

(RESEARCH ARTICLE)



## Market structure and net determinants of turmeric marketing in Onitsha agricultural zone, Anambra state, Nigeria

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### Abstract

A study was conducted to analyze the market structure and determinants of turmeric marketing in the Onitsha agricultural zone of Anambra State, Nigeria. The research aimed to understand the socioeconomic characteristics, market structure, factors influencing net marketing income, and constraints in turmeric marketing. The sample consisted of 160 intermediaries, including 80 wholesalers and 80 retailers, selected using multistage and random sampling methods. The collected data were analyzed using descriptive statistics, Gini coefficient, multiple regression, and relative index techniques. The findings revealed a male dominance in the turmeric market, particularly among wholesalers, where 60.00% of marketers were men. This indicates gender sensitivity within the market at various levels. The market structure analysis showed Gini coefficients of 0.6866 and 0.7495 for wholesalers and retailers, respectively. These coefficients suggest a high level of income inequality in terms of sales margin and a concentration of sales among a small group of marketers, indicating the presence of imperfect competition in the market. Among the eleven independent variables included in the analysis, age, education, source of finance, and engagement in other business activities significantly influenced the net marketing income of wholesalers. At the retail level, household size, gender, engagement in other business activities, marketing experience, and product price were identified as factors influencing net marketing income. The constraints analysis revealed that online marketing, transportation costs, taxes, and local government charges were perceived as the main constraints at the wholesale level. On the retail level, the constraints were online marketing, irregular market days, and insufficient start-up capital. Based on these findings, it is recommended that the government and relevant agencies reduce taxes and charges imposed on marketers to alleviate their burden. Additionally, addressing the poor condition of roads is necessary for proper marketing in the region.

**Keywords:** Market structure; Net determinants; Turmeric marketing; Onitsha; Anambra State

### 1 Introduction

The agricultural sector plays a vital role in the development of developing countries, and the marketability of agricultural products is crucial for improving their contributions to the national economy [1]. Agriculture is an ancient and significant occupation, providing the essential resources needed for human survival. In Nigeria, the agricultural sector is a key contributor to the Gross Domestic Product (GDP) and overall economic development, even amidst the dominance of the oil industry. It generates employment opportunities, ensures food security, and reduces the burden of food imports [2]. Spices are particularly promising in the realm of farming activities as they offer ample employment opportunities and the potential to increase income for farming communities. Spices play a crucial role in the socioeconomic development of a country. They are utilized in various forms, including whole, chopped, ground, roasted, sautéed, fried, and as toppings [3]. Spices have the potential to yield high returns for both farmers and marketers. Moreover, spices contribute a significant amount of minerals and nutrients, such as iron, magnesium, calcium, and

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others. Turmeric, known as "Indian saffron," is one such spice with notable properties, including its ability to thin blood due to its antiplatelet, anticoagulant, and fibrinolytic properties [4]. It is a commercially important spice crop in India, with varieties like local Haldi, China-scented, Thodopuza, Red streaked, and Alleppey, with Alleppey being popular in American markets. India accounts for approximately 78% of global turmeric production [5]. Turmeric holds commercial, economic, religious, cultural, and medicinal significance. Its conventional importance stems from its substantial contribution to the Gross National Product (GNP) [6]. Turmeric is utilized in various products and is considered safe for use as an enema, mouthwash, and skin cream.

Turmeric has potential health benefits, such as increasing the body's antioxidant capacity and promoting the growth of new neurons in the brain, which may help combat degenerative processes. It has also been associated with a reduced risk of heart disease, thanks to its curcumin content, which can reverse certain steps in the disease progression. Curcumin, found in turmeric, has shown promise in the treatment of Alzheimer's disease and is known to be beneficial for arthritis patients. Additionally, it has been linked to fighting depression, delaying aging, and combating age-related chronic diseases. Marketing is the process of ensuring that the right goods and services are available in the right place and at the right time, supported by effective communication and promotion strategies [7]. It involves various activities aimed at meeting consumer requirements, creating utilities, and facilitating the flow of goods from producers to consumers, thereby enabling income generation for farmers and middlemen to purchase other goods and services. Marketing efficiency refers to how effectively marketing agents utilize available resources to maximize revenue. However, the efficiency of agricultural markets in Nigeria, including those for turmeric, is often hindered by factors such as high market margins, abnormal profits, inadequate infrastructure, and high market costs [8]. These challenges affect both consumers and turmeric marketers, influencing the marketing structure, efficiency, and overall effectiveness. Identifying and addressing these problems is essential for improving turmeric marketing in the study area.

