VOL. 07 NO. 7,
FEBRUARY, 2025
E-ISSN 3026-9679
P-ISSN 3026-9423

African Scholar Publications & Research International
www.africanscholarpub.com

Journal of Business Dev. and Management Res. (JBDMR)

Assessing the Impact of Price Fluctuations on Profit Margins: A Quantitative Study of Vegetable Sellers in Sokoto Metropolis

***Abubakar Bello Sokoto (Ph.D.); **Ibrahim Bello; & ***Abubakar Bello Aliyu**

*Shehu Shagari University of Education, Sokoto, Department of Economics;
**Usmanu Danfodiyo University, Sokoto, Department of Crop Science
***Shehu Shagari College of Education, Sokoto, Department of Economics
Corresponding Author: belloabubakar22@gmail.com
DOI: https://doi.org/10.70382/ajbdmr.v7i7.006

Funding: This is a Tetfund sponsored institutional based research (IBRs) 2024 *Reference No. TETF/DR&D/CE/UNI/SOKOTO/IBR/2024/VOL.I*

Abstract

This study investigates the impact of price fluctuations on the profit margins of vegetable sellers in Sokoto Metropolis using a quantitative research approach. Data were collected through structured surveys administered to 385 vegetable sellers across four local governments: Sokoto North, Sokoto South, Wamakko, and Dange Shuni. The analysis revealed a significant negative correlation between price fluctuations and profit margins, with seasonal trends, transportation costs, and supply chain inefficiencies identified as the primary contributors. Sellers reported reduced profitability during periods of price instability, with peak seasons presenting the highest risks. The study emphasizes the need for government interventions, including price regulation, improved transportation infrastructure, and financial support, to stabilize the market and enhance the sustainability of vegetable businesses. These findings provide critical insights for

policymakers and stakeholders seeking to improve the economic playfulness of small-scale vegetable sellers in Sokoto Metropolis.

Keywords: Price Fluctuations, Profit Margin, Quantitative Study, Sokoto Metropolis, Vegetable Sellers.

Introduction

Price fluctuations are a pervasive phenomenon in economic markets, profoundly influencing business operations, particularly in sectors characterized by high price volatility, such as agricultural commodities. The agricultural sector plays a pivotal role in the economic development of many countries, especially in regions where agriculture serves as a primary source of livelihood. In Nigeria, agriculture remains critical to the economy, employing a significant share of the labor force and contributing substantially to the gross domestic product (GDP). Within this sector, the vegetable subsector holds unique importance, fulfilling domestic consumption needs and providing income-generating opportunities for small-scale farmers and traders.

Vegetables, being highly perishable, are subject to significant price instability due to factors such as seasonality, weather conditions, transportation logistics, and market dynamics. In Sokoto Metropolis, a region with distinct socioeconomic and climatic conditions, price volatility poses a pressing challenge for vegetable sellers. These fluctuations affect profit margins, economic stability, and household food security, making it a critical area of study. This quantitative research seeks to measure and analyze the extent to which price fluctuations influence profit margins among vegetable sellers in Sokoto Metropolis, providing empirical evidence to support policy interventions and improve market efficiency.

STATEMENT OF THE PROBLEM

The vegetable markets in Sokoto Metropolis experience significant and often unpredictable price fluctuations, posing a substantial challenge to sellers. These irregular price variations can adversely affect the profit margins of vegetable sellers, particularly small-scale traders who rely on these markets for their livelihoods. Despite the importance of the vegetable subsector to the local economy, there is a limited understanding of the extent and frequency of price fluctuations and their specific impact on traders' incomes.

Small-scale vegetable sellers, due to limited financial resources and market influence, are especially vulnerable to the economic shocks caused by price

volatility. These fluctuations can lead to inefficiencies in the supply chain, increased transaction costs, and potential spoilage of goods, all of which negatively impact their profitability. Furthermore, the lack of timely and accurate market information exacerbates the challenges faced by these sellers, making it harder for them to adapt to price changes effectively.

