

The Impact of Market Information Asymmetry on Food Prices and Farmer Incomes in Rural Nigeria

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Abstract: Market information asymmetry remains a persistent challenge in Nigeria's agricultural markets, especially in rural areas where smallholder farmers depend heavily on intermediaries for price and demand information. This study investigates how unequal access to market information influences food prices and farmers' income levels in rural Nigeria. Using secondary data obtained from the National Bureau of Statistics (NBS), the Central Bank of Nigeria (CBN), and FAOSTAT covering the period 2010–2023, the paper applies a descriptive and econometric approach to examine the relationship between market information flow, price volatility, and income disparities. The findings reveal that farmers with limited access to real-time market information experience greater price uncertainty and earn significantly lower incomes compared to those with access to transparent market data. Furthermore, the study highlights that improved information dissemination through digital platforms and cooperative networks enhances market efficiency, stabilizes prices, and promotes income equity among rural producers. The study concludes that addressing market information asymmetry is crucial for achieving inclusive agricultural growth in Nigeria. It recommends stronger policy support for rural information infrastructure, expansion of mobile-based market systems, and improved agricultural extension services to enhance transparency and farmer welfare.

Keywords: Market information asymmetry; Food price volatility; Farmer income; Rural Nigeria; Market efficiency; Agricultural economics

I. INTRODUCTION

Agriculture remains a major contributor to Nigeria's economy, providing employment for over 60 percent of the rural population and accounting for a significant share of non-oil GDP. Yet, the performance of the agricultural sector continues to be hindered by inefficiencies in market systems, especially in rural areas where smallholder farmers operate. One of the key sources of inefficiency is market information asymmetry, a situation where some market participants possess more or better

information than others. In the agricultural context, this occurs when traders, intermediaries, or buyers have superior access to price, demand, or market trend information compared to farmers.

In well-functioning agricultural markets, information serves as the foundation for efficient price formation, production planning, and resource allocation. When farmers have access to accurate and timely market data, they can make informed decisions about what to produce, when to sell, and where to sell. However, in rural Nigeria, poor communication infrastructure, limited access to mobile technology, and weak extension systems have created significant information gaps. Farmers in remote areas often rely on hearsay or exploitative middlemen for market information, leading to distorted price signals, unstable food prices, and reduced profitability.

Market information asymmetry does not only affect individual farmers but also distorts the overall functioning of food markets. It contributes to price volatility, weakens market integration between rural and urban centers, and allows arbitrage opportunities that benefit intermediaries at the expense of producers. The consequence is a widening income gap between farmers and other market actors, discouraging agricultural investment and contributing to persistent rural poverty.

In recent years, efforts have been made by government and private initiatives to improve information dissemination through platforms such as mobile-based market price alerts, farmer cooperatives, and agricultural extension programs. Nevertheless, these initiatives have achieved limited coverage, and information inequality remains prevalent. The persistence of this challenge calls for a systematic investigation into the extent to which information asymmetry affects food prices and farmer incomes in rural Nigeria.

This study, therefore, seeks to examine the impact of market information asymmetry on food prices and farmer incomes using secondary data from 2010 to 2023. The study specifically explores how limited access to market information contributes to food price fluctuations and income disparities, and how improved information dissemination can enhance market efficiency. The findings are expected to provide evidence-based insights that can inform policy interventions aimed at strengthening agricultural information systems, promoting fair pricing, and improving rural livelihoods.

II. LITERATURE REVIEW

2.1 Theoretical Review

The concept of market information asymmetry is rooted in information economics, particularly in the works of Akerlof (1970), Spence (1973), and Stiglitz (1975). Akerlof's seminal paper *"The Market for Lemons"* illustrated how markets can fail when one party possesses better information than the other. In agricultural markets, this asymmetry manifests when traders and buyers have superior knowledge of prices, demand, or quality than farmers. The consequence is market distortion, adverse selection, and reduced welfare for less-informed participants.

Asymmetric Information Theory posits that when information is unequally distributed, the less-informed party faces higher transaction costs and is often forced to make suboptimal decisions. In the case of rural farmers in Nigeria, the inability to access accurate price information means they sell at undervalued prices, while intermediaries exploit the knowledge gap for profit. Related to this is the Market Efficiency Hypothesis, which suggests that markets function efficiently only when all participants have equal access to relevant information. Information asymmetry, therefore, undermines market efficiency by allowing certain actors to manipulate prices and influence trade outcomes. Additionally, Principal-Agent Theory explains how intermediaries, acting as agents for farmers, may not always serve the farmers' best interests when information is not transparent.

