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ECONOMIC ASSESSMENT OF PLANTAIN MARKETING IN ILORIN METROPOLIS, KWARA STATE, NIGERIA

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Abstract

It is insufficient for policymakers to focus solely on resolving production issues without considering their marketing issues in order to secure food security. This study, therefore, analyzed plantain marketing in the Ilorin metropolis of Kwara state, Nigeria. The study specifically looked at the socioeconomic characteristics of plantain marketers in the study area, assessed the market margin and marketing efficiency of plantain marketers, identified the local plantain market structure, and looked at factors influencing price as well as those restricting the marketing of plantains in the area. Purposive and random sampling methods were combined to gather information from 100 respondents. The analysis used descriptive statistics, market margin, marketing efficiency analysis, Herfindahl index, and Likert-type scale. According to the result of this study, women made up the vast majority (98%) of plantain marketers. It was determined that the market margin and marketing efficiency were 6,111.21 NGN per week and 34.88%, respectively. The Herfindahl index for the plantain market was 0.0121, indicating a tendency toward perfect competition. While poor roads, bulkiness, high perishability, a lack of storage facilities, and a short supply were the main issues restricting the marketing of plantains in the area, high transportation costs, size, and quantity were the significant factors determining plantain prices in the area. Therefore, it is advised that the government increase its spending on building

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and repairing roads. To support efficient marketing activity, storage and processing facilities should also be made available to marketers.

Key words: Plantain, marketing, Herfindahl index, market structure.

JEL⁶: D30, Q13

Introduction

Plantains are members of the genus *Musa* and the family *Musaceae* (Brown et al., 2017). Despite their potential to reach tree height, plantains are actually herbaceous plants (Kaushal et al., 2022). In tropical areas of the world, it is a common food (Amah et al., 2021). One of the biggest producers and consumers of plantains worldwide is Nigeria (FAO, 2006; Akinyemi et al., 2010; Olumba, Onunka, 2020). Nigeria produced 3,088,938 tons of plantains in 2016, ranking her fourth in Africa after Uganda, Rwanda, and Ghana (FAO, 2017). However, smallholder farmers, with an average farm size of 0.7 ha (Kainga, Seiyabo, 2012) are the predominant producers (Norgrove, Hausser, 2014; Elum, Tigiri, 2018).

Due to Nigeria's rapid urbanization and the high desire for quick, simple, and convenient foods among the urban populations who do not engage in agriculture, the demand for plantains has increased significantly in recent years (Ayanwale et al., 2016). In addition to being a staple food for many people in more humid areas, plantains are also a delicacy and a popular snack in other ecologies (Ukwuaba et al., 2022). The country's current strong demand is thought to be the result of a developing sector, primarily plantain chips production. Millions of people in the developing world, notably in sub-Saharan Africa, now eat plantains as their main diet (Ekesa et al., 2013). It is a staple of many African traditional diets, particularly those in Nigeria (Ekesa et al., 2013; Akintade et al., 2016; Ukwuaba et al., 2022).

Despite being significant economically and nutritionally, plantains are extremely perishable and are best collected while still green (Mba, 2013; Eleazu, Okafor, 2015; Olutomilola, 2021). Due to the perishable nature of the fruit, post-harvest losses of plantains vary from one country to the next based on market chains, eating patterns, and preservation techniques. The post-harvest loss of plantains in Nigeria may reach 60% (FAO, 2016). Because of the high demand, starting a plantain marketing business has great potential. However, the technology utilized in plantain production receives most of the attention, while the marketing of the crop receives far less. Increased output without an equal increase in marketing could result in resource waste and keep people on the same level as starvation.

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Even though the real output may be adequate, marketable, and marketed surplus may be insufficient and unreliable, therefore policymakers cannot just focus on correcting production difficulties without considering their marketing problems (Ariyo et al., 2013). Because plantains are a seasonal crop with a limited shelf life, they are only in on-season for a short time, and the post-harvest wastages are quite significant (Nkwain et al., 2021). The marketing implication of these circumstances requires a thorough examination.

