exposure to non-monetary shocks. As evidenced in India, inflation targeting has had limited success in curbing food inflation because of the high sensitivity of food markets to production shocks and policy distortions.

In this context, the agricultural terms of trade (NTP) serves as a critical indicator of rural welfare, reflecting farmers' purchasing power relative to input costs. While rising food prices can temporarily improve NTP, parallel increases in input costs often erode these benefits, leaving farmers vulnerable to long-term welfare losses (Chadwick, 2023). This duality highlights the importance of analyzing both price gains and cost burdens.

In the Southeast Asian context, smallholder farmers are particularly vulnerable to food price volatility. Yang et al. (2015) highlight that currency depreciation and global commodity price shocks elevate input costs, which can significantly erode profit margins. Sekhar et al. (2018) further note that under volatile conditions, smallholders tend to reduce investment in productive inputs, thereby initiating a negative feedback loop of declining productivity and income, ultimately exacerbating food insecurity.

Macroeconomic variables such as exchange rate fluctuations, international commodity prices, and domestic agricultural policies are also central to the discourse on food inflation in emerging markets. Mittal et al. (2018) observe that the food price index in India has been highly responsive to both domestic and global influences, revealing the intricate interdependence of market forces. Ceballos et al. (2017) affirm that agricultural commodity prices are particularly susceptible to external shocks, necessitating a policy framework that is both agile and context specific.

Inflation control mechanisms, particularly those targeting headline inflation, often intersect with food security strategies in complex and sometimes contradictory ways. While policies such as import tariffs, subsidies, and buffer stocks aim to stabilize prices, they can also introduce distortions that impair long term market efficiency (Abokyi et al., 2018). Brümmer et al. (2015) argue that such interventions, although well intentioned, may disrupt price signals and hinder sustainable agricultural development. The challenge, therefore, lies in balancing inflation management with the imperative to ensure food availability and affordability.

Against this backdrop, Indonesia presents a compelling case study. The nation has made significant strides in macroeconomic management through its inflation targeting regime. However, the persistent volatility in food prices, especially in staple commodities like rice and chili, continues to challenge the effectiveness of monetary policy in safeguarding rural welfare. Recent empirical evidence suggests that while inflation targeting has succeeded in curbing headline inflation, food inflation remains more volatile and less responsive to policy instruments. This discrepancy raises important questions about the inclusivity and comprehensiveness of current policy frameworks.

Accordingly, this study asks: To what extent does food price volatility influence the agricultural terms of trade (NTP) across Indonesian provinces, and how do these effects differ regionally? To address this, we employ a dual econometric approach Vector Error Correction Models (VECM) to analyze short- and long-run relationships, and Two-Stage GARCH models to capture volatility effects. By incorporating food inflation, core inflation, exchange rates, and rainfall anomalies, the study captures the multidimensional nature of inflationary shocks.

The novelty of this research lies in its integration of macroeconomic inflation trends with regional welfare indicators using multi provincial panel data. In doing so, it provides a more granular understanding of how food price volatility translates into economic realities for rural households. The findings are expected to inform both monetary and agricultural policy, advocating for a more coordinated and responsive approach to inflation management that aligns with rural development objectives. Ultimately, the study contributes to the growing literature on food price volatility by offering empirical insights into its localized impacts in an emerging market context.

METHOD

This chapter outlines the methodological framework employed to investigate the impact of food price volatility on the agricultural terms of trade (NTP) across Indonesian provinces. The study

uses a combination of the Vector Error Correction Model (VECM) and a Two Stage Generalized Autoregressive Conditional Heteroskedasticity (GARCH) approach to examine both the equilibrium relationships and the volatility dynamics within the dataset. This dual model structure enables a comprehensive analysis of short run adjustments and long run trends while accounting for conditional variance effects in inflation indicators.

Research Design and Data Sources

The research design is quantitative and panel based, incorporating monthly data from 34 Indonesian provinces over the period from May 2017 to December 2023. The data sources include:

- Agricultural Terms of Trade (NTP): obtained from Badan Pusat Statistik (BPS), serving as a proxy for rural welfare.
- Inflation Indicators: food inflation, core inflation, and headline inflation sourced from Bank Indonesia and BPS.
- Exchange Rate Data: IDR/USD monthly averages from Bank Indonesia.
- Climatic Data: Rainfall anomalies and drought indices from the Meteorological, Climatological, and Geophysical Agency (BMKG).

The selection of these variables reflects the multifactorial nature of food price volatility and its potential transmission channels to rural welfare.

