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Research Paper

Income Distribution, And Market Participation among Women Cassava Marketers in Imo and Anambra States, Nigeria

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ABSTRACT

This study evaluated income distribution, and market participation among women cassava marketers in Anambra and Imo States, Nigeria. The objectives were to describe income distribution of women cassava marketers and analyze the determinants of level of market participation by women cassava marketersin the study area. A multi-stage random sampling technique was used to collect data from 368 respondents (182 in Imo and 186 in Anambra). Data were analyzed using Gini coefficient and multiple regression Income distribution analysis revealed mean monthly incomes of ₦167,265.10 (Imo), ₦136,000.52 (Anambra), and ₦303,265.62 (pooled). Gini coefficients showed moderate income inequality: Anambra (0.42), Imo (0.36), and pooled (0.39). Imo women marketers had higher income distribution and better market access. Market participation determinants included education (P<0.05), marketing experience (P<0.05), age (P<0.05), market association membership(P<0.05), access to credit(P<0.1), and income (P<0.05) for (Anambra); marketing experience (P<0.1), household size (P<0.05), and income (P<0.05) for (Imo); marketing experience (P<0.05) and market association (P<0.05) for (pooled). Multiple regression analysis model explained 50.3% (Anambra), 76% (Imo), and 56.8% (pooled) of the variation in market participation. Based on these findings, the study recommended the need to develop financial products and strengthen cooperative networks, fostering mentorship programs within marketing associations, and promoting technology adoption and improve road networks for women marketers, tailor interventions to address the unique needs of women marketers in Imo and Anambra States in the area of income distribution.

1. Introduction

Cassava (Manihot spp.) remains a staple crop of immense global importance, particularly across developing regions. With an annual growth rate exceeding 3%, cassava is the fastest-growing staple food in cassava-consuming countries and is increasingly sought after for industrial purposes (Eze, Okoye, &Onyenweaku, 2023). Africa contributes about 64% of the world's cassava output, and Nigeria alone leads globally with 19.4% of total production, equating to approximately 60.83 million tons in 2022 (Akaninyene, Obiekwe, Anunobi, Obot & Udoh, 2023). Cultivated in 24 of Nigeria's 36 states and with over 40 varieties in circulation, cassava's versatility spans consumption, industrial processing, and income generation for millions of stakeholders (Eguono, 2015). Despite Nigeria's vast cassava potential and several governmental initiatives aimed at strengthening the value chain, cassava marketing has yet to perform at optimal capacity. Persistent issues such as unstable output prices, high marketing costs, systemic inefficiencies, and market-related uncertainties limit its full commercialization (Ukeje et al., 2014; Chijioke & Charles, 2018). These challenges are particularly acute for women, who dominate cassava marketing in Nigeria's Southern region, including Imo and Anambra States. Women cassava marketers face disproportionate challenges in market participation due to cultural norms, gender-based discrimination, and

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structural inequalities. Constraints include limited access to land, capital, education, extension services, and transportation, which collectively restrict their productivity and expose them to income volatility (Eerdewijk & Danielsen, 2015; Okezie & Joshua, 2016). Consequently, their capacity to generate and equitably distribute income from cassava marketing is significantly compromised (Gebre et al., 2020). Income is the return on women's investment of labour, capital, land, and entrepreneurship in cassava value chains.

Their participation ranges from cassava aggregation and processing to final distribution. However, due to systemic exclusion and socio-economic disadvantages, many women earn far less than their male counterparts, despite their crucial role in sustaining the cassava economy (Mignouna et al., 2015). This has critical implications for rural livelihoods, poverty reduction, and gender equity. Although cassava marketing presents significant economic opportunities, women cassava marketers in Imo and Anambra States continue to face systemic challenges that limit their full integration into agricultural markets. Their contribution to economic development is under recognized, while critical resources such as credit, training, and land, remain out of reach. These inequities undermine their ability to participate competitively in markets and to generate equitable income from cassava-related activities. The result is a persistent income gap, not just between men and women, but among women marketers themselves, often driven by differences in risk attitude, social positioning, and access to productive resources (Egwuonwu, 2018). Women's participation is further constrained by low education levels, restrictive cultural and religious norms, and a lack of property rights and supportive institutions (Igbe et al., 2021). These conditions deepen the marginalization of women in the cassava marketing ecosystem, reduce their bargaining power, and increase their exposure to poverty.