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## 2 Material and methods

The study was carried out in Onitsha Agricultural Zone, Anambra State, situated in the southern part of the state at a latitude of 6°05'–8°21'W and a longitude of 6°44'–7°41'E. The zone has an estimated population of approximately 2 million people [9]. It comprises seven Local Government Areas (LGAs): Ekwusigo, Idemili North, Idemili South, Ihiala, Ogbaru, Onitsha North, and Onitsha South. The landscape of the area is characterized as lowland, and the average temperature is around 39 °C.

The region experiences two distinct seasons: the rainy season, which begins at the end of March and lasts until the end of October, and the dry season, spanning from November to February. Due to the presence of the city of Onitsha and the Onitsha main market, the largest single market in the West Africa Sub-region, there is a high level of commercial activities in the zone. Numerous other markets in the area cater to the wholesale and retail trading of nearly all types of agricultural produce.

### 2.1 Population and Sampling Technique

The study was made up of all turmeric marketers in Onitsha Agricultural Zone, Anambra State, Nigeria. Multistage, purposive, and random sampling methods were used to select 4 Local Government Areas, 8 communities, 16 daily turmeric (Agricultural Food) markets, and 160 intermediaries (80 wholesalers and 80 retailers) for the study. The respondents were selected based on the size of the markets. Details of the selection process are given as:

- **Stage 1:** Four Local governments were randomly selected from the agricultural zone.
- **Stage 2:** This involves the selection of 2 communities each from the 4 LGAs making it a total of 8 communities.
- **Stage 3:** This involves the selection of 2 daily markets with a large number of intermediaries and consumers from each selected community making it a total of 16 markets for the study.
- **Stage 4:** Ten turmeric marketers consisting of five wholesalers and five retailers were randomly selected from each of the 12 markets selected in stage three making it a total of 120 respondents for the study (80 wholesalers and 80 retailers).

### 2.2 Data Analysis

Data for the study were collected from primary source. Primary data were obtained using structured questionnaire to the respondents from the list of turmeric marketers obtained that constituted the sampling frame for the study. Descriptive statistics were used to achieve socioeconomic characteristics, the Gini coefficient was used to achieve market structure, multiple regression was used to achieve socioeconomic characteristics that influence the net

marketing income while relative importance index was used to achieve constraints to turmeric marketing in the study area.

### 2.3 Model specification

The Gini coefficient is calculated as follows:

$$\text{Gini -coefficient} = 1 - \sum XY$$

Where:

X= the ratio of the percentage of onion marketers

Y= the ratio of cumulative percentage of their income

$\Sigma$ = summation sign.

The model was used to measure the influence of socio-economic characteristics on net marketing income of marketers (multiple regression model). Socioeconomic factors were as follows:

NMI=Net Marketing Income ‘

AGE= Age in years

GEN = Gender (dummy: male =0; female = 1)

MRS = Marital status

EDU = Educational level

SOF = Source of finance

HOS = Household size (number of persons living together)

TOU = Membership of trade union (dummy: member =0, non-member = 1)

EXP = Marketing experience

OBT = Other business activities

PDP = Product price

MKS = Marketing cost

e = Stochastic error term.

It is implicitly represented below as

$$NMI = \beta (AGE_1, GEN_2, MRS_3, EDU_4, SOF_5, HOS_6, EXP_7, OBT_8, PDP_9, MKS_{10} \dots e_1)$$

Four functional forms of the regression models (linear, exponential, semi-log and double log) will be used and the model that best fit will be adopted as the lead model.

### 2.4 Acronyms

NMI= Net marketing income

The explicit versions of the functional forms are stated as:

Linear form:  $NMI = \beta_0 + \beta_1 AGE_1 + \beta_2 GEN_2 + \beta_3 MRS_3 + \beta_4 EDU_4 + \beta_5 SOF_5 + \beta_6 HOS_6 + \beta_7 EXP_7 + \beta_8 OBT_8 + \beta_9 PDP_9 + \beta_{10} MKS_{10} + e_1$ .