As a result, the study uses the Ilorin metropolitan area as a case study to analyze the complexity of plantain marketing. The research questions are: a) What socioeconomic traits do plantain marketers in the research region have? b) What are the plantain market margin and marketing efficiency in the study area? c) What is the market structure for plantains in the area under study? d) What are the variables influencing plantain prices and those preventing plantain from being marketed in the research area?

The dataset for this study is made up of semi-structured interviews with 100 plantain marketers in the city of Ilorin. Primary data provides a fuller and more complex viewpoint. It enables analysts to verify market size projections and growth outlooks and to get specialized knowledge of particular market trends or driving forces.

Methodology

Study Area

The metropolis of Ilorin, the state capital of Kwara, was the research area. The city is home to people of several Nigerian ethnic groups, including the *Yoruba, Hausa, Igbo, Fulani, Nupe, and Baruba*. Ilorin is a fast-growing metropolitan city, with a projected population of 847,580 in 2006 (NPC, 2006), the city has been projected to have a population of 1,000,477 persons in 2022 (UN, 2022). The dry and wet seasons are the two primary climate seasons of the state, with a transitional cold and dry harmattan phase that typically lasts from December to January. The Niger River and its tributaries cross the plains and rainforests, which make up the majority of the natural vegetation.

Sampling Techniques

The sampling process involved two stages. First, eight markets known for their plantain marketing were specifically chosen. A 100 plantain marketers were then chosen using a proportionate and random sample technique.

Table 1. Sampling Procedure Adopted for the Study

| Area | Markets | Respondents |
|-------------------|----------------------|-------------|
| Ilorin Metropolis | Ipata | 20 |
| | Oja-tuntun | 15 |
| | Oja-oba | 20 |
| | Mandate ultra-modern | 12 |
| | Obbo road | 8 |
| | Yoruba road | 10 |
| | Sango | 5 |
| | Offa Garage | 10 |

Source: Salami et al., 2014.

The target population for this study was plantain marketers. The major markets used for this research and the number of respondents is shown in table above (Table 1.). The selection of respondents was based on the proportion of plantain marketers in each market.

Limitations of the Study

This study has a few imitations. As data is linked to study conducted in 2014, the list of registered plantain marketers was not available, therefore after the consultation research results in the proportionate selection of 100 plantain marketers in the major plantain markets within the Ilorin metropolis. More so, generally, there was dearth of empirical evidences about the value of the Nigerian plantain market.

Although, the survey for this research was conducted in 2014, there have not been many deviations between the results derived from this study and the current research findings from similar studies in Nigeria. For instance, the report of the Ukwuaba and associates in 2022 on plantain marketing in Enugu were in tandem with this study with both studies reporting a monthly marketing margin of 63.51 USD and 57.12 USD respectively (Ukwuaba et al., 2022).

Data Gathering

Primary data were used in this investigation. A semi-structured interview employing a questionnaire produced the primary data. The major goals of using an interview to deliver the questionnaire are to get the necessary information from the respondent and to prevent respondents with low levels of education from misinterpreting the questions. To avoid interfering with their marketing efforts, the marketers were interviewed during their free time.

Data Analysis Technique and Model Definition

Descriptive Statistic

To assess the respondents' socioeconomic characteristics and problems they encountered while marketing, the data was collected and analyzed using descriptive statistical techniques, which included tables, frequency distributions, mean values, and percentages.