Despite the growth of literature on cassava production and marketing, few studies explicitly investigate income distribution among women cassava marketers. This limits our understanding of the complex social, economic, and institutional dynamics shaping women's market performance and earning potential in the sector. Several past studies have explored various dimensions of cassava agriculture and gender. For instance, Irenaeus (2014) examined income distribution among rural farmers in Imo State but did not specifically address women cassava marketers or compare outcomes across Imo and Anambra. Ajah et al. (2018) analyzed risk management practices among cassava farmers in Imo but similarly excluded a focus on women marketers. Udemezue, Okoye, and Ewuziem (2021), as well as Olanike (2021), explored gender participation in cassava production and marketing in Anambra State; however, these studies did not provide a detailed analysis of income distribution or the socio-economic factors influencing women's market participation.

The current literature does not adequately integrate income distribution analysis and market participation among women cassava marketers particularly within the comparative context of Imo and Anambra States. This study seeks to fill that critical gap, offering an integrated perspective on how socio-economic variables and market participation affect the income distribution of women cassava marketers. The following specific objectives were used to address these gaps
(i) describe the income distribution patterns among women cassava marketers in Imo and Anambra States.
(ii) analyze the determinants of the level of market participation by women cassava marketers in the area.

2. Material and methods

The research was conducted in Imo and Anambra States, in the southeastern region of Nigeria. The south eastern region lies between Latitudes 04° 24'N and 07° 00'N, and Longitudes 05° 34'E and 09° 24'E, the region is located in Nigeria's humid tropical agro-ecological zone. The wet season runs from April to October, with a brief dry period in August, while the dry season runs from November to late March. Woodland savannah may be found in the northern part of the zone, while mangrove forests can be found in the deep Niger Delta. The region is made up of the states of Ebonyi, Enugu, Anambra, Imo, and Abia. It has a population of 21,955,414 people (National Bureau of Statistics, 2016). Anambra state has four (4) agricultural zones with twenty-one (21) Local Government Areas. The four agricultural zones are Awka, Anambra, Aguata, and Onitsha (LGAs) in Figure 3,2. Anambra State is located between the Longitudes of 6°36'E and 7°21'E and the Latitudes of 5°38'N and 6°47'N. It has a population of 5,527,809 people, with men making up 50.9 percent of the population and females making up 49.1 percent (National Bureau of Statistics, 2016). The state is bordered on the north by Kogi State, on the west by Delta State, on the south by Imo State, and on the east by Enugu State. It has a total area of 4,416km^2, with arable land accounting for 70% of that (Ebido*et al*., 2020). Imo State is located in the southeast of Nigeria (Figure 3.1). It has a population of 5,408,756 people (National Bureau of Statistics, 2016).

The state is divided into twenty-seven Local Government Areas. Imo State is located between Longitudes 6°38 and 7°25 east of the Greenwich Meridian and Latitudes 5°12 and 5°56 north of the Equator. On the east, it is surrounded by Abia State, while on the west, it is bounded by the Niger River. The west is bordered by Anambra State on the north and River State on the south. The state is located in the rainforest zone, having rainy and dry seasons. Agriculture (farming) is the principal source of income in the area, which is primarily rural. Among the crops grown are rice, yam, cassava, cocoyam, maize, melon, and vegetables. A multi-stage random sampling method. In the first stage, four (4) markets from each of the two States (Anambra and Imo States) were chosen at random from the list of major food market in the state, giving a total of eight (8) markets. In the second stage, all women cassava marketers in the eight (8) markets with two states (Imo and Anambra) were listed. In the third and final steps 40% equal-proportional random selection approach using Cochran (1977) (equation 3.1) was utilized to select a total sample size of 368 women cassava marketers from the sample frame (Table 3.1). Cochran (1977) for estimating sample size is given as:

$$n_0 = \frac{Z^2 PQ}{e^2} = 368 \qquad (3.1)$$

n_0 = Sample Size (Units)
Z^2= Abscissa of the normal curve that cuts off an area α at the tails (1 - α equals the desired confidence level, e.g., 95%) = 1.96
P = Estimated Proportion of (40%)
Q = 1-P = 60%
e^2= Desired Level of Precision = 5%

Table 1: Sampling Frame and Sample Size of the Sampled Women Cassava Marketers in Anambra and Imo States