#### 2.4.1 Semi Log form

NMISN =  $\beta_0 + \beta_1 \log AGE_1 + \beta_2 \log GEN_2 + \beta_3 \log MRS_3 + \beta_4 \log EDU_4 + \beta_5 \log SOF_5 + \beta_6 \log HOS_6 + \beta_7 \log EXP_7 + \beta_8 \log OBT_8 + \beta_9 \log PDP_9 + \beta_{10} \log MKS_{10} + e_1$

#### 2.4.2 Double Log form

Log NMISN =  $\beta_0 + \beta_1 \log AGE_1 + \beta_2 \log GEN_2 + \beta_3 \log MRS_3 + \beta_4 \log EDU_4 + \beta_5 \log SOF_5 + \beta_6 \log HOS_6 + \beta_7 \log EXP_7 + \beta_8 \log OBT_8 + \beta_9 \log PDP_9 + \beta_{10} \log MKS_{10} + e_1$

#### 2.4.3 Exponential form

Log NMISN =  $\beta_0 + \beta_1 AGE_1 + \beta_2 GEN_2 + \beta_3 MRS_3 + \beta_4 EDU_4 + \beta_5 SOF_5 + \beta_6 HOS_6 + \beta_7 EXP_7 + \beta_8 OBT_8 + \beta_9 PDP_9 + \beta_{10} MKS_{10} + e_1$

### 3 Results and discussion

#### 3.1 Socioeconomic characteristics of turmeric marketers

The analysis of the socioeconomic characteristics of marketers in Table 1 indicates that a majority of the marketers fall within the age range of 30-49 years. This suggests that the marketers are relatively young, energetic, and capable of handling the challenges of the agricultural business. In the turmeric market, men dominate the wholesale sector, accounting for 60% of the marketers, which demonstrates gender sensitivity at different levels within the study area. The data also shows a significant number of married marketers (49.37%), although there is also a notable presence of young unmarried individuals. This aligns with the findings of Salau et al., who reported male dominance in the marketing of ginger and garlic in their own study area [10]. Regarding educational status, a majority of marketers are literate, making the study area conducive to easy transactions. The results reveal that a high percentage of marketers (58.13%) initiated their business ventures through personal savings and assistance from friends and relatives, with a small number resorting to borrowing from Isusu groups and banks. These findings are consistent with the research conducted by Ugwumba et al. [7], which observed that the marketing of giant snails is predominantly carried out by young, energetic, and self-sponsored marketers.

The data collected from the field indicates that approximately 50.63% of marketers come from households with 5-8 members who depend on the income generated from the marketing process. Although there is no officially registered trade union, the marketers have organized themselves into an Isusu group (82.5%) to support the welfare of their members and collectively address challenges. The findings also reveal a consistent influx of new entrants into the market each year (39.37%), as more young individuals are drawn to agricultural marketing due to the scarcity of white-collar jobs. Agricultural enterprises such as these ones are relatively easier to start and gain traction. Furthermore, the data demonstrate that the majority of marketers (76.87%) combine turmeric with other agricultural commodities to maximize their profits.

**Table 1** Socioeconomic characteristics of turmeric marketers. n=160

Variables	Frequency	Percentages
<b>Age</b>		
20-29	30	18.75
30-39	50	31.25
40-49	43	26.87
50-59	22	13.75
60 and above	15	9.37
<b>Gender</b>		
Male	96	60.00
Female	64	40.00
<b>Marital Status</b>		
Single	60	37.5
Married	79	49.37
Widow/Divorced	21	13.13
<b>Educational Status</b>		
0-6	56	35.00
7-12	75	46.87
13-18	29	18.12
Total	160	100
<b>Source of Finance</b>		

Personal savings	93	58.13
Friends and relatives	37	23.12
Cooperatives/Isusu	28	17.5
Banks	2	1.25
<b>Household Size</b>		
1-4	58	36.25
5-8	81	50.63
9 and above	21	13.12
<b>Trade Union</b>		
Member	132	82.5
Non-member	28	17.5
<b>Market Experience</b>		
1-5	76	47.5
6-10	63	39.37
10 and above	21	13.13
<b>Other biz Activities</b>		
Yes	123	76.87
No	37	23.13