Marketing Margin Analysis

Following Ebong and Enyenihi (2015), the Marketing margin can be estimated as follows:

$$\text{Marketing Margin} = \text{Selling price} - \text{Cost price} \quad (1)$$

$$\text{Cost price} = \text{farm price of the commodity}$$

$$\text{Net marketing margin} = \text{Marketing Margin} - \text{Marketing Cost} \quad (2)$$

$$\text{Marketing cost} = \text{transport, loading, and other charges}$$

$$\text{Net marketing margin} = \text{MM} - \text{MC} \quad (3)$$

Where,

$$\text{MM} = \text{Marketing Margin}$$

$$\text{MC} = \text{Marketing Cost}$$

$$\text{Marketing Cost} = \text{Cost of the value-adding activities of the retailer}$$

$$\text{Gross Marketing Margin} = \text{Wholesaler Selling Price} - \text{Retailer Cost Price} \quad (4)$$

Marketing Efficiency Analysis

$$\text{Marketing Efficiency} = \frac{\text{Value added by marketing activities}}{\text{Marketing Cost}} \times 100\% \quad (5)$$

$$\text{Value added by marketing activities} = \text{Selling Price} - \text{Cost Price} \quad (6)$$

Equating (4) and (6)

$$\text{Net Marketing Margin} = \text{Value added by marketing activities}$$

Therefore,

$$\text{Marketing Efficiency} = \frac{\text{Net Marketing Margin}}{\text{Marketing Cost}} \times 100\% \quad (7)$$

Measurement of Market Structure

The structure has been defined as the significant economic variable that characterized an organization. It refers to certain characteristics of marketing which are believed to influence the nature of competition and the process of price formation (Oparinde, Ojo, 2012).

The elements of the structure include the following: 1) A brief history of the market; 2) Barriers to entry; 3) Product differentiation; 4) Size and number of buyers and sellers; 5) The ratio of fixed costs to variable costs in the short run.

The structure of the market was to be appraised using the Herfindahl index. Herfindahl index consists of the sum of squares firm (marketers) size measured as a proportion of total industry size (Naldi, Flamini, 2018).

$$HI = \sum (S_i)^2$$

Where,

$$S = [X_i/T]; \quad i = 1, 2, 3, 4, 5, \dots, n$$

Where,

S_i = Market share for respondent i .

X_i = Total number of plantain bunches sold in a month by respondent i .

T = Total number of plantain bunches sold per month by all the respondents.

The value of the index will be equal to $1/N$ if all firms are of equal size. Otherwise, the value will tend towards unity. The Herfindahl index is a summary index and a measure of concentration.

Likert-type Scale

The Likert-type scale was used to analyze the factors affecting the price of plantain marketing in the study area.

Strongly Agree, Agree, Disagree, and Strongly Disagree were the terms used.

The Likert-type scale was also used to examine the factors limiting the marketing of plantain in the study area. In this case, Very Serious, Serious, Moderately Serious, and Less Serious were the terms used.

Results and Discussion

In Table 2. it was demonstrated that women make up the vast majority (98%) of marketers. This is in tandem with the findings of Aina et al. (2012), who discovered

that women made up 84% of plantain marketers in Ondo State's Odigbo Local Government Area in Nigeria. Individuals between the ages of 30-49 make up the majority of plantain marketing participants (57%). In the research area, plantain marketers were 46 years old on average. Exactly 93% of the respondents are married, or only 7% are unmarried. The average family size among responders (56%) was between 6 and 10 persons. Only 37% of respondents had just completed elementary school, while 45% had no formal education. A cooperative society was the affiliation of the vast majority (86%) of plantain marketers.

