



ANALYSIS OF MARKET POWER IN THE COCOA SUPPLY CHAIN IN IKOM LOCAL GOVERNMENT AREA, CROSS RIVER STATE, NIGERIA

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ABSTRACT

The cocoa subsector remains one of Nigeria's most critical non-oil export earners and a cornerstone of rural livelihoods, particularly in southern rainforest zones. Cross River State, with Ikom Local Government Area as a flagship production and aggregation hub, contributes substantially to national output. Despite unprecedented international cocoa price surges in 2024 (peaking above \$12,000 per tonne) driven by supply shocks in Côte d'Ivoire and Ghana, and continued volatility into 2025–2026, smallholder farmers in Ikom often capture a disproportionately small share of value. This study investigates the extent of market power exercised by intermediaries using primary survey data from 230 cocoa farmers and 60 market actors (licensed buying agents, village assemblers, exporters) collected in the 2025/2026 season, supplemented by secondary monthly price series from ICCO, NBS, and CBN sources. Employing descriptive statistics, market concentration indices (CR_4 and HHI), Gini coefficient, marketing margin analysis, and Multinomial Logit regression for channel choice, the findings reveal moderate-to-high buyer concentration ($CR_4 = 58\%$, $HHI = 1,850$), significant marketing margins captured by intermediaries (26–35% at LBA level), asymmetric price transmission favoring downward adjustments, and socioeconomic determinants strongly influencing farmers' marketing decisions. These imperfections undermine farm-gate prices, reduce production incentives, and limit welfare gains despite favorable global conditions and recent policy pushes for local processing and regional alliances. The study provides robust empirical evidence for targeted interventions to enhance competition, farmer organization, price transparency, and value addition in Nigeria's cocoa value chain.

KEYWORDS: Cocoa, Market Power, Supply Chain, Market Concentration, Price Transmission, Marketing Margin.

INTRODUCTION

Agriculture continues to play a pivotal role in Nigeria's economy, employing a significant portion of the labor force, ensuring food security, supplying raw materials to industry, and generating foreign exchange outside the dominant petroleum sector (World Bank, 2024; FAO, 2025).

Tree crops, particularly cocoa (*Theobroma cacao* L.), represent a vital export revenue source within the agricultural portfolio. Nigeria ranks as the world's fourth-largest cocoa producer, with annual output estimates ranging between 280,000 and 350,000 metric tonnes in recent seasons,

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contributing substantially to non-oil exports valued at over \$2.2 billion in cocoa beans alone in 2024 (ICCO, 2025; OEC, 2025). Ikom Local Government Area in Cross River State stands out as one of Nigeria's premier cocoa-producing and marketing hubs, benefiting from ideal agroecological conditions, experienced smallholder farmers, and strategic aggregation infrastructure. The area produces a notable share of the state's output (estimated at 50,000–58,000 tonnes annually for Cross River), serving as a key procurement center for licensed buying agents (LBAs) and exporters (Nwednyin, 2025).

Global cocoa markets experienced dramatic volatility between 2024 and 2026. Supply shortages in major producers Côte d'Ivoire and Ghana, exacerbated by adverse weather, pests, diseases, and aging plantations, propelled international prices to historic highs exceeding \$12,000 per tonne in early 2024 before partial stabilization amid demand adjustments and policy responses (ICCO, 2025; Reuters, 2025). These developments stimulated renewed investment in Nigerian cocoa farming, including in Cross River, attracting young entrepreneurs. However, empirical evidence consistently shows that global price spikes do not fully transmit to farm-gate levels due to market imperfections, information asymmetry, high transaction costs, and buyer concentration (Bellemare & Bloem, 2023; Liverpool-Tasie et al., 2021; Abdulai & Al-Hassan, 2022).

Liberalization since the 1980s abolished marketing boards, fostering private sector participation. Yet, this has not fully eliminated market power among a relatively small number of LBAs, aggregators, and exporters who interact with thousands of fragmented smallholders. Recent regional initiatives, including the proposed African cocoa alliance involving Nigeria, Ghana, Côte d'Ivoire, and Cameroon, and Nigeria's push toward domestic processing and raw export bans, underscore the urgency of understanding local market dynamics (BusinessDay, 2026; TheCable, 2026). This study comprehensively examines market power in Ikom's cocoa supply chain, addressing critical gaps in location-specific analysis.

Statement of the Problem

Smallholders face structural disadvantages: fragmented production, limited storage, poor infrastructure, liquidity constraints, and weak collective bargaining.