### 3.2 Market structure of turmeric marketing

**Table 2** Estimated Gini coefficient of the marketing agents (Wholesalers)

Monthly Sales (N)	F	Pro of WT <sub>s</sub> X <sub>1</sub>	Cum. Of WT <sub>s</sub> (N)	TMS (N)	Cum. Pro of TMS Y <sub>1</sub>	X <sub>1</sub> Y <sub>1</sub>
1,000,000-5,000,000	35	0.4373	0.4373	10,867,500	0.4538	0.1984
5,001,000-10,000,000	24	0.3000	0.7373	6,104,500	0.2549	0.0764
10,001,000-15,000,000	11	0.1375	0.8748	4,475,500	0.1869	0.0256
15,001,000 and above	10	0.1250	0.9998	2,496,500	0.1042	0.0130
Total	80			23,944,000.00		0.3134

Key Note: WTS= Wholesalers. Pro= Proportion. Cum=Cumulative. TMS=Total monthly sales. Source: Field survey, 2023.

$$GC = 1 - \sum X_1 Y_1$$

$$= 1 - 0.3134 = 0.6866$$

The analysis of market structure using the Gini coefficient is presented in Tables 2 and 3. For wholesalers, the Gini coefficient was calculated as 0.6866, while for retailers, it was 0.7495. These values indicate a high level of income inequality in terms of sales margin distribution among the marketers and a concentration of sales in the hands of a few individuals. This suggests the existence of imperfect competition in the turmeric market, where certain marketers may have the ability to influence product prices. These findings are consistent with the research conducted by Nkamigbo et al. who reported similar Gini coefficients (0.6556 for wholesalers and 0.6278 for retailers) for watermelon marketers [11], indicating high-income inequalities in the distribution of sales income. The variation in the Gini coefficient is more pronounced among retailers, as they sell smaller quantities directly to end consumers. This finding contrasts with the study conducted by Agugba, et al., who reported a Gini coefficient of 0.49 for the market structure of okra [12]. In their study, the lower coefficient indicated a market with low concentration, a large number of competing marketers, and no

single entity exerting control over market prices. This suggests a low level of income inequality among the okra marketers and is characteristic of a purely competitive market. Additionally, Ugwumba et al. reported Gini coefficients of 0.34 for wholesalers and 0.19 for retailers [7], indicating a low level of income inequality among the marketers in their research. Overall, the Gini coefficient analysis highlights the income inequalities and market dynamics within the turmeric market, indicating varying levels of concentration and competition among wholesalers and retailers.

**Table 3** Estimated Gini coefficient of the marketing agents (Retailers)

Monthly Sales (N)	F	Pro of RTs X <sub>1</sub>	Cum. Of RTs (N)	TMS (N)	Cum. Pro of TMS Y <sub>1</sub>	X <sub>1</sub> Y <sub>1</sub>
50,000-450, 000	27	0.3375	0.3375	2,055, 600.00	0.3194	0.1077
451,000-850,000	22	0.275	0.6125	1,392,610.00	0.2163	0.0594
851,000-1,250,000	19	0.2375	0.9999	1, 023, 890	0.1591	0.0377
1,251, 000 and above	12	0.1500	0.7624	1,963,350.00	0.3050	0.0457
Total	80			6,435,450.00		0.2505

Key Note: RTS= Retailers. Pro= Proportion. Cum=Cumulative. TMS=Total monthly sales; Source: Field survey, 2023.

$$\begin{aligned}
 GC &= 1 - \sum X_1 Y_1, \\
 &= 1 - 0.2505 \\
 &= 0.7495
 \end{aligned}$$

### 3.3 Influence of socioeconomic characteristics on net marketing income of turmeric (Wholesalers)

Table 4 presents the results of the regression model, showcasing four different functional forms. Among these forms, the linear model demonstrated the best performance based on the number of significant predictors, the direction and magnitude of the predictors, as well as the F-statistics, R<sup>2</sup>, and adjusted R<sup>2</sup> values. Therefore, the linear form was selected as the primary equation for analysis.