Table 2. Socio-economic characteristics

| Characteristics | Category | Frequency (N=100) | Percentage |
|---------------------------------|----------------------------|----------------------|------------|
| Gender | Male | 2 | 2.0 |
| | Female | 98 | 98.0 |
| Age | < 30 | 9 | 9.0 |
| | 30-39 | 20 | 20.0 |
| | 40-49 | 37 | 37.0 |
| | ≥ 50 | 34 | 34.0 |
| Household size | < 5 | 35 | 35.0 |
| | 6-10 | 56 | 56.0 |
| | 11-15 | 7 | 7.0 |
| | ≥ 16 | 2 | 2.0 |
| Marital status | Single | 7 | 7.0 |
| | Married | 93 | 93.0 |
| Educational level | No formal | 45 | 45.0 |
| | Primary | 37 | 37.0 |
| | Post primary | 14 | 14.0 |
| Cooperative association | Yes | 86 | 86.0 |
| | No | 14 | 14.0 |
| Source of funds | Personal savings | 60 | 60.0 |
| | Relations/friends | 28 | 28.0 |
| | Cooperative loans | 10 | 10.0 |
| | Moneylender | 2 | 2.0 |
| | Banks | 0 | 0.0 |
| | Government | 0 | 0.0 |
| Marketing experience (years) | <5 | 4 | 4.0 |
| | 5-10 | 26 | 26.0 |
| | 11-15 | 32 | 32.0 |
| | ≥ 16 | 38 | 28.0 |
| Methods of minimizing losses | Processing | 74 | 74.0 |
| | Selling at a cheaper price | 26 | 26.0 |

Source: Salami et al., 2014

The market margin, farmers' (gatherers') share, and marketing effectiveness of plantain marketing in the research area are shown in Table 3. The marketers paid a weekly an average of 6,811.50 NGN for their plantains. The average weekly amount spent on marketing was 2,769.21 NGN. The average weekly price for plantains was 12,922.71 NGN. This led to a weekly market margin of 6,111.21 NGN, totaling 24,444.84 NGN per month (i.e. 57.12 USD). Although, this result conflicts with what Nse Nelson et al. (2016) found. It is in line with the results of Ukwuaba et al., 2022 which states that the net marketing margin of plantain marketers in Enugu was 63.51 USD (26,050.38 NGN). Therefore, it might be concluded that plantain marketing is a valuable endeavor in the field of study. The share of farmers (hunter-gatherers) was 52.71%. This suggests that the marketing system receives 47.29% of the money spent by plantain customers.

Table 3. Marketing Margin, Marketing Efficiency, and Gatherers'/Farmers' Share

| Cost/Revenue Items | Average Amount NGN/week |
|---|-------------------------|
| Cost of Purchase of Plantain (W) | 6,811.50 |
| Marketing costs | |
| Transportation Cost | 2,250.00 |
| Loading and Off-loading Cost | 519.21 |
| Total Marketing cost (X) | 2,769.21 |
| Total Cost | 9,580.71 |
| Selling Price (Y) | 12,922.71 |
| Gross Market Margin (Z) [$Z = Y - W$] | 6,111.21 |
| Marketing Margin (Net Marketing Margin) [$Z - X$] | 3,342 |
| Gross Marketing Margin as a Percentage of Selling Price | 47.29 |
| Gatherers'/Farmers' Share (%) | 52.71 |
| Marketing Efficiency (%) | 34.88 |

Source: Salami et al., 2014

Note: currency ratio was 1 USD = 428 NGN (Central Bank of Nigeria)

Analyzing Market Structure

A Synopsis of the Firms' History

Marketing professionals have an average age of 46 years, 98% of whom are female, and 17.5 years of experience. The marketers' marital status was 93%. Sixty percent of the marketing came from personal savings, and 45% lacked any academic education.

Object of Entry

The capital was the entry barrier taken into consideration here. Utilizing the total cost of marketing, the start-up capital needed for the business is not prohibitively expensive for a potential marketer to enter the market.

Product Differentiation

From the study, it was shown that most of the variety handled by the firms is not different from one another. No product differentiation mechanics are put in place by marketers. The variety of plantain handled by a firm is a perfect substitute for that which other marketer's handle.

Number of Plantain Buyers and Sellers

Since there is no barrier to entry into the market, there are a large number of buyers and sellers. The number is so large that no marketer is significant in the market in terms of the quantity he/she sells. Thus, marketers are price takers.

The overall market structure was obtained using a measure of concentration. A summary of the concentration (Herfindahl summary index) was adopted to determine the structure of the market.