Variable Definition and Description

The dependent variable is the Agricultural Terms of Trade (NTP), defined as the ratio between the price index received by farmers and the price index paid for agricultural inputs. The independent variables include:

- Food Inflation (%): Monthly percentage change in food prices.
- Core Inflation (%): Monthly percentage change in non-volatile inflation components.
- Exchange Rate (IDR/USD): Monthly average nominal exchange rate.
- Rainfall Anomaly (SPI): Standardized Precipitation Index to proxy weather shocks.

These variables are chosen to capture both price movements and external macroeconomic and environmental shocks that can influence agricultural welfare.

Econometric Framework

The primary model employed is the Vector Error Correction Model (VECM), which is suitable for analyzing cointegrated time series data. VECM enables the identification of both long run

equilibrium relationships and short run dynamics among the variables (Hummada et al., 2019). This model is particularly useful in macroeconomic settings where deviations from equilibrium occur due to policy or external shocks. It incorporates an error correction term that measures the speed at which the dependent variable returns to equilibrium after a disturbance, allowing for timely policy inferences (Ayele et al., 2017; Burhanuddin, 2020).

Following VECM estimation, a Two Stage GARCH model is employed to assess volatility transmission effects. GARCH type models are widely used for modeling time varying volatility in macroeconomic indicators (Banerjee, 2017; Hossain, 2014). The standard GARCH(1,1) framework captures volatility clustering and persistence, while its extensions, such as Two Stage GARCH, account for asymmetries and non-normality in error terms (Nurhayati et al., 2022). This is particularly relevant in agricultural economics where large price movements often result in disproportionate volatility shifts.

The Two Stage GARCH model allows for enhanced volatility estimation by including second stage parameters that model the residuals of the first stage regression. This improves the accuracy of volatility forecasts and the understanding of shock transmission mechanisms, particularly in heterogeneous regional settings (Rastogi & Kanoujiya, 2022).

Panel Structure and Regional Considerations

Given the use of multi provincial data, the analysis incorporates fixed and random effects tests to account for unobserved heterogeneity. Each province may exhibit unique structural characteristics affecting the sensitivity of NTP to macroeconomic shocks. The panel configuration enhances the robustness of the findings by controlling for these inter regional differences (Nortey et al., 2015).

Moreover, the model structure supports the use of multivariate GARCH (MGARCH) extensions where needed, to assess volatility spillovers and cross sectional dependencies. This is particularly pertinent for regions like Indonesia, where economic linkages and climate patterns vary significantly across provinces (Olayemi et al., 2021).

Model Validation and Diagnostic Testing

All models are subjected to rigorous diagnostic testing to ensure robustness and validity. For the VECM, tests for stationarity (ADF test), cointegration (Johansen test), and autocorrelation (LM test) are conducted. For GARCH models, criteria such as the Akaike Information Criterion (AIC), Schwarz Bayesian Criterion (SBC), and likelihood ratio tests are used to determine optimal lag structures and model fit (Yelamanchili, 2020).

Cross validation techniques and residual diagnostics are employed to test for heteroskedasticity and normality, ensuring that the assumptions of both models are not violated. The combination

of these validation steps ensures the reliability of results and supports their use in policy formulation and academic inference.

Through this dual method approach, the study provides a statistically grounded and contextually sensitive framework to understand how food price volatility affects agricultural welfare across Indonesia, capturing both dynamic interactions and risk characteristics intrinsic to rural economic structures.

RESULT AND DISCUSSION

This chapter presents the empirical findings of the study, structured into four major sections: descriptive analysis, results from the Vector Error Correction Model (VECM), GARCH based volatility estimates, and regional variations in the impact of food price volatility on the agricultural terms of trade (NTP). Each section integrates the results with existing literature to contextualize the outcomes and highlight implications.

Descriptive Analysis

Food inflation rates in Indonesia have varied significantly across provinces over the past decade, shaped by regional disparities in supply chain efficiency, agricultural output, and economic structure. Provinces such as DKI Jakarta and West Java, characterized by developed infrastructure and consistent food supply chains, have experienced relatively stable food inflation rates (Ismaya & Anugrah, 2018; Pratikto & Ikhsan, 2016). Conversely, remote provinces like Papua have faced greater volatility due to logistical constraints and frequent supply disruptions. Setiawan & Hadianito (2014) observed that areas with robust agricultural activity tend to exhibit more stable food prices than urban centers reliant on food imports, underscoring the importance of regional food self-sufficiency.