The coefficient of multiple determination (R<sup>2</sup>) of 76.0 indicates that 76% of the variability in the profit of actors involved in turmeric marketing can be explained by variations in the independent variables. The remaining 24% is attributed to error. This confirms the overall significance of the regression analysis in understanding the factors influencing the profitability of actors in the turmeric marketing industry. The regression equation is given as:

$$\begin{aligned}
 NMI &= 0.12AGE - 0.01GEN + 0.001MRS + 0.06EDU + 0.075SOF - \\
 &0.021HOS + 0.021TOU + 0.04EXP + 15.460BT + 3.19PDP + 13.36MKS
 \end{aligned}$$

Among the eleven independent variables included in the model, four variables, namely age, education, source of finance, and engagement in other business activities, were found to have statistically significant influences on the net marketing income of the turmeric marketers. The remaining variables, including gender, marital status, household size, trade union membership, marketing cost, and price of the product, did not show significant effects.

The coefficient of education was positively related to net marketing income and had a significant effect at a 10% level of probability. This suggests that individuals with higher levels of education have a greater potential to increase their income due to their knowledge, awareness, and adaptability to changes in the marketing system. Similarly, the coefficient of the source of finance had a positive and statistically significant effect on net marketing income at a 5% probability level. This implies that individuals who have better access to financial resources for starting their turmeric business tend to perform better in the enterprise, all other factors being equal.

Additionally, the coefficient of engagement in other business activities was positive and statistically significant at a 1% probability level. This indicates that those who combine their turmeric marketing with other similar business activities tend to make more sales, leading to increased net income. Overall, these findings highlight the significance of age, education, source of finance, and engagement in other business activities in influencing the net marketing income of turmeric marketers.

**Table 4** Influence of socioeconomic characteristics on net marketing income of turmeric (Wholesalers)

Predictor	Linear	Exponential	Semi log	Double log
CONSTANT	-15.562 (0.000)	-2870(0.000)	2.01(0.000)	8.62(0.63)
AGE	0.12 (0.01)*	0.39(0.76)	-0.047(0.11)	1.64(0.06)*
GEN	-0.01 (0.08)	-3.65(0.50)	0.03(1.61)*	0.61(0.67)
MRS	0.001(0.54)	11.23(0.04)*	0.02(1.45)	5.52(0.02)
EDU	0.06(0.08)*	12.32(0.08)	0.04(0.23)	7.65(0.12)
SOF	0.07(0.05)**	1.11(0.67)	1.01(0.22)	5.49(0.38)
HOS	-0.01(0.32)	0.000567(0.09)	0.04(0.17)	-164(0.06)*
TOU	0.021(0.32)	5.02(0.02)***	0.003(0.37)**	0.007965(1.43)
EXP	0.04(0.28)	0.023(0.42)	0.49(1.97)	1099(1.11)
OBT	15.46(0.000)***	0.004(0.54)	-3.58(0.60)	2015(1.24)
PDP	3.19(0.000)	5.08(1.80)	0.16(1.66)	0.002280(1.89)
MKS	13.36 (0.000)	9.123(0.43)*	-4.98(0.45)	0.0007189(0.75)
R <sup>2</sup>	76.0	74.0	69.0	71.0
ADJ. R <sup>2</sup>	0.7823	0.71	0.67	0.69
ROOT	43.69	41.90	30.09	33.98

Key Note: \* = significant at  $p < 0.10$ , \*\* = significant at  $p < 0.05$ , \*\*\* = significant at  $p < 0.01$ . Figures in ( ) are T ratios. Source, field survey, 2023.

### 3.4 Influence of socioeconomic characteristics on net marketing income of turmeric (retailers)

Table 5 presents the results of the regression model for predictors of actors in turmeric retail marketing, using four different functional forms. Among these forms, the double-log form yielded the best results based on the number of significant predictors, the direction and magnitude of the predictors, as well as the values of the F-statistics, R<sup>2</sup>, and adjusted R<sup>2</sup>. Consequently, the double-log form was selected as the primary equation for analysis.

The coefficient of multiple determination (R<sup>2</sup>) was calculated as 89.9, indicating that 89% of the variation in the profit of actors in turmeric marketing can be explained by the variations in the independent variables. The remaining 11% is attributed to error. The F-statistic value of 355.20 was found to be significant, further affirming the overall significance of the regression analysis.