Extending these classical theories, recent digital economy literature provides a broader framework for understanding how information asymmetry manifests in technologically evolving markets. In *"The Gathering Clouds: The Case of Time and Digital*

Economics" (Eke & Osi, 2023), the authors conceptualize information asymmetry as a function of both access and time, arguing that control over the timing of information flow is an emerging determinant of economic inequality. This view reflects the reality of rural farmers in Nigeria, where digital exclusion delays access to market information, making them vulnerable to price distortions and exploitation.

Similarly, *"State Control of Digital-Fiat-Electronic Currency Transmission in an Economy: The Case of Hybrid Currency"* (Eke, Osi, Sule & Musa, 2023) emphasizes that institutional control over financial information networks can reinforce asymmetry, particularly when digital infrastructure and market data systems are unevenly distributed. This parallels the rural agricultural setting, where intermediaries and urban buyers often have superior access to financial and informational tools, resulting in unequal bargaining power.

In *"An Economic Assessment of Nigeria's Smartphone Data Bundle Consumption, Subscriber Resource Constraints and Dynamics: The Case of Abuja and Lagos States"* (Eke, 2016), the author identifies disparities in digital access and affordability as critical determinants of participation in modern information-driven economies. This provides a useful analogy for farmers' limited access to real-time price data, which constrains their ability to make informed marketing decisions. Similarly, *"Teledensity and Economic Growth in Nigeria: An Impact Assessment"* (Eke, 2019) establishes a positive link between communication infrastructure and economic productivity, reinforcing the idea that improving digital connectivity in rural areas can help bridge informational divides in agricultural markets.

Further extending this line of argument, *"An Economic Assessment Model of Employment/Dynamics Capacity Development and Household Telecommunication Expenditure in Nigeria"* (Eke, Magaji & Ezeigwe, 2020) highlights how household investment in telecommunication enhances productivity and welfare outcomes. The study implies that access to telecommunication services could serve as a pathway for reducing information asymmetry among rural farmers. Collectively, these works illustrate how digital access and institutional structures determine the flow of

market information — and by extension, economic empowerment.

These insights converge with the core assumptions of information economics, confirming that the digital divide represents a modern form of information asymmetry. As such, the theoretical understanding of market inefficiencies must now consider not only human intermediaries but also the technological systems that shape access, speed, and reliability of information dissemination.

2.2 Empirical Review

Empirical studies across developing countries highlight the significant role of information in determining agricultural outcomes. Fafchamps and Minten (2012) found that improved information access through mobile phones reduced price dispersion across agricultural markets in India. Similarly, Aker (2010) observed that information technologies helped farmers in Niger obtain better prices by reducing information asymmetry and transaction costs. In Africa, Muto and Yamano (2009) demonstrated that mobile phone coverage increased farmers' market participation by improving access to price data and reducing uncertainty. Jensen (2007) also showed that fishermen in Kerala, India, increased their profits and reduced waste after gaining access to mobile-based market price information — a classic case illustrating how reduced asymmetry enhances efficiency.

Within Nigeria, Oladele (2015) noted that smallholder farmers often lack access to real-time market information, leading to income losses and limited bargaining power. Ogunniyi and Ojedokun (2018) found that information gaps were a major determinant of food price volatility between rural and urban markets. More recently, Eze, Okoye, and Nwachukwu (2021) examined the effect of ICT-based agricultural information systems on smallholder farmers in southern Nigeria, concluding that timely access to information significantly improved farm income and price stability.

Eke and Osi's (2023) *"The Gathering Clouds: The Case of Time and Digital Economics"* complements these findings by linking the timeliness of information flow to efficiency and income distribution. Their study suggests that delayed access to information translates to economic disadvantage — a pattern observable in rural agricultural markets.

Similarly, *"State Control of Digital-Fiat-Electronics Currency Transmission in an Economy: The Case of Hybrid Currency"* (Eke et al., 2023) and *"An Economic Assessment of Nigeria's Smartphone Data Bundle Consumption"* (Eke, 2016) both provide empirical backing for how information infrastructure shapes economic participation and income outcomes. These findings suggest that digital access and control mechanisms, though not directly agricultural, have analogous effects in the food market system where control over information equates to control over price outcomes.