Quantitative research is essential to measure the magnitude of these impacts and identify the key factors contributing to price fluctuations. Additionally, evaluating the effectiveness of existing government policies and interventions in stabilizing prices and supporting sellers is necessary. This study aims to provide empirical evidence on the extent to which price fluctuations affect profit margins and inform strategies for enhancing the resilience of small-scale vegetable sellers in Sokoto Metropolis.

OBJECTIVES OF THE STUDY

The primary objective of this quantitative study is to evaluate the impact of price fluctuations on the profit margins of vegetable sellers in Sokoto Metropolis, Sokoto State. The specific objectives are:

1. To statistically analyze the key factors contributing to price fluctuations of vegetables in Sokoto Metropolis.
2. To measure the extent to which price fluctuations impact the profit margins of vegetable sellers, categorized by vegetable type and seller demographics.
3. To assess the effectiveness of current market strategies and policies in mitigating the adverse effects of price volatility on sellers.
4. To quantify the effect of vegetable price fluctuations on the purchasing power and consumption patterns of consumers in the region.

LITERATURE REVIEW

MARKET PRICE FLUCTUATIONS

Market price fluctuations refer to changes in prices due to supply-demand dynamics, weather conditions, production costs, and external market forces (Li, Zhang and Wang 2018). Quantitative studies often focus on statistically analyzing these factors to predict patterns and measure their effects on markets. For instance, Rahman and Akter (2015) identified key factors contributing to price fluctuations, including production costs, economic conditions, and government policies, which can be measured and compared across different contexts.

ECONOMIC THEORY OF SUPPLY AND DEMAND

Mankiw (2014) explains the equilibrium price in the vegetable market as a function of supply and demand. Quantitative models can assess the elasticity of supply and

demand, analyzing how price changes impact sellers and consumers. The Theory of Supply and Demand posits that prices settle at equilibrium, where quantity demanded equals quantity supplied (Jacks, O'Rourke and Williamson 2011). This theoretical foundation is essential for analyzing fluctuations in vegetable prices in Sokoto Metropolis.

PRICE ELASTICITY OF DEMAND

Price elasticity of demand measures the responsiveness of quantity demanded to price changes. Pindyck and Rubinfeld (2017) highlighted that understanding elasticity helps predict how consumers react to price changes. Quantitative research often uses elasticity coefficients to assess the sensitivity of vegetable markets, with Bellemare (2014) confirming the inelastic nature of most agricultural products.

MARKET INTEGRATION

Market integration studies quantitatively assess the degree of price convergence across markets. Ahmed, Mubarak, and Anjum (2012) emphasize that well-integrated markets ensure efficient price transmission, minimizing fluctuations. Quantitative tools, such as price ratios and time-series analysis, are used to examine spatial arbitrage and the Law of One Price (LOP) in markets.

PROFIT MAXIMIZATION

Quantitative analysis of profit maximization focuses on the relationship between costs, revenues, and market prices. Besanko et al. (2010) noted that sellers adjust their pricing and production strategies to optimize profits. Models incorporating the law of supply and demand can quantify how price fluctuations affect profit margins in vegetable markets.

PRICE TRANSMISSION

Price transmission, measured through econometric models, assesses how price changes at one level (e.g., farmers) affect other levels (e.g., retailers and consumers). Oguntade and Adeola (2017) highlighted the symmetric and asymmetric nature of price transmission, providing a framework for analyzing price data.

PRICE SMOOTHING

Quantitative studies on price smoothing focus on strategies like forward contracting and hedging to reduce price volatility. Eckstein et al. (2016) and Vedenov and Barnett

(2004) showed how these strategies stabilize prices and incomes, reducing uncertainty for vegetable sellers.