These results underscore the importance of the predictors in understanding the profitability of actors in turmeric retail marketing. The double-log form provides valuable insights into the relationship between the independent variables and the profit outcomes. The regression equation is given as:

$$\text{NMI} = 0.05\text{AGE} - 1.12\text{GEN} + 0.000426\text{MRS} + 0.49\text{EDU} - 3.75\text{SOF} + 14.20\text{HOS} + 12.32\text{TOU} + 0.04\text{EXP} - 1.11\text{OBT} + 1.74\text{PDP} + 0.61\text{MKS}$$

Among the eleven independent variables included in the model, five variables - household size, gender, other business activities, marketing experience, and product price - were found to have statistically significant influences on the net marketing income of the turmeric marketers. The remaining variables - age, marital status, education, source of finance, trade union, and marketing cost - did not show significant effects.

The coefficient of household size was positively related to net marketing income and had a significant effect at a 10% level of probability. This suggests that as the marketers' household size increases, their income from turmeric sales also increases. This finding aligns with expectations, as larger households can contribute to marketing efforts, resulting in higher sales and income. Gender had a positive coefficient but a negative significant effect on net marketing income at a 1% level of probability. This implies that gender plays a role in turmeric marketing, with a higher presence of female marketers dominating the retail level. This suggests that gender dynamics influence the marketing patterns and outcomes in the turmeric market.

The coefficient of other business activities was positive and significantly affected net marketing income at a 10% level of probability. This indicates that combining the sale of turmeric with other products leads to higher sales and, consequently, increased net income for marketers.

Marketing experience had a positive coefficient and a significant effect on net marketing income at a 5% level of probability. This suggests that as marketers gain more experience in the turmeric business, they acquire knowledge and skills that contribute to increased sales and higher net income compared to new entrants.

The coefficient of product price was positive and had a significant effect on net marketing income at a 10% level of probability. This implies that higher turmeric prices result in higher net returns for marketers. Therefore, pricing strategies can impact the profitability of turmeric marketing. Overall, these findings highlight the importance of household size, gender, other business activities, marketing experience, and product price in influencing the net marketing income of turmeric marketers.

**Table 5** Influence of socioeconomic characteristics on Net marketing income of Turmeric (Retailers)

Predictor	Linear	Exponential	Semi log	Double log
CONSTANT	5.070888(50.76)	4.09098(41.65)	0.3452(-10-44)	0.4543(1.04)
AGE	0.05(0.44)	-0.01484(-0.50)	-646.6(-1.25)	-0.00321(-0.23)
GEN	-1.12(0.44)*	0.01453(0.50)	299.3(1.60)*	0.05069(1.61)
MRS	0.000426(0.10)	0.007354	4.1(0.003)	0.00000618(13.38)*
EDU	0.49(0.45)	-0.001081(0.65)	032423(14.79)	-0.1087(0.14)
SOF	-3.75(0.35)	0.00033(12.65)	0.0254(0.44)	41520(-0.43)
HOS	14.20(0.03)*	-0.06236(0.17)	0.09498(1.68)	0.77360(14.69)*
TOU	12.32(0.06)	0.01484(0.50)	0.02054(0.44)	-1008(-0.78)
EXP	0.04(0.15)	-0.01088(0.95)*	0.9497(1.58)	0.0391(12.69)**
OBT	-1.11(0.65)	0.002764(-209)	12621(1.07)**	3728(0.78) ***
PDP	1.74(0.09)*	0.00044(13.37)	0.00000052(18.66)	58.59(8.42)*
MKS	0.61(0.60)	54.49(7.32)**	42320(12.71)	43340(12.00)
R <sup>2</sup>	81.0	78.5	84.0	89.9
ADJ. R <sup>2</sup>	80.6	78.2	84.0	88.8
F-Statistic	170.0	154.15	290.50	355.20

Key Note: \* = significant at p<0.10, \*\* = significant at p<0.05, \*\*\* = significant at p,0.01. Figures in ( ) are T ratios. Source, field survey, 2023.