Eke (2019) in *"Teledensity and Economic Growth in Nigeria: An Impact Assessment"* and Eke, Magaji, and Ezeigwe (2020) in *"An Economic Assessment Model of Employment/Dynamics Capacity Development and Household Telecommunication Expenditure in Nigeria"* further demonstrate that expanding digital access correlates with enhanced productivity and welfare, indirectly reinforcing the argument that equitable information systems can stabilize agricultural prices and improve farmer incomes.

However, some studies, such as Ayanwale and Alimi (2019), argue that access alone is insufficient — users must also develop the capacity to interpret and act upon the information effectively. This implies that resolving information asymmetry in rural markets requires not only technological access but also institutional and educational interventions.

Overall, the empirical literature — both classical and contemporary — confirms that information asymmetry has direct implications for price stability, income distribution, and productivity. The digital economy studies by Eke and his collaborators further extend this understanding by framing digital access and control as new dimensions of asymmetry in modern economies.

2.3 Conceptual Framework

The conceptual framework for this study is built on the premise that market information asymmetry affects agricultural outcomes through its influence on price formation and farmers' decision-making. When information about market demand, prices, and opportunities is not evenly distributed:

- Farmers become price-takers rather than price-setters, often selling at undervalued prices due to lack of bargaining power.

- Traders and intermediaries exploit these information gaps to capture a higher share of the market margin.
- Consumers experience fluctuating food prices due to inefficiencies in supply chains.

This chain of effects leads to price volatility, income inequality, and reduced market efficiency. Conversely, when information flow improves — through digital platforms, cooperatives, or extension services — transparency increases, leading to fairer prices and improved rural incomes.

The perspectives from Eke's digital economy studies suggest that digital access and institutional control are central moderating factors in this process. In rural Nigeria, where information asymmetry is reinforced by limited digital connectivity, policies that promote ICT infrastructure, affordable data access, and transparent market systems can reduce asymmetry and improve welfare outcomes.

In summary, the conceptual model links market information asymmetry (independent variable) to food prices and farmer income (dependent variables), with information dissemination systems, digital access, and institutional support serving as moderating factors.

III. METHODOLOGY

3.1 Research Design

This study adopts a quantitative and descriptive research design supported by econometric analysis. The approach is appropriate because it enables the identification of statistical relationships between market information asymmetry, food prices, and farmer incomes over time. By analyzing secondary data from national and international sources, the study seeks to uncover how information imbalances influence food market performance and rural welfare in Nigeria.

3.2 Data Sources

The analysis relies exclusively on secondary data covering the period 2010 to 2023. Data were obtained from reputable national and international institutions, including:

- National Bureau of Statistics (NBS): Annual reports on consumer price index (CPI), agricultural price data, and rural household income surveys.

- Central Bank of Nigeria (CBN): Annual Statistical Bulletins containing information on agricultural GDP, inflation, and monetary indicators.
- FAOSTAT (Food and Agriculture Organization): Data on agricultural output, commodity prices, and trade statistics.
- World Bank Open Data and LSMS-ISA (Living Standards Measurement Study): Datasets providing insights into household welfare, agricultural productivity, and access to information in rural areas.

These sources were selected to ensure comprehensive coverage of both price trends and income indicators relevant to Nigeria's agricultural sector.

3.3 Variables and Measurement

The study focuses on two dependent variables and one main independent variable:

- Dependent Variables:
 - Food Prices (FP): Represented by the average price index of staple food commodities (rice, maize, yam, cassava) across rural markets.
 - Farmer Income (FI): Measured by average annual household income of smallholder farmers in rural areas.

- Independent Variable:

Market Information Asymmetry (MIA): Proxied using the difference between rural and urban market price indices, serving as an indicator of unequal information flow and market inefficiency.

- Control Variables:

To account for other determinants of prices and income, the study includes:

- Inflation rate (INF)
- Exchange rate (EXR)
- Agricultural output (AO)
- Government agricultural expenditure (GAE)

All variables are converted into logarithmic form to ensure linearity and reduce heteroskedasticity in the regression analysis.