State	Market	Sample Frame	Proportion	Sample Size (40%)
Anambra	Eke Awka Market	121	0.1312	48.4
	Nkwo Nnewi Market	105	0.1139	42
	Nkwo Ogbe Market Ihiala	120	0.1302	48
	Eke Market Ekwulobia	120	0.1302	48
Imo	Ekeukwu Owerri	104	0.1128	41.6
	Eke Okigwe Market	130	0.1410	52
	Afor Ogbe Market	113	0.1226	45.2
	AhiazuMbaise International Market Orlu	109	0.1182	43.6
	Total	**922**	**1**	**368**

Source: Food Market Associations in Anambra and Imo States (2023)

The data were analyzed using gini coefficient and multiple regression analysis models.

2.1 Model Specifications
Gini Coefficient
Gini-coefficient following the studies conducted by Anyaegbu (2019) was used for the estimation and to compare the degree of income inequality between women cassava marketers in the study area. The model was adopted for this study and specified as follows;

$$G.C = 1 - \sum_{i=1}^{n} F_i P_i - - - (1)$$

Where;
$G.C$ = Gini Coefficient (Units),
F_i = Proportion of women cassava marketers' income in the ith Class (Naira), and
P_i = Cumulative Proportion of women cassava marketer's income in the ith Class (Naira).
Gini-coefficient is a measure of statistical dispersion most prominently used as a measure to show the degree of income distributions or inequality of wealth distributions between different households in a population. Gini-coefficient is defined as a ratio with values between zero and one (0-1). A low Gini-coefficient indicated more equal income or wealth distribution, while a high Gini-coefficient indicates more unequal distribution. Zero (0) corresponds to perfect equality, while one (1) corresponds to perfect inequality.

2.2 Multiple Regression Analysis Model
Factors influencing the level of participation of women cassava marketers in the cassava marketing in the area. Multiple RegressionAnalysis was employed adopted the model used by Alabi et al (2013) in this study. The model was specified explicitly as follows;

$$Y_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \varepsilon_i - - - \quad (2)$$

Where;
Zi = Participation Index (Number),
X_1 = Educational Level (Years),
X_2 = Years of Experience (Years),
X_3 = Age of Farmer (Years),
X_4 = Household Size (Units),
X_5 = Membership of Association (1, Member; 0, Otherwise),
X_6 = Amount of Credit Accessed (₦), and
X_7 = Income (₦)

Ɛi = Errors Term.

3. Results and Discussion

3.1 Analysis of Income Distribution of the Women Cassava Marketers in the Study Area

The results of the income distributions of the women cassava marketers are presented in Table 1. the mean monthly income of women cassava marketers across Imo and Anambra States. Women in Imo State showed a higher mean income of ₦167,265.10, while their counterparts in Anambra State earned an average of ₦136,000.52. When pooled, the total mean income across both states was ₦303,265.62. This pattern suggests that women marketers in Imo may have better access to profitable markets, more efficient transportation, or operate at a larger scale. Moreover, the Gini coefficient analysis shows a noticeable income inequality among the women marketers in the study area. The Gini coefficient for Anambra State was 0.42, implying a high level of income inequality, whereas Imo State recorded a lower Gini coefficient value of 0.36, pointing to a more equitable distribution. The pooled Gini coefficient stood at 0.39, which reflects a moderate level of income inequality across the marketers in the areas. These findings align with Okoro and Uchenna (2021), who observed a significant income inequality among rural women marketers in South East Nigeria, attributing the variation to unequal access to capital and transportation facilities. Similarly, Eze and Chika (2023) emphasized that inequality in income distribution among women agricultural traders often stems from differential access to marketing information, value addition opportunities, and cooperative memberships. These studies reinforce the current findings, underscoring that structural inequalities such as scale of operation, access to transportation, and market information continue to shape income outcomes among women cassava marketers.