Table 1. Average Food Inflation by Province (2017–2023)

Province	Avg. Food Inflation (%)	Std. Dev.
DKI Jakarta	3.2	0.8
West Java	3.5	1.0
East Java	4.1	1.2
Papua	5.8	2.4
Central Java	4.0	1.1

The agricultural terms of trade (NTP) also showed wide regional disparities. For instance, Central Java benefited from strong rice production and policy support, sustaining higher and more stable NTP. Conversely, Bali experienced declines due to dependence on imports and weakening

agricultural productivity. This indicates that structural differences in agricultural systems directly mediate welfare outcomes.

Table 2. Average Agricultural Terms of Trade (NTP) by Region

Province	Avg. NTP	Min NTP	Max NTP
Central Java	104.5	100.2	108.3
Bali	96.8	92.1	101.4
East Java	102.3	98.0	106.7
West Nusa Tenggara	101.0	97.3	104.2
Papua	95.7	90.4	100.3

Comparative analysis between food and core inflation reveals further regional divergence. In agricultural provinces like East Java, food inflation is closely aligned with headline inflation due to its prominence in household consumption. In contrast, core inflation dominates in urban provinces with diversified consumption profiles (Rohimuddin & Panjawa, 2022). Structural economic differences also impact inflation response. Provinces with substantial agricultural output, such as West Nusa Tenggara, have shown lower inflation pass through effects, while industrial regions like Jakarta remain highly susceptible to global commodity shocks (Rahmanta & Maryunianta, 2020).

VECM Estimates

The VECM estimates confirm that food inflation significantly boosts NTP in the short run, but the effect reverses over time as rising input costs erode real gains. Core inflation remains statistically insignificant, suggesting that monetary policy geared toward core inflation does not adequately capture rural welfare dynamics. Exchange rates and rainfall anomalies also exert long-term effects, highlighting both macroeconomic and climatic channels of influence.

Table 3. VECM Results: Impact of Inflation Variables on NTP

Variable	Coefficient (Short Run)	t stat	Long Run Effect
Δ Food Inflation	+0.087**	2.76	+0.242**
Δ Core Inflation	+0.013	1.04	Not Significant
Δ Exchange Rate	0.021*	1.91	0.038*
Δ Rainfall Anomaly	0.032*	1.98	0.071**
(* $p < 0.10$, ** $p < 0.05$)			

The model confirms the existence of bidirectional causality between inflation and agricultural trade terms. Favorable NTP conditions help suppress inflationary pressures, while deteriorating trade

terms push food prices upward (Devaguptapu & Dash, 2021). Food prices were found to have a more substantial influence on NTP than exchange rates, reinforcing the view that agricultural welfare in Indonesia is more sensitive to domestic supply factors than international currency fluctuations (Mustafa & Sivarajasingham, 2019). This sensitivity is particularly pronounced in areas dependent on food imports (Aginta, 2023).

These findings align with earlier studies emphasizing the utility of VECM in agricultural economic analysis. The model's capacity to disentangle short term shocks from long term trends has been well documented in agrarian economies (Göktaş, 2016). Furthermore, AlKhazraji (2024) dan Samal & Goyari (2022) note that food inflation shocks exert more intense effects on farmers than general inflation due to their direct impact on input costs and rural income.

GARCH Estimates

The application of the Two Stage GARCH model allowed for an in depth assessment of volatility in inflation variables and their implications for agricultural welfare. The results demonstrate that inflation volatility has a significant adverse impact on NTP across most provinces. This volatility effect disproportionately burdens lower income and rural households, who allocate a larger portion of their income to food and agricultural inputs (Rohimuddin & Panjawa, 2022).

Table 4. GARCH Model Results: Volatility Impact on NTP by Province

Province	Food Inflation Volatility	Exchange Rate Volatility
East Java	+0.274**	+0.039
Central Java	+0.192**	+0.046
Papua	+0.306**	+0.058*
West Nusa Tenggara	+0.089	+0.012
Bali	+0.156**	+0.034

Moreover, the GARCH model revealed regional asymmetries in volatility sensitivity. Rural areas exhibited greater responsiveness to inflationary shocks than urban areas, driven by differences in income elasticity and market integration (Aginta & Someya, 2022). Incorporating external shocks into the model further enhanced predictive accuracy. Exchange rate fluctuations and climatic anomalies, such as droughts and unseasonal rainfall, significantly increased volatility in NTP by affecting both input prices and crop yields (Liu et al., 2024).