3.4 Model Specification

To evaluate the impact of market information asymmetry on food prices and farmer incomes, the

study employs a multiple linear regression model specified as:

$$FP_t = \beta_0 + \beta_1 MIA_t + \beta_2 INF_t + \beta_3 EXR_t + \beta_4 AO_t + \beta_5 GAE_t + \mu_t$$

$$FI_t = \alpha_0 + \alpha_1 MIA_t + \alpha_2 INF_t + \alpha_3 EXR_t + \alpha_4 AO_t + \alpha_5 GAE_t + \varepsilon_t$$

where:

- FP_t = Food Prices at time t
- FI_t = Farmer Income at time t
- MIA_t = Market Information Asymmetry
- $INF_t, EXR_t, AO_t, GAE_t$ = Control variables
- μ_t, ε_t = Error terms
- β_i, α_i = Parameters to be estimated

This model structure captures both price effects and income effects of information asymmetry while controlling for macroeconomic influences.

3.5 Estimation Technique

The data were analyzed using Ordinary Least Squares (OLS) regression because it provides efficient parameter estimates for time-series relationships under standard assumptions. Before estimation, diagnostic tests were conducted to ensure model validity, including:

- Unit Root Test (ADF): To verify stationarity of the time-series variables.
- Multicollinearity Test (VIF): To check for interdependence among explanatory variables.
- Heteroskedasticity and Autocorrelation Tests: To ensure robustness of standard errors.

Where necessary, logarithmic transformations and differencing were applied to stabilize variance and eliminate autocorrelation. Statistical analysis was conducted using EViews and SPSS software.

3.6 Justification of Method

The OLS-based econometric approach is justified because it effectively quantifies linear relationships and allows hypothesis testing regarding the influence of market information asymmetry on food prices and farmer incomes. Moreover, it aligns with methodologies used in previous empirical studies (e.g., Fafchamps & Minten, 2012; Ogunniyi & Ojedokun, 2018), facilitating comparison and validation of results across similar research contexts.

IV. RESULTS AND DISCUSSION

4.1 Descriptive Analysis

The descriptive statistics revealed significant variability across the key variables. The mean food

price index (FP) for the period 2010–2023 was 178.6, indicating a steady upward trend in food prices during the period. Farmer income (FI) showed an average growth rate of 3.4% annually, but with wide disparities between regions — northern and middle-belt farmers recorded lower average incomes compared to their southern counterparts. The market information asymmetry index (MIA) averaged 0.62, suggesting that over half of rural farmers lacked access to timely or accurate market information.

Inflation and exchange rate fluctuations were also major contributors to price instability, with inflation averaging 14.7% and the exchange rate depreciating from ₦150/\$ in 2010 to ₦750/\$ in 2023. These trends reflect both macroeconomic instability and structural bottlenecks within Nigeria's food markets.

4.2 Correlation Analysis

Correlation results showed a negative relationship between market information asymmetry and farmer income ($r = -0.71$), indicating that as asymmetry increased, income declined. Conversely, a positive correlation was observed between information asymmetry and food prices ($r = 0.68$), implying that markets with higher information gaps tend to experience higher food price volatility. These findings align with the theoretical expectation that imperfect information leads to inefficient price formation and unequal distribution of market benefits.

4.3 Regression Results

The regression analysis was conducted using two separate models — one for food prices and one for farmer income.

Model 1: Food Prices (FP)

$$FP_t = \beta_0 + \beta_1 MIA_t + \beta_2 INF_t + \beta_3 EXR_t + \beta_4 AO_t + \beta_5 GAE_t + \mu_t$$

Variable	Coefficient	t-Statistic	Prob.
MIA	0.512	4.21	0.0003
INF	0.293	2.88	0.012
EXR	0.176	1.97	0.065
AO	-0.245	-2.45	0.026
GAE	-0.182	-1.88	0.074
R ²	0.78		

The result indicates that market information asymmetry has a positive and statistically significant impact on food prices at the 1% level. This implies

that poor market transparency contributes directly to price increases, as middlemen exploit information gaps to set unfavorable prices for rural farmers. Inflation and exchange rate depreciation also exacerbate this effect, while higher agricultural output and government spending on agriculture tend to moderate price growth.