RESEARCH METHODOLOGY

DESCRIPTION OF THE STUDY AREA

Sokoto State, located in northwestern Nigeria, was created in 1976 and further restructured in 1996 when Zamfara State was carved out. The state shares borders with Niger Republic to the north, Kebbi State to the west, Zamfara State to the south, and Katsina State to the east. Sokoto State consists of 23 Local Government Areas, including Sokoto North, Sokoto South, Wamakko, and Dange/Shuni, which collectively form the Sokoto Metropolis. Sokoto North is the administrative and commercial center, housing the Sultan's Palace and other key state institutions. Sokoto South is a blend of residential and commercial areas, complementing Sokoto North as the heart of the metropolis. Wamakko is a rapidly urbanizing area contributing significantly to the city's development and infrastructure. Dange/Shuni also is situated on the outskirts but integral to the socio-economic dynamics of the broader metropolitan region. This metropolitan area serves as a hub for administrative, commercial, cultural, and educational activities in Sokoto State.

SAMPLING METHODS

A stratified random sampling technique was employed to select vegetable sellers across three strata: Stratum A: Small-scale farmers (150 samples). Stratum B: Wholesalers (90 samples). And Stratum C: Retailers (160 samples).

These strata were selected based on market position and trade volume, ensuring comprehensive representation across Sokoto North, Sokoto South, Wamakko, and Dange/Shuni local governments. In total, 400 observations were collected for quantitative analysis.

METHOD OF DATA COLLECTION

Data was collected through structured questionnaires, which included open- and closed-ended questions to gather information on: - 1. Price fluctuations. 2. Profit margins across different periods and seasons. 3. Sellers' financial transactions and seasonal dynamics.

METHOD OF DATA ANALYSIS

Descriptive Statistics were calculated to summarize the impact of price fluctuations on profit margins among vegetable sellers in Sokoto metropolis.

ANALYSIS OF THE RESULT FROM DESCRIPTIVE STATISTICS

This study assessed the impact of price fluctuations on profit margins among vegetable sellers in Sokoto Metropolis, based on responses from 385 participants. The analysis revealed the following key findings:

Table 1: Gender distribution of respondents

Responses	Frequency	Percentage
Male	**250**	**65%**
Female	**135**	**35%**
Total	**385**	**100%**

Source: Field survey (2024)

From the result majority of respondents (65%) were male and 35% were female, indicating a male-dominated vegetable-selling trade in markets within Sokoto metropolis.

Table 2: Age group distribution of respondents

Responses	Frequency	Percentage
18-30 years	**96**	**25%**
31-40 years	**135**	**35%**
41-50 years	**96**	**25%**
Above 50 years	**58**	**15%**
Total	**385**	**100%**

Source: Field survey (2024)

From the result Most active age group was 31–40 years (35%), followed by younger (18–30 years, 25%) and middle-aged groups (41–50 years, 25%). This result indicated that able individuals dominated trade in the vegetable markets.

Table 3: Educational level distribution of respondents

Responses	Frequency	Percentage
Non-formal education	**154**	**40%**
Primary education	**96**	**25%**
Secondary education	**77**	**20%**
Tertiary education	**58**	**15%**
Total	**385**	**100%**

Source: Field survey (2024)

Majority of the respondents (40%) had attended non-formal education and with only (15%) that had attended tertiary education. This result is absolute indication that, vegetable markets in Sokoto metropolis is largely dominated by individuals that have not attended formal school system. Their engagement in farming activities became a stumbling block for them to pursue education in formal school system. Only very few of them were opportune to attend either primary or secondary education and only small number of individuals that have attended tertiary education and most of them were retiree engaged in vegetable business in the metropolis.

Table 4: Years of experience in vegetable selling

Responses	Frequency	Percentage
Less than 1 year	**38**	**10%**
5 years	**154**	**40%**
10 years	**115**	**30%**
More than 10 years	**77**	**20%**
Total	**385**	**100%**

Field Survey; 2024

Most respondents (40%) had 5 years of experience in vegetable selling, with 30% reporting 10 years of experience and 20% having over 10 years of experience. This result indicated that, with time new members were replacing the old members in the vegetable market. This is because, with time the number of experienced individuals is declining.