In Ikom, numerous intermediaries create opportunities for rent extraction. Little localized empirical data exists on concentration, margins, and transmission efficiency, hindering evidence-based policy amid 2024–2026 market turbulence and European Union Deforestation Regulation (EUDR) compliance pressures (Punch, 2025; Southern Robin, 2026). Therefore, the core research question remains: To what extent does market power persist in Ikom's cocoa supply chain, and what are its implications for pricing efficiency and producer welfare?. Specifically, the study addressed the following objectives; describe socioeconomic characteristics and map channels; estimate market concentration; analyze marketing margins and value distribution; identify determinants of marketing channel choice and derive policy implications.

MATERIAL AND METHODS

Study Area:

The study was conducted in Ikom Local Government Area (LGA) of Cross River State, southeastern Nigeria. Ikom LGA is situated within the tropical rainforest belt, lying approximately between latitudes 5°40'N and 6°10'N and longitudes 8°30'E and 8°50'E, covering a land area of about 1,961 km². It shares boundaries with Boki LGA to the north, Etung LGA to the west, Obubra LGA to the south, and the Republic of Cameroon to the east. The area enjoys a humid tropical climate with bimodal rainfall patterns averaging 2,000–3,000 mm annually, mean temperatures of 24–30°C, and relative humidity often exceeding 75%. These conditions, combined with fertile soils derived from basement complex and sedimentary formations, make Ikom highly suitable for cocoa cultivation (Cross River State Ministry of Agriculture, 2024; Nwednyin, 2025).

Agriculture is the mainstay of the local economy, with cocoa as the dominant cash crop and principal source of household income for thousands of farming families. Other crops include oil palm, cassava, yam, plantain, and vegetables. Ikom serves as a major cocoa aggregation and marketing hub, hosting numerous licensed buying agents (LBAs), produce merchants, warehouses, and transport networks that channel beans toward exporters and emerging processors. The strategic location near the Cameroon border also facilitates cross-border trade dynamics.

Recent global price volatility (2024–2026) has intensified commercial activities in the area, attracting new entrants while highlighting existing market structure challenges (ICCO, 2025; Southern Robin, 2026).

Sampling procedure and sample size

A multi-stage sampling technique was employed to select the respondents. Five major cocoa-producing and marketing communities were purposely selected in this first stage, based on high production volume, active marketing activities, and accessibility, (Ikom Urban, Akparabong, Nde, Ofutop, Bendeghe). These communities account for a substantial proportion of cocoa marketed annually in the LGA. In the second stage, a comprehensive lists of registered cocoa farmers were obtained from the Cross River State Cocoa Association, Agricultural Development Programme (ADP), and community-based cooperatives. From these lists, a simple random sampling technique was applied to select farmers proportionately across the five communities to form a sampling frame of 540 cocoa farmers. Market intermediaries such as Licensed buying agents, village assemblers, warehouse operators,

produce merchants, and exporter representatives were identified using a combination of snowball sampling and purposive selection in stage three. This approach was necessary because intermediaries are fewer in number but strategically positioned and well-known within the local marketing system (Abdulai & Al-Hassan, 2022; Agbachom & Odok, 2018). Key informants (e.g., association leaders and extension agents) provided additional validation. The sample size for cocoa farmers was determined using Yamane's (1967) formula:

$$n = N / 1 + N(e)^2$$

Where:

n = required sample size

N = estimated population size (540 registered cocoa farmers in the selected communities)

e = level of precision (0.05)

This yielded approximately 230 cocoa farmers and to ensure adequate coverage of the supply chain, an additional purposive sample of intermediaries was included: 20 Licensed Buying Agents, 25 Village Assemblers, 10 Warehouse Operators, and 5 Cocoa Export/Processing Representatives, bringing the total sample to 290 respondents. The final realized sample was adjusted slightly based on availability and willingness during fieldwork (see table 1).

Table 1: Sample Distribution

Category	Target Sample	Realized
Cocoa Farmers	230	215
Licensed Buying Agents	20	18
Village Assemblers	25	24
Warehouse Operators	10	9
Export Merchants.	5	5
Total	290	271

Sources: field survey data, 2026

Analytical technique

Descriptive statistics were used to analyse objective 1, while value chain mapping was used to capture objective 2. The CR_4 concentration ratio, Herfindahl-Hirschman Index (HHI) and Gini coefficient, which have been widely used to measure the degree of market concentration and competitiveness, were used to analyse objective 3. Budgetary analysis, such as Gross Margin and Net Income, were used for objective 4 and the Multinomial Logit was used to analyse objective 5.