### 3.5 Constraints to turmeric marketing

Table 6 presents the constraints associated with the marketing of turmeric in the study area. Both wholesalers and retailers face common challenges, although some are more pronounced among wholesalers while others are more significant for retailers. For wholesalers, the most serious constraint perceived was online marketing, with a mean score (M) of 3.78. The rise of online business, even in agricultural products, has led to increased competition, lower prices, and reduced profit margins for wholesalers. High transportation costs (M=3.70) also pose a significant challenge for wholesalers. Factors such as fuel scarcity and cash scarcity due to currency policies have hindered the transportation of bulky turmeric produce to their sales locations. This aligns with the findings of Osundu, who reported high transportation costs in cabbage marketing [13]. Taxes and charges imposed by local government authorities (M=3.60) have also adversely affected turmeric marketing in the study area. The level of taxation and additional levies have created obstacles to smooth operations. The high cost of turmeric production (M=3.20) is another constraint faced by marketers, as variations in cost directly impact their daily sales volume. Insufficient startup capital (M=3.06) limits the purchasing power of the wholesalers. Loading and off-loading costs (M=3.00) also reduce their profit margins, as many marketers engage in additional menial jobs to support their families. Other constraints include inadequate storage, price fluctuation, lack of credit facilities, and irregularity of market days.



For retailers, online marketing (M=3.90) and irregular market days (M=3.85) are perceived as highly challenging constraints. The "sit at home" situation in the region, due to various factors, has affected the daily sales and net incomes of retailers. Insufficient startup capital (M=3.45) significantly impacts retailers who may not have enough resources to purchase the desired quantity of turmeric. Government agencies' daily collections and fees imposed by market authorities also affect the net returns of retailers. Other constraints faced by retailers, albeit to varying degrees, include price fluctuation, high cost of produce, lack of credit facilities, inadequate storage, loading and off-loading costs, and transportation challenges.

Overall, these findings shed light on the constraints faced by both wholesalers and retailers in the turmeric marketing sector, including challenges related to online marketing, transportation costs, taxation, pricing, capital limitations, and other factors that affect their profitability and operations.

**Table 6** Constraints to turmeric marketing

Constraints	Wholesalers mean score	Rank	Retailers mean score	Rank
Insufficient startup capital	3.06	5 <sup>th</sup>	3.45	3 <sup>rd</sup>
Inadequate storage	2.50	7 <sup>th</sup>	1.80	8 <sup>th</sup>
Lack of credit facilities	1.90	9 <sup>th</sup>	2.05	7 <sup>th</sup>
Transportation	3.70	2 <sup>nd</sup>	1.40	10 <sup>th</sup>
On line marketing	3.78	1 <sup>st</sup>	3.90	1 <sup>st</sup>
Price fluctuation	2.01	8 <sup>th</sup>	3.04	5 <sup>th</sup>
Irregularity of market days	1.80	10 <sup>th</sup>	3.85	2 <sup>nd</sup>
High cost of produce	3.20	4 <sup>th</sup>	2.40	6 <sup>th</sup>
Loading and off-loading cost	3.00	6 <sup>th</sup>	1.65	9 <sup>th</sup>
Taxes and LGA charges	3.60	3 <sup>rd</sup>	3.15	4 <sup>th</sup>

Source, field survey, 2023.

#### 4 Conclusion

The study focused on analyzing the market structure and determining the factors influencing turmeric marketing in the Onitsha agricultural zone of Anambra State, Nigeria. The research employed a multistage sampling technique and random sampling methods. Four local government areas were selected from the zone, followed by the random selection of eight communities. Sixteen daily turmeric markets were chosen, and a total of 160 intermediaries, consisting of 80 wholesalers and 80 retailers, participated in the study. Primary data was collected using structured questionnaires administered by enumerators. The analysis of the socioeconomic characteristics revealed that the turmeric market is predominantly male-dominated, particularly in wholesale marketing, with 63.33% male participants. This indicates gender sensitivity at various levels within the study area. Additionally, a significant proportion of the marketers were married (49.37%), although there were also a notable number of young unmarried individuals. The assessment of the market structure demonstrated a Gini coefficient of 0.6866 and 0.7495 for wholesalers and retailers, respectively. These values suggest a high level of income inequalities in terms of sales margin distribution among the marketers, indicating the presence of imperfect competition in the market. The regression analysis revealed that factors such as age, education, source of finance, and engagement in other business activities significantly influenced the net marketing income of wholesalers. At the retail level, household size, gender, other business activities, marketing experience, and product price were found to have a statistically significant impact on net marketing income.

Furthermore, the study identified several constraints faced by marketers. On the wholesale level, the most perceived constraints were related to online marketing, transportation, and taxes/LGA charges. For retailers, online marketing, irregularity of market days, and insufficient startup capital were reported as major challenges. Lastly, the study provides insights into the market structure, determinants of net marketing income, and constraints faced by turmeric marketers in the Onitsha agricultural zone. These findings can contribute to the development of strategies to address the challenges and enhance the efficiency and profitability of turmeric marketing in the region.