Table 4. Volume of Plantain Sold Monthly (in bunches)

| Volume (X) | Frequency (N=100) | Percentage (%) |
|------------|-------------------|----------------|
| ≤12 | 1 | 1.0 |
| 13-28 | 3 | 3.0 |
| 29-44 | 25 | 25.0 |
| 45-60 | 24 | 24.0 |
| 61-76 | 28 | 28.0 |
| 77-92 | 10 | 10.0 |
| 93-108 | 0 | 0.0 |
| 109-124 | 5 | 5.0 |
| ≥125 | 4 | 4.0 |

Source: Salami et al., 2014.

Mean volume of plantain sold (in bunches) = 63

Table 5. Square of Ratio of Individual Volume to Total Volume of Plantain Sold

| Square of ratio (X/T) ² | Frequency (N=100) | Percentage (%) |
|------------------------------------|-------------------|----------------|
| 0.0000031 – 0.0001030 | 59 | 59.0 |
| 0.0001031 – 0.0002030 | 29 | 29.0 |
| 0.0002031 – 0.0003030 | 4 | 4.0 |
| 0.0003031 – 0.0004030 | 4 | 4.0 |
| 0.0004031 – 0.0005030 | 1 | 1.0 |
| 0.0005031 – 0.0006030 | 1 | 1.0 |
| 0.0006031 – 0.0007030 | 1 | 1.0 |
| 0.0007031 – 0.0008030 | 1 | 1.0 |

Source: Salami et al., 2014.

In Table 4. is revealed that the mean volume of plantain sold by the marketers is 63 bunches per month, with the exemption of 4 traders selling above 125 bunches. More so, only 4% of the plantain traders sell below 28 bunches in a month.

Mean of the square of the ratio of individual volume to the total volume of plantain sold = 0.0001209 (Table 5.).

Herfindahl index = $\sum(X/T)^2 = 0.01208568 \approx 0.0121$ (1.21%)

Herfindahl's index stands at 0.0121, or 1.21%. The structure of the plantain market in the research area was ascertained using the Herfindahl index. The maximum value that can be obtained is 1. The results showed a relatively low Herfindahl index of 0.0121. Plantain's market structure tends toward perfect competition, which is characterized by a large number of buyers and sellers, a homogeneous product, no barrier to entry into the industry, perfect mobility of resources, and perfect knowledge of all relevant information. The low Herfindahl index revealed that the concentration ratio for plantain marketers was very low. This discovery is remarkably comparable to that made by Ariyo et al. (2013). In Kaduna Metropolis, Nigeria, they found that plantain marketing had a Herfindahl index of 0.013.

Table 6. Factors Affecting the Price of Plantain

| Factors | SA | A | D | SD | MS | Rank |
|------------------------------------|----------|----------|----------|----------|------|-----------------|
| Size | 26 (26%) | 57 (57%) | 17 (17%) | 0 (0%) | 3.09 | 2 nd |
| Transport cost | 43 (43%) | 57 (57%) | 0 (0%) | 0 (0%) | 3.43 | 1 st |
| Variety | 4 (4%) | 30 (30%) | 4 (4%) | 62 (62%) | 2.32 | 4 th |
| Quantity available | 6 (6%) | 77 (77%) | 17 (17%) | 0 (0%) | 2.89 | 3 rd |
| Influence of marketing association | 2 (2%) | 22 (22%) | 45 (45%) | 31 (31%) | 1.95 | 5 th |

Source: Salami et al., 2014.

SA = strongly agree, A = agree, D = disagree, SD = strongly disagree, MS = mean score. Mean score (MS) was obtained from SA = 4; A = 3; D = 2; SD = 1.