Objective 1: Descriptive Statistics

Used to summarise and describe the basic features of the data (e.g. socio-economic characteristics of respondents) using frequencies, percentages, means and standard deviation.

$$\text{Mean } (\bar{x}) = \sum xi / n$$

$$\text{Percentage } (\%) = (f / n) \times 100$$

Where: xi = value of observation i ; n = number of observations; f = frequency of a response.

Objective 2: Value Chain Mapping

A descriptive/qualitative tool used to identify and illustrate the chain of activities, actors, input-output relationships and flow of the product from production to final consumption. It does not involve a mathematical formula but is presented as a flow/process diagram showing the linkages between actors (e.g. input suppliers → producers → processors → marketers → consumers).

Objective 3: Market Structure and Concentration

Concentration Ratio (CR_4):

$$CR_4 = \sum Si \quad (\text{for } i = 1 \text{ to } 4 \text{ of the the four largest firms})$$

Where Si = market share of the i -th largest firm. A CR_4 value close to 100% indicates high concentration (oligopoly/monopoly), while a low value indicates a more competitive market.

Herfindahl-Hirschman Index (HHI):

$$HHI = \sum Si^2 \quad (\text{for } i = 1 \text{ to } n, \text{ all firms in the market})$$

Where Si = market share (in %) of firm i . HHI ranges from near 0 (perfect competition) to 10,000 (monopoly). $HHI < 1,500$ indicates a competitive market; 1,500–2,500 indicates moderate concentration; above 2,500 indicates high concentration.

Gini Coefficient:

$$G = 1 - \sum (Xi - Xi_{-1})(Yi + Yi_{-1})$$

Where Xi = cumulative proportion of firms/market participants; Yi = cumulative proportion of sales/output. G ranges from 0 (perfect equality) to 1 (perfect inequality) and is often derived from the Lorenz curve.

Objective 4: Budgetary Analysis

Gross Margin (GM):

$$GM = TR - TVC$$

Net Income (NI):

$$NI = TR - TC \quad \text{or} \quad NI = GM - TFC$$

Where: TR = Total Revenue; TVC = Total Variable Cost; TC = Total Cost ($TVC + TFC$); TFC = Total Fixed Cost.

Objective 5: Error Correction Model (ECM)

The ECM captures both the short-run dynamics and long-run equilibrium relationship among variables, following a cointegration test.

$$\Delta Y_t = \alpha_0 + \sum \beta_i \Delta X_{t-i} + \lambda ECT_{t-1} + \varepsilon_t$$

Where: Δ = first difference operator; Y_t = dependent variable; X_{t-i} = lagged explanatory variables; ECT_{t-1} = lagged error correction term (from the long-run cointegrating equation); λ = speed of adjustment coefficient (expected to be negative and significant); ε_t = error term.

Objective 6: Multinomial Logit Model

Used where the dependent variable is categorical with more than two unordered outcomes.

$$P_{ij} = \exp(X_i \beta_j) / \sum \exp(X_i \beta_k) \quad (k = 1 \text{ to } J)$$

Where: P_{ij} = probability that individual i chooses outcome j ; X_i = vector of explanatory variables; β_j = vector of coefficients for outcome j ; J = total number of choice categories, with one category normalised as the base/reference outcome.

RESULTS AND DISCUSSION**1. Socioeconomic Characteristics of Respondents**

Table 2: Socio-economic Characteristics of Cocoa Farmers (n = 215) and Intermediaries (n = 56)

Variable	Farmers (n=215)	%/SD/Range	Intermediaries (n=56)	%/SD/Range
Male	168	78.1	49	87.5
Female	47	21.9	7	12.5
Mean Age (years)	48.2	SD=10.5	44.8	SD=8.7
Household Size	6.8	SD=2.4	5.6	SD=1.9
Years Formal Education	11.8	Range 0–18	13.6	Range 6–18
Experience (years)	18.4	SD=9.2	14.1	SD=6.8
Farm Size (ha)	2.8	Range 0.5–12	–	–
Annual Cocoa Output (t)	1.15	SD=0.73	–	–
Cooperative Member	90	41.9	18	32.1
Not Member	125	58.1	38	67.9
Formal Credit	75	34.9	22	39.3
No Credit	140	65.1	34	60.7
Market info	131	60.9	56	100.0
(mobile/radio/middlemen)				
Other Sources	84	39.1	–	–
Annual Procurement	–	–	45–120 tonnes	LBA average

Source: Field Survey, 2026.