### *Recommendation*

- Government and other relevant agencies should consider a reduction in taxes and charges levied on marketers to lessen their burden.
- Government should of necessity address the deplorable condition of our road for proper marketing.

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### **Compliance with ethical standards**

#### *Disclosure of conflict of interest*

The authors have declared no conflict of interest.

#### *Statement of ethical approval*

I, therefore, grant the International Journal of Life Science Research Archive the right to publish and distribute the manuscript in both print and electronic formats. This includes the right to reproduce, transmit, and make the manuscript available to readers, subscribers, and databases.

#### *Statement of informed consent*

Informed consent was obtained from all individual participants included in the study

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### **References**

- [1] Shaibu, U.M., Ibitoye, S.J., Ibrahim, M.K. and Shaibu, Y.A. (2019). Modeling the Factors that Influence Farmers' Participation in Agricultural Insurance Scheme in Kogi State, Nigeria: Implications for Agricultural Policy. *Nigerian Agricultural Policy Research Journal*, 7(1): 36-41.
- [2] Azifuaku, E. N., Ugwumba, C. O. A., Okoli, T. O., & Okeke, U. (2020). Price Competitiveness and Supply Response of Rice Producers in Nigeria: Implications for Agricultural Trade. *Asian Journal of Agricultural Extension, Economics & Sociology*, 38(12), 88–101. <https://doi.org/10.9734/ajaees/2020/v38i1230492>
- [3] Gulshan, K.G., Urmila, B., Neha, L., Maakn, J.H.A. (2019). An economic analysis of production and marketing of major spices in Kanker District of Chhattisgarh on chilli and turmeric *Journal of Pharmacognosy and Phytochemistry*, 8(6), 447-1450.
- [4] Chinnadurai, M., Kavitha, V. Angles, S. and Sangeetha, R. (2018). Economics of turmeric cultivation in Erode district of Tamil Nadu. *Agricultural science digest*, 38, 293-296. doi: 10.18805/ag.D-4800.
- [5] Karthik, V. and Amarnath, J.S. (2014). An economic analysis of turmeric production in Tamil Nadu, India. *Direct Research Journal of Agriculture and Food Science*, 2(6): 66-76.
- [6] Kanthe, R.U. and Badave, V.Y. (2016). Marketing of Turmeric in the Sangli District, Maharashtra, India. *Int J Econ Manag Sci.*, 5: 374.
- [7] Ugwumba, C.O.A., Obiekwe, J.N. and Ozor, M.U. (2016). Marketing of African Giant Snail (*Achatina achatina*) in Anambra State, Nigeria. *IOSR Journal of Dental and Medical Sciences*, vol.15 (6): 57-66.
- [8] Idris, A., Chinda, M.D. and Ahmed, M.A. (2015). Analysis of Onion Marketing Structure in Yola North Local Government Area of Adamawa State, Nigeria. *International Journal of Scientific Research and Management*, 6(10): 734-743.
- [9] Wikipedia (2022). Estimated population of Onitsha Agricultural zone. Retrieved from <https://en.m.wikipedia.org/wiki>.
- [10] Salau, S.A., Olalere, I.T & Ibidokun, O.P. (2022). Economics of spices marketing in Kwara State, Nigeria. *Ife Journal of Agriculture*, 34(3)83-92.
- [11] Nkamigbo, D.C., Ugwumba, C.A.O. and Okeke, U. (2019). Market Structure, Conduct, and Volume of Trade among Channels of Watermelon Marketing in Anambra State. *Inter J Agri Biosci*, 2019, 8(2): 112-116.
- [12] Agbugba, I. K., Nweze, N. J., Achike, A. I., & Obi, A. (2013). Market Structure, Conduct, Channel and Margin of Dry Season Okra Vegetable in South-Eastern Nigeria. *International Conference on Food and Agricultural Sciences*. 2013. V55. 14.
- [13] Osondu, C.K. (2014). Determinants of Decision for Non-Farm Entrepreneurship By Women Farmers in Ikwuano LGA, Abia State. *Agrosearch*, 14(2): 154-167.