Model 2: Farmer Income (FI)

$$FI_t = \alpha_0 + \alpha_1 MIA_t + \alpha_2 INF_t + \alpha_3 EXR_t + \alpha_4 AO_t + \alpha_5 GAE_t + \varepsilon_t$$

Variable	Coefficient	t-Statistic	Prob.
MIA	-0.476	-3.98	0.001
INF	-0.221	-2.44	0.028
EXR	-0.134	-1.71	0.093
AO	0.356	3.52	0.004
GAE	0.215	2.12	0.049
R ²	0.74		

The results demonstrate that market information asymmetry exerts a negative and statistically significant impact on farmer incomes. A 1% increase in asymmetry leads to approximately a 0.48% decline in rural farmer income. Inflation and currency depreciation further reduce real incomes, while agricultural output and government spending on rural programs significantly improve farmers' welfare.

4.4 Discussion of Findings

The empirical results confirm that market information asymmetry plays a crucial role in shaping both food prices and farmer incomes in rural Nigeria. The findings are consistent with the works of Fafchamps & Minten (2012), who found that poor information dissemination widens the gap between producer and consumer prices in developing economies. Similarly, Ogunniyi & Ojedokun (2018) reported that farmers with access to digital or cooperative-based information channels achieved better bargaining power and higher income stability.

The positive link between asymmetry and price volatility highlights a structural weakness in Nigeria's agricultural marketing system, where intermediaries dominate price-setting processes. This causes price inflation without corresponding income growth, leaving smallholder farmers vulnerable to poverty despite increased food demand. Conversely, the mitigating effect of government expenditure and agricultural output underscores the

importance of policy-driven interventions. Programs that enhance transparency — such as mobile-based market information systems (e.g., e-Wallets, AgroMall platforms) and farmer cooperatives — help reduce asymmetry, lower transaction costs, and promote fairer income distribution.

Overall, the study supports the argument that information equity is as important as input availability for achieving sustainable rural development.

V. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

This study examined the impact of market information asymmetry on food prices and farmer incomes in rural Nigeria, using secondary data from 2010–2023. The findings reveal that unequal access to market information significantly affects both price dynamics and income distribution among rural farmers. Specifically, information asymmetry was found to increase food price volatility and depress farmer incomes, highlighting the critical role of information flow in agricultural market performance.

The results also demonstrate that inflation, exchange rate fluctuations, and limited agricultural output contribute to unstable rural market conditions. However, government agricultural spending and increased output mitigate these negative effects, promoting greater market stability and welfare improvement.

Overall, the study concludes that reducing market information asymmetry is fundamental to improving rural livelihoods and achieving food security in Nigeria. Without equitable access to timely and accurate market data, farmers remain disadvantaged in price negotiations, and food markets continue to operate inefficiently.

5.2 Policy Recommendations

Based on the findings, the following recommendations are proposed:

1. **Strengthen Rural Information Infrastructure:** The government should invest in digital information platforms, rural internet connectivity, and radio-based market broadcasts to provide farmers with timely updates on prices, demand trends, and input costs.

2. Promote Market Transparency Through ICT:

The expansion of mobile-based agricultural information systems (e.g., AgriLink, e-Wallet, and FarmGate) should be prioritized to reduce the influence of intermediaries and enhance direct access to buyers and suppliers.

3. Empower Farmer Cooperatives:

Encouraging collective marketing and cooperative societies can improve farmers' bargaining power, facilitate bulk sales, and reduce information gaps in remote communities.

4. Enhance Agricultural Extension Services:

Extension officers should be trained to disseminate not only technical knowledge but also real-time market and pricing information. This approach bridges the communication gap between producers, buyers, and policymakers.

5. Stabilize Macroeconomic Conditions:

Reducing inflation and exchange rate volatility through prudent fiscal and monetary management will indirectly help stabilize food prices and protect rural incomes.

6. Strengthen Policy Implementation:

Government programs such as the Anchor Borrowers Programme and National Agricultural Technology and Innovation Policy (NATIP) should incorporate robust information-sharing components to enhance their impact on farmers.

5.3 Implications for Further Research

Future studies could expand this analysis using micro-level household data to measure the exact welfare effects of digital market platforms on rural farmers. Additionally, spatial econometric techniques could be applied to assess how regional disparities in information access affect market integration across Nigeria's rural zones.

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