Table 2: Income Distribution and Gini Coefficient of Women Cassava Marketers

States	Number of Respondents	Mean monthly income (N)	Gini coefficient	Level of inequality
Imo	182	167,265.1	0.42	High inequality
Anambra	186	136,000.52	0.36	Moderate inequality
Pooled	368	303,265.62	0.39	Moderate inequality

Source: *Computed from Field Survey Data, 2025 0.00 – 0.20 (Very Low Inequality), 0.21 – 0.30 (Low Inequality), 0.31 – 0.40 (Moderate Inequality), 0.41 – 0.50 (High Inequality), Above 0.50 (Very High)*

3.2 Determinants of the Level of Market Participation by Women Cassava Marketers in Anambra and Imo States

The results of the determinants of the level of market participation by women in cassava marketers in Anambra and Imo States are presented in Tables 2 and 3. The results from Tables 2 and 3 indicated that the linear and double-log functional forms emerged as the best-fitting (lead) equations for Anambra and Imo States, respectively, while the semi-log functional form was chosen for the pooled data. The coefficients of multiple determination (R^2) for Anambra, Imo, and the pooled data were 0.503, 0.760, and 0.568, respectively.

This means that 50.3%, 76%, and 56.8% of the variation in the level of market participation by women cassava marketers was explained by the explanatory variables in the models. These R^2 values, especially in Imo (0.760) and the pooled data (0.568), underscore the reliability of the models. The F-statistic was statistically significant at 1% level of probability. This significance led to the rejection of the null hypothesis, indicating a significant relationship between socioeconomic characteristics and the level of market participation income among women cassava marketers in the studied areas. The variables such as education, marketing experience, age, market association, amount of credit, and income were significant predictors ($p<0.05$) for Anambra State. In Imo State, marketing experience ($p<0.1$), household size ($p<0.05$), and income ($p<0.1$) were significant, while in the pooled data, marketing experience and market association were significantly associated with market participation ($p<0.05$). The coefficient for education was positive and significant, this implies that higher education attainment boosts women's participation in cassava marketing. This underscores the role of education in broadening market access by enhancing managerial skills and information gathering. The finding aligns with the studies of Ajibade *et al*. (2018), who observed that educated farmers better exploit credit sources and navigate difficult market environments.

Marketing experience was also positively and significantly related to market participation ($p<0.05$), highlighting that women with longer years of experience are more engaged in cassava marketing. This suggested that experience is an asset, though its effect may differ across States, likely due to different market structures and dynamics (Seluhinga, 2023). This aligns with the work of Lindsjö*et al.* (2021), who emphasized how experience boosts farmers' resilience in market participation, especially in cassava marketing. Conversely, age was negatively and significantly related to market participation at $p<0.05$. Older women were less likely to participate actively, likely due to the physically demanding nature of cassava marketing. This study agrees with the findings of Reddy *et al.* (2020), who noted that younger marketers tend to be more agile and innovative, while older ones face limitations in physically intensive activities. Membership in a market association had a positive and significant effect across the three categories. This indicated that belonging to a marketing association enhances participation levels, as associations often provide members with critical privileges and support networks that non-members lack (Sun and Ho, 2018). Household size was negatively and significantly associated with market participation in Imo ($p<0.05$).

This suggested that larger families may divert women's time and resources away from marketing activities to meet household needs, thereby limiting their involvement. The amount of credit accessed had a negative and significant relationship with market participation ($p<0.05$). This suggested that limited access to credit, or the misuse of credit for non-market-related purposes, can distort women's participation in cassava marketing. This finding agrees with that of Moahid and Maharjan (2020), who observed that credit misuse or diversion often restricts market-focused investments among rural farmers. Lastly, income had mixed effects: it was positively significant in Anambra ($p<0.05$) but negatively significant in Imo ($p<0.1$). This implies that while higher income can enable better market participation (by providing resources for transport, storage, etc.), it does not always translate into increased participation if the income is reinvested into production rather than marketing efforts.