Several provinces exhibited either resilience or exposure to volatility based on their institutional and economic frameworks. For instance, Bali demonstrated resilience through local food stockpiling and diversified supply chains (Mukhlis & Wahyuningsih, 2020). Conversely, provinces

lacking such mechanisms were more exposed to volatility, underscoring the importance of adaptive food security strategies (Seaman et al., 2014).

Regional Analysis

Regional analysis highlights that institutional capacity, market access, and agricultural diversity are decisive in shaping resilience to inflation shocks. Provinces with strong local governance and food self-sufficiency (e.g., Central Java, West Sumatra) exhibited more stable NTP, while import-dependent provinces were more fragile. These findings emphasize that localized policy design is essential (Duran & Dindaroğlu, 2020).

Agricultural structure also shaped inflation transmission. Regions practicing diversified farming systems were better equipped to absorb price shocks compared to monoculture dependent areas (Wardan et al., 2024). Inflation protection mechanisms like buffer stock policies and price stabilization programs played a critical role in reducing volatility impacts (Ahmad et al., 2019).

Historical sensitivity patterns revealed that densely populated provinces such as North Sumatra and Jakarta are more vulnerable to food inflation due to higher dependency on food imports and greater per capita consumption (Seaman et al., 2014). Šoškić (2015) argues that strengthening local agricultural systems through investment and innovation is essential to mitigating such vulnerabilities.

In summary, the results underscore that Indonesia's food price volatility is regionally heterogeneous, shaped by both macroeconomic forces and local structures. While ITF stabilizes headline inflation, it fails to address province-level disparities in food-driven welfare outcomes. The combined use of VECM and GARCH provides robust evidence that a one-size-fits-all policy approach is insufficient, pointing to the need for targeted regional strategies.

Limitations of Inflation Targeting in Managing Food Price Volatility

The findings from this study shed light on the multifaceted and regionally nuanced nature of inflation dynamics and agricultural welfare in Indonesia. Although Indonesia's Inflation Targeting Framework (ITF) has contributed significantly to achieving macroeconomic stability, particularly in maintaining low and predictable headline inflation rates, it has demonstrated limited efficacy in addressing the volatility of food prices that directly impact rural livelihoods. As highlighted in the VECM analysis, food inflation shows a persistent and statistically significant relationship with the agricultural terms of trade (NTP), both in the short and long term. In contrast, core inflation remains statistically insignificant, indicating that inflation targeting strategies that prioritize core inflation overlook the more volatile, but impactful, nature of food inflation.

This discrepancy reveals a key structural limitation of inflation targeting. By focusing on broader indicators such as core inflation, which excludes volatile food and energy prices, monetary authorities may inadvertently underemphasize the segments of inflation most relevant to low income and rural populations. Pescatori et al. (2021) argue that food prices tend to respond more

sensitively to non-monetary shocks such as supply chain disruptions, harvest failures, and commodity price shifts than to monetary interventions. As a result, the effectiveness of inflation targeting in addressing food inflation becomes constrained, particularly when these real sector shocks dominate the inflationary environment. In the Indonesian context, where a large proportion of the population relies on agriculture for their livelihood and allocates a substantial share of their income to food consumption, the implications of this oversight are far reaching.

Impact of Food Inflation Volatility on Agricultural Welfare

The GARCH analysis further illustrates that volatility intensifies welfare risks, especially in remote provinces such as Papua and Bali. Farmers' limited financial buffers magnify the impact of price shocks, reducing their ability to invest and lowering productivity over time. This reinforces that inflation management must account not only for average inflation trends but also for volatility-induced uncertainty that directly undermines rural resilience.

Together, the VECM and GARCH results highlight a central policy challenge: monetary stability alone does not safeguard rural welfare. Food inflation volatility amplifies regional inequality, threatening inclusive growth unless complemented by adaptive interventions. The evidence supports expanding the policy toolkit to include targeted subsidies, food reserves, and region-specific safety nets, while ensuring that these instruments avoid market distortions.

Effectiveness of Non-Monetary Interventions

In contrast to the limitations of monetary policy, non-monetary interventions have proven effective in stabilizing food prices and protecting both producers and consumers. Programs such as food subsidies, strategic grain reserves, and market price controls serve as essential shock absorbers, especially in times of crisis. As illustrated by Chadwick, (2023), well managed storage systems can dampen seasonal price swings by ensuring availability during lean periods. Catão & Chang (2015) further demonstrate that national food reserves can insulate domestic food markets from external shocks, enhancing food security.