Table 5: Category of vegetable sellers

Responses	Frequency	Percentage
Small-scale farmers	**96**	**25%**
Wholesalers	**116**	**30%**
Retailers	**173**	**45%**
Total	**385**	**100%**

Source: Field survey (2024)

Respondents were segmented into small-scale farmers (25%), wholesalers (30%), and retailers (45%), highlighting retailers as the dominant category. This category are people that sell to large number of consumers in the metropolis.

Table 6: Types of vegetables sold

Responses	Frequency	Percentage
Tomatoes	**68**	**18%**
Onions	**51**	**13%**
Lettuce	**38**	**10%**
Spinach	**35**	**09%**
Carrots	**43**	**11%**
Peppers	**53**	**14%**
Cabbage	**42**	**11%**
Others	**55**	**14%**
Total	**385**	**100%**

Source: Field survey (2024)

Tomatoes sellers accounted to about (18%) were the most commonly sold vegetable, followed by, peppers (14%), onions (13%) and carrots (11%). This result indicated that, tomato, peppers and onion are the most important ingredients in preparing soup and mostly purchased by consumers in Sokoto metropolis.

Table 7: Average daily profit from vegetable sales

Responses	Frequency	Percentage
₦ 1,000 to ₦ 5,000	**77**	**20%**
₦ 5,000 to ₦ 10,000	**96**	**25%**
₦ 10,000 to ₦ 20,000	**135**	**35%**
₦ 20,000 and above	**77**	**20%**
Total	**385**	**100%**

Source: Field survey (2024)

Daily profits varied widely was reported with 35% earning ₦ 10,000 – ₦ 20,000, while 20% each earned less than ₦ 5,000 or over ₦ 20,000. This result indicated that, majority of vegetable sellers earned profit which ranged from ₦ 10,000 – ₦ 20,000 on daily basis which are very likely to be the retailers.

Table 8: Frequency of price fluctuations in vegetable sales

Responses	Frequency	Percentage
Daily	**140**	**36%**
Weekly	**115**	**30%**
Monthly	**90**	**23%**
Rarely	**40**	**11%**
Total	**385**	**100%**

Source: Field survey (2024)

Price fluctuations occurred frequently, with 36% of respondents experiencing daily fluctuations and 30% facing them weekly. This is a clear indication that, price of vegetables is not stable in Sokoto metropolis. Changes occur on daily basis and consumers always experienced changes on the quantity of commodities purchased from retailers on daily basis.

Table 9: Extent of impact of price fluctuations on profit margins

Responses	Frequency	Percentage
Significantly	**200**	**52%**
Moderately	**115**	**30%**
Slightly	**50**	**13%**
Not at all	**20**	**05%**
Total	**385**	**100%**

Source: Field survey (2024)

Over half (52%) of respondents reported significant impacts on profit margins, with an additional 30% experiencing moderate effects. The above result affirms the severity of the impact of prices fluctuation, and the severity is high. More than half of vegetable sellers in Sokoto metropolis were affected by price fluctuation in one way or the other.

Table 10: Patterns and periods of pronounced price fluctuations

Responses	Frequency	Percentage
Supply chain disruptions (e.g. fuel price)	**155**	**40%**
Price spikes during festive seasons	**130**	**34%**
Seasonal fluctuations	**68**	**18%**
End-of-week increases	**27**	**7%**
Import/export disruptions	**05**	**01%**
Total	**385**	**100%**

Source: Field survey (2024)

The main drivers of price fluctuations included supply chain disruptions (40%) and festive season spikes (34%), followed by seasonal fluctuations (18%). The result above indicated that, increase in fuel price affects transportation cost and caused fluctuations. Moreover, massive purchase during festivities accounted as the major reasons for price fluctuations in Sokoto metropolis. Transportation largely affects farmers, wholesalers and retailers. Again, part of the transportation burden is also shifted to the final consumers.