Table 3: Level of Market Participation by Women Cassava Marketers

	ANAMBRA STATE				IMO STATE			
Explanatory Variable	**+Linear**	**Exponential**	**Double-Log**	**Semi-Log**	**Linear**	**Exponential**	**+Double-Log**	**Semi-Log**
Constant	0.965	-0.096	0.768	1.533	0.970	-0.068	0.143	1.233
	(6.905)	-(0.495)	(0.919)	(2.287)	(7.701)	-(0.507)	(0.248)	(2.287)
Education	0.005**	0.008*	0.097	0.068	0.004	0.005	0.083	0.068
	(1.753)	(1.737)	(1.294)	(1.253)	(1.155)	(1.325)	(1.436)	(1.253)
Marketing Experience	0.005**	0.003**	0.083**	-0.049	-0.003	-0.003	-0.058	-0.049
	(2.367)	(2.166)	(2.836)	-(1.243)	-(0.727)	-(0.847)	-(1.373)	-(1.243)
Age	-0.006**	-0.007**	-0.263*	0.015	0.001	0.001	0.019	0.015
	-(2.390)	-(2.052)	-(1.606)	(0.133)	(0.246)	(0.221)	(0.157)	(0.133)
Household Size	-0.002	-0.002	-0.005	-0.096**	-0.013**	-0.011**	-0.087**	-0.096**
	-(0.431)	-(0.264)	-(0.118)	-(2.475)	-(2.180)	-(1.805)	-(2.102)	-(2.475)
Market Association	0.086**	0.090*	0.040	0.032	0.026	0.040*	0.043*	0.032
	(2.514)	(1.881)	(0.787)	(1.270)	(1.082)	(1.534)	(1.606)	(1.270)
Amount of Credit	-4.06E-007**	-6.05E-007**	-0.081*	0.012	6.520E-008	7.31E-008	0.013	0.012
	-(2.080)	-(2.225)	-(1.943)	(0.914)	(0.639)	(0.674)	(0.894)	(0.914)
Farm Income	2.72E-007**	3.38E-007**	0.044*	-0.033*	-1.361E-007	-1.57E-007*	-0.032*	-0.033*
	(2.340)	(2.091)	(1.551)	-(1.687)	-(1.453)	-(1.578)	-(1.527)	-(1.687)
R^2	0.503	0.485	0.453	0.469	0.597	0.637	0.760	0.800
Adj R^2	0.471	0.453	0.414	0.431	0.223	0.264	0.393	0.434
F Statistics	6.404***	5.714***	3.897***	4.390***	1.597*	1.710*	2.069**	2.186**
Observation	186				182			

*Source: Field Survey Data Analysis, 2025 P< 0.05 = * and P < 0.01 = ** +Lead Equation Values in parentheses are the t ratio*

Table 4 Pooled Data on Level of Market Participation by Women Cassava Marketers

Explanatory Variable	**Linear**	**Exponential**	**Double-Log**	**+Semi-Log**
Constant	0.990	1.365	0.441	-0.056
	(9.942)	(3.288)	(0.839)	-(0.430)
Education	0.012	0.143	0.197	0.017
	(5.161)	(4.097)	(4.442)	(5.815)
Marketing Experience	0.005	0.057	0.078	0.006**
	(2.476) **	(3.282)	(3.548)	(2.413)
Age	-0.006	-0.246	-0.316	-0.008
	-(3.553)	-(2.986)	-(3.029)	-(3.510)
Household Size	-0.006	-0.017	-0.012	-0.005
	-(1.327)	-(0.686)	-(0.384)	-(0.944)
Market Association	0.060	0.055**	0.054**	0.069**
	(2.719) **	(2.464)	(1.891)	(2.411)
Credit Amount	4..056E-009	0.006	0.004	-1.171E-008
	(0.041)	(0.438)	(0.217)	-(0.091)
Income	-1.796E-009	-0.008	-0.009	-5.176E-010
	-(0.025)	-(0.596)	-(0.530)	-(0.005)
R^2	0.556	0.525	0.534	0.568
Adj R^2	0.539	0.507	0.516	0.552
F-Statistic	9.487	6.866	7.387	10.374
Observation	**386**			

*Source: Field Survey Data Analysis, 2025 P< 0.05 = * and P < 0.01 = ** +Lead Equation Values in parentheses are t ratio*

4. Conclusion

This study examined income distribution and market participation among women cassava marketers in Anambra and Imo States, Nigeria. The results revealed noticeable differences in income levels and market involvement between the two states. Women in Imo State earned higher average monthly incomes and exhibited more equitable income distribution (Gini coefficient = 0.36) compared to their counterparts in Anambra (Gini = 0.42). The pooled Gini coefficient (0.39) indicated a moderate level of income inequality across the study area. The determinants of market participation varied across states, but key influencing variables included education, marketing experience, household size, income level, and membership in market associations. Notably, marketing experience consistently emerged as a significant factor across both states and the pooled data. The multiple regression models explained substantial proportions of the variability in market participation, ranging from 50.3% in Anambra to 76% in Imo, demonstrating that socio-economic factors play a central role in influencing women's involvement in cassava markets.

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