According to the results in Table 6., the respondents' main challenging issues were high transportation costs and a high perception ($X = 3.43$), and they claimed to agree that too high transportation costs could affect the price of plantains. The respondent believes that the size of the plantain could affect price in the next question about the size of the plantain with a strong perception ($X = 3.09$). Additionally, there was a strong agreement with the assertion that the quantity of plantains available also influences the price ($X = 2.89$), indicating that there was a high perception of the quantity available. Last but not least, there was a low perception about the

influence of marketing associations ($X = 1.95$) where the respondents disagree to the statement that marketing associations influence the price of plantains. There was a low perception about the variety ($X = 2.32$) where the respondents strongly disagree to the statement that the variety of plantains affects the price of plantains.

Table 7. Factors Limiting the Marketing of Plantain

| Factors | VS | S | MS | LS | NS | MS | Rank |
|----------------------------|----------|----------|----------|----------|--------|------|-----------------|
| Lack of adequate credit | 11 (11%) | 15 (15%) | 57 (57%) | 17 (17%) | 0 (0%) | 3.20 | 6 th |
| High level of perishable | 23 (23%) | 37 (37%) | 13 (13%) | 27 (27%) | 0 (0%) | 3.56 | 3 rd |
| Lack of storage facilities | 22 (22%) | 35 (35%) | 14 (14%) | 21 (21%) | 8 (8%) | 3.42 | 4 th |
| Low supply | 2 (2%) | 37 (37%) | 48 (48%) | 12 (12%) | 1 (1%) | 3.27 | 5 th |
| Bulkiness | 16 (16%) | 65 (65%) | 19 (19%) | 0 (0%) | 0 (0%) | 3.97 | 2 nd |
| Bad roads | 64 (64%) | 34 (34%) | 2 (2%) | 0 (0%) | 0 (0%) | 4.62 | 1 st |

Source: Salami et al., 2014.

VS = very serious, S = serious, MS = moderately serious, LS = less serious, NS = not serious, MS = mean score. MS was obtained from VS = 5; S = 4; MS = 3; LS = 2; NS = 1.

The plantain merchants identified poor roads that increase transportation costs as the main barrier to their business due to the data shown in Table 7. The weight of the plantains supported this. The third greatest challenge for marketers is the high rate of perishability associated with plantains. The fourth apparent limiting factor in terms of the seriousness of the marketers was a lack of storage facilities. This outcome is comparable to that of Ariyo et al. (2013) but not identical to that of Nse Nelson et al. (2016). The marketers ranked low supply as their fifth biggest issue and a lack of sufficient finance as their sixth biggest issue.

Conclusion and Recommendations

In conclusion, the research demonstrates that the plantain industry is a fully competitive market and that starting a firm with a little initial investment is simple. Because plantains are sourced from far-flung communities, plantain marketing is extremely lucrative with a large market margin that is likely to rise. However, obstacles including poor roads, the product's weight, and perishability, and inadequate storage facilities are impeding the selling of plantains in the research area.

The majority of the plantain marketers are women with an average age of 46 years. Nearly half of them (45%) had no formal education. The marketing margin is 24,444.84

NGN per month (i.e. 57.12 USD) and the marketing efficiency was estimated to be 34.88%. The plantain market in Ilorin is characterized by homogenous products with numerous buyers and sellers, depicting a perfectly competitive market.

Therefore, it is advised that the required infrastructure be put in place, particularly good roads, to allow easy and effective produce transportation and enhance the marketing effectiveness of plantains. Additionally, it aids in the improvement of road transportation by the inclusion of rail service, which provides a more advantageous and affordable method of moving large quantities of cargo. It's also crucial to build new roads and renovate old ones that are in poor condition, especially for connecting rural and urban areas. This will facilitate delivering the product to markets on schedule and in good condition (quality). Additionally, it will save transportation expenses, which will lower marketing expenses. It is important to encourage stakeholders to invest in small-scale plantain processing for a variety of alternate industrial uses and for the production of snacks like plantain chips. This will lessen the amount of spoilage.

As a suggestion for further research it might be explored the issues of digital literacy and adoption of e-commerce platforms among plantain marketers in Nigeria. More so, plantain marketing efficiency could be analyzed through the gender lens.

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