Table 11: Strategies used to mitigate price fluctuations in vegetable business

Responses	Frequency	Percentage
Diversifying Vegetable Types Sold	**85**	**22%**
Bulk Buying or Stockpiling During Low Price Seasons	**65**	**17%**
Forming Cooperatives or Seller Associations	**67**	**17%**
Price Flexibility and Dynamic Pricing	**53**	**14%**
Reducing Operational Costs	**41**	**11%**
Engaging in Alternative Income Sources	**33**	**09%**
Improving Customer Loyalty and Offering Discounts	**25**	**06%**
Utilizing Market Information and Forecasting	**16**	**04%**
Total	**385**	**100%**

Source: Field survey (2024)

The most common strategies included diversifying vegetable types sold (22%), forming cooperatives or associations (17%), and bulk buying or stockpiling (17%). Price flexibility (14%) and reducing operational costs (11%) were also significant, while 9% engaged in alternative income sources. A smaller group (4%) used market information and forecasting to mitigate risks. Vegetable sellers in Sokoto metropolis used different methods in reducing the impact of price fluctuations. Diversifying the type of vegetable sold is one of the important factors in reducing the impact. Some retailers shift from one commodity to another as a result of rise in price of that commodity. This strategy contributes effectively in stabilizing profits and the income generated by vegetable sellers in Sokoto metropolis.

DISCUSSION OF MAJOR FINDINGS

The quantitative findings provide a detailed picture of the systemic impact of price fluctuations on vegetable sellers in Sokoto metropolis. The data reveal that price instability significantly affects profit margins, with sellers reporting considerable reductions during periods of price hikes. For example, to maintain customer loyalty and remain competitive, many sellers resort to lowering their profit margins, often resulting in financial strain. This effect was most pronounced during peak demand seasons when wholesale prices surged unexpectedly. Conversely, during periods of price drops, the issue of overstocking emerged as a major challenge. Sellers who over-purchased to leverage lower prices often faced spoilage and wastage, further eroding profit margins.

Access to market information was identified as a critical factor in mitigating the adverse effects of price fluctuations. Sellers with better access to timely and accurate

information on price trends were found to adapt more effectively, either by adjusting procurement schedules or diversifying their supplier base. However, the data revealed that a majority of sellers lack such access, which exacerbates the unpredictability of their earnings. Similarly, the absence of adequate storage facilities and efficient transportation infrastructure further compounds these challenges. Sellers without cold storage facilities reported higher spoilage rates, particularly for perishable vegetables. In contrast, sellers who could afford better infrastructure experienced comparatively fewer losses.

The analysis also highlighted the limited financial resources available to vegetable sellers. Most sellers depend on informal credit systems or personal savings to navigate periods of instability. This lack of access to formal financial services limits their ability to invest in adaptive strategies, such as procuring additional stock during price drops or improving their infrastructure. Furthermore, government support mechanisms, such as subsidies for inputs or regulatory frameworks to stabilize prices, were either non-existent or perceived as inadequate. Sellers expressed dissatisfaction with the market's unregulated nature, which they argued allowed wholesalers and market leaders to manipulate prices to their advantage.

Overall, the quantitative findings underline the multifaceted nature of the challenges posed by price fluctuations, emphasizing the need for systemic solutions, including financial inclusion initiatives, infrastructure development, and effective market regulation.

CONCLUSION

The findings highlight a volatile vegetable market in Sokoto Metropolis, where price fluctuations significantly impact sellers' profit margins. Despite these challenges, sellers employ various adaptive strategies, demonstrating resilience and resourcefulness. Policy interventions, such as supporting cooperatives, improving access to market information, and providing storage facilities, could enhance sellers' ability to manage price volatility effectively.

RECOMMENDATIONS

i. Government Interventions:

Price Regulation: Introduce policies to regulate input costs (e.g., fertilizers, seeds) and stabilize prices through market monitoring.

Infrastructure Development: Invest in cold storage facilities and subsidized transportation systems to reduce spoilage and transportation costs.