However, these interventions are not without challenges. Poorly designed subsidies can distort market signals, leading to inefficiencies and disincentivizing production. Additionally, excessive reliance on price controls can suppress necessary supply responses, resulting in shortages or black market activity. Therefore, the success of non-monetary interventions hinges on thoughtful implementation, transparent governance, and regular monitoring to ensure that policy objectives are met without undermining market dynamics. When executed effectively, such programs can serve as critical complements to inflation targeting, offering a safety net for the most affected segments of the population.

Integrating Food Security into Macroeconomic Frameworks

Given the limitations of standalone monetary or agricultural policies, there is an urgent need to integrate food security goals into the broader macroeconomic policy framework. This would require establishing institutional linkages between central banks, ministries of agriculture, and other relevant agencies to ensure policy coherence and responsiveness. Jamaludin (2022) proposes enhanced coordination mechanisms that facilitate real time data sharing, joint forecasting, and synchronized policy responses. By embedding food security considerations into the inflation targeting process, policymakers can improve the inclusivity and effectiveness of monetary interventions.

Pourroy et al. (2016) support this integrated approach by advocating for macroeconomic models that explicitly include agricultural variables and rural economic indicators. Such models enable policymakers to anticipate potential trade-offs and design interventions that address both inflation control and food accessibility. In the Indonesian setting, where regional disparities in agricultural infrastructure and productivity persist, incorporating disaggregated data into macroeconomic planning can foster more equitable and efficient outcomes.

Lessons from Other Emerging Markets

Comparative evidence from other emerging economies strengthens this conclusion. Ghana's targeted food distribution, Brazil's Bolsa Família, and India's investments in local food systems demonstrate that combining short-term welfare measures with long-term structural investments builds resilience. These lessons indicate that Indonesia can reduce vulnerability by integrating cash transfers, farmer support programs, and infrastructure development (Akter & Basher, 2014).

Moreover, investments in local food systems, including infrastructure development, capacity building for smallholder farmers, and enhanced market access, have helped countries like India and Nigeria build resilience against global price shocks. Studies by Paul et al. (2020) and Adekunle et al. (2020) highlight the importance of empowering local producers as a long term strategy to stabilize domestic food prices and improve rural incomes. These examples suggest that a blend of short term welfare measures and long term structural investments is necessary to build robust and adaptive food systems.

Policy Implications and Recommendations

Overall, the findings suggest that Indonesia must move beyond a one-dimensional reliance on ITF. A multi-pillar approach is needed—one that strengthens monetary responsiveness to sectoral shocks, scales up adaptive non-monetary interventions, institutionalizes cross-sector coordination, and incorporates lessons from other emerging economies. Such a framework would better balance macroeconomic stability with rural welfare protection.

Indonesia, with its unique geographical, economic, and agricultural diversity, stands to benefit significantly from such an integrated policy approach. Strengthening rural infrastructure,

improving climate resilient agricultural practices, and scaling up social safety nets are not only necessary for mitigating the effects of food inflation but also essential for achieving long term economic stability and food sovereignty. Future research should continue to explore the dynamics between inflation volatility and sectoral welfare to inform more responsive and context specific policy innovations.

CONCLUSION

This study provides empirical evidence that food inflation, unlike core inflation, exerts a persistent and significant impact on the agricultural terms of trade (NTP) in Indonesia. While rising food prices temporarily improve farmers' purchasing power, these benefits erode in the long run as higher input costs and volatility undermine welfare. The GARCH results further demonstrate that volatility disproportionately harms provinces with weaker infrastructure and higher agricultural dependency, amplifying uncertainty and deepening regional disparities. Taken together, these findings highlight the limitations of Indonesia's Inflation Targeting Framework (ITF), which prioritizes core inflation while overlooking the dimensions of food price volatility most critical to rural households. By integrating econometric insights with provincial data, this study contributes to the literature by showing how inflation shocks translate into localized welfare risks in emerging economies.

Looking ahead, policymakers must adopt a multi-dimensional framework that aligns monetary policy with agricultural development, climate resilience, and social protection. Concrete steps include enhancing coordination between central banks and agricultural ministries, scaling up strategic food reserves and targeted subsidies, and embedding food security considerations into macroeconomic planning. Lessons from Brazil, Ghana, and India suggest that combining social safety nets with long-term investments in local food systems can strengthen resilience against volatility. For Indonesia, advancing such integrated strategies is vital not only for stabilizing food prices but also for ensuring rural welfare, promoting equitable development, and safeguarding food sovereignty in the face of growing macroeconomic uncertainty.

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