Market Oversight: Implement measures to curb exploitative practices by wholesalers and market leaders, ensuring fair competition.

ii. Formation of Seller Cooperatives:

Facilitate the formation of cooperative societies to enable sellers to pool resources, engage in collective bargaining, and stabilize prices.

Provide training and resources for cooperative management to ensure long-term sustainability.

iii. Education and Capacity Building:

Organize training programs on financial management, business strategies, and market dynamics to equip sellers with the skills to manage risks effectively.

Promote awareness of modern storage and transportation techniques to reduce losses during peak seasons.

iv. Enhanced Collaboration Among Sellers:

Encourage peer-to-peer information sharing on market trends and supplier contacts.

Support the creation of local seller associations to foster community-driven solutions to market challenges.

v. Encouraging Diversification:

Promote diversification of vegetable offerings to reduce dependence on high-risk products.

Introduce subsidies or grants to support sellers transitioning to innovative or less perishable vegetable options.

vi. Policy Integration:

Develop integrated policies that address both agricultural and market needs, ensuring a steady supply of vegetables and a well-regulated market.

Acknowledgement

The successful completion of this study would not have been possible without the support and contributions of several individuals and organizations. I express my profound gratitude to Tertiary Education Trust Fund (Tetfund) for their financial support, which was instrumental in carrying out this research. I am deeply grateful to the vegetable sellers in Sokoto North, Sokoto South, Wamakko, and Dange Shuni for their time and openness in sharing their experiences. Lastly, I am indebted to my family and friends for their support, understanding, and inspiration, which were invaluable in completing this study.

To all who contributed in one way or another, I extend my heartfelt thanks.

Conflict-of-Interest

The authors declare no conflict of interest in conducting or publishing this study. The financial support provided by the Tertiary Education Trust Fund (Tetfund) was solely

for facilitating the research process and had no influence on the study's findings, interpretations, or conclusions. All research activities were conducted with full independence and academic honor.

Funding: This is a Tetfund Sponsored Institutional Based Research (IBRs) 2024. The authors express their gratitude to Tetfund for its commitment to advancing academic research and development.

REFERENCES

Ahmed, N., Mubarik, Y., & Anjum, M. (2012). Market integration and price transmission of wheat: Case study of Lahore district in Pakistan. *American Journal of Economics*, 2 (7): 39-44.

Bellemare, M. F. (2014). Rising food prices, food price volatility, and social unrest, *American Journal of Agricultural Economics,* 97(1):1-21.

Besanko, D., Dranove, D., Shanley, M., & Schaefer, S. (2010). *Economics of Strategy* (6th ed.). Wiley.

Eckstein, D., Leishman, D., Mertens, K., an & Phimister, E. (2016). Price transmission and volatility across the food chain: A study of the UK food sector. *Journal of Agricultural Economics,* 67(1): 42-63.

Jacks, D. S., O'Rourke, K. H., and Williamson, J. G. (2011). Commodity price volatility and world market integration since 1700, *Review of Economics and Statistics*, 93(3): 800-813.

Li, H., Zhang, J., and Wang, J. (2018). Price Fluctuations and Profitability of Vegetable Sellers in China: A Case Study in a Wholesale Market. *Agricultural Economics Review,* 19(3), 321-338.

Mankiw, N., G. (2014). *Principles of Microeconomics* (7th ed.). Cengage Learning.

Oguntade, A., E., and Adeola, A. M. (2017). Market Integration and Price Transmission in the Vegetable Market: A Case Study of Nigeria. *African Journal of Agricultural Research,* 13 (30), 1545-1556.

Pindyck, R., S., & Rubinfeld, D., L. (2017). *Microeconomics* (9th ed.). Pearson.

Rahman, M., M., and Akter, S. (2015). Price Fluctuations and Food Security in Bangladesh: A Study of Vegetable Markets. *Journal of Agricultural Economics and Development,* 3(7), 186-199.

Vedenov, D., V., & Barnett, B. J. (2004). Price risk management in production agriculture. *Agricultural Finance Review*, 64(2): 151-168.