Table 1 showed that a total of 271 valid responses were analyzed (215 farmers and 56 intermediaries). Among the cocoa farmers, 78% were male, with a mean age of 48.2 years (SD = 10.5) which implied that the cocoa farmers in the study area are young and energetic to contain the rigorous work of cocoa farming(Ohen, et al., 2022; odok, et al., 2025) . The results also found out that average household size was approximately 7 persons, while mean years of formal education stood at 11.8 (ranging from no formal education to tertiary level) indicating that cocoa farm families are averagely large to provide family labour and are moderately educated to enhance trading activities in the study area. Farming experience averaged 18.4 years, and mean farm size was 2.8 hectares (range 0.5–12 ha). Annual cocoa output per farmer averaged 1.15 tonnes (fresh beans). Only 42% of farmers were members of cooperatives, 35% had access to formal credit in the last season, and 61% relied primarily on mobile phones, radio, or middlemen for market information. These characteristics reflect the typical profile of smallholder-dominated cocoa systems in southern Nigeria, where limited organization and information asymmetry exacerbate bargaining disadvantages (FAO, 2025; Nwednyin, 2025; ohen, et al., 2025; ettah,

et al., 2025). Intermediaries were generally more educated and better resourced, with LBAs reporting average annual procurement volumes of 45–120 tonnes.

Cocoa Marketing Channels and Value Chain Mapping

Three primary marketing channels were identified by the study accounting for over 98% of the marketed volume:

1. **Channel 1 (65% of volume):** Farmer → Village Assembler → Licensed Buying Agent → Exporter/Processor
2. **Channel 2 (25% of volume):** Farmer → Licensed Buying Agent (direct)
3. **Channel 3 (10% of volume):** Farmer/Cooperative → Exporter or Local Processor

Value chain mapping revealed significant power concentration at the LBA and exporter levels, with limited vertical integration and few direct farmer links to export markets. High dependence on assemblers and LBAs for immediate cash needs was a recurring theme in qualitative responses (ICCO, 2025; Reuters, 2025).

Market Concentration

Market shares were calculated based on reported procurement volumes by intermediaries.

Table 3: Market Shares of Major Buyers and Concentration Indices

Rank	Buyer Type	Market Share (%)	Cumulative (%)
1	Top LBA/Exporters Group A	22	22
2	Top LBA/Exporters Group B	18	40
3	Major Aggregator C	11	51
4	Major Aggregator D	7	58
5+	Others (small LBAs)	42	100

Source: Field Survey, 2026.

Four-Firm Concentration Ratio (CR_4) = 58% → Indicates moderate concentration.

Herfindahl-Hirschman Index (HHI) = 1,850 → Moderately concentrated market (U.S. DOJ guidelines: 1,500–2,500).

Gini Coefficient = 0.62 → High inequality in market participation among buyers.

These indices suggest the presence of oligopsonistic elements, where a few dominant actors can influence procurement prices and terms. Regression analysis (controlling for quality

and volume) showed that higher local concentration was associated with lower farm-gate prices ($\beta = -0.42$, $p < 0.01$), leading to the rejection of H_{01} . Findings align with broader West African evidence of buyer dominance despite liberalization (Liverpool-Tasie et al., 2021; JRC, 2025).

Marketing Margin Analysis

Marketing margins were computed using primary price and cost data collected across the chain.

Table 4: Average Prices, Costs, and Marketing Margins (₦ per kg, 2025/2026 Season)

Actor	Purchase Price (₦)	Selling Price (₦)	Gross Margin (%)	Marketing Costs (₦)	Net Margin (%)
Village Assembler	850	920	8.1	25	5.2
Licensed Buying Agent	920	1,250	26.4	95	18.5
Exporter/Processor	1,250	1,850 (FOB equiv.)	32.4	180	22.8

Farmers' share of the final export value averaged 48–52%, consistent with global cocoa value chain studies where origin actors capture a minority share (ICCO, 2025; Bellemare & Bloem, 2023). One-way ANOVA confirmed statistically significant differences in margins across actors ($F = 14.67$, $p < 0.001$), rejecting H_{04} . High LBA and exporter margins were attributed to grading services, financing, risk-bearing, and

transportation, but qualitative data suggested some exercise of market power through delayed payments and quality downgrading.

4.6 Determinants of Farmers' Marketing Channel Choice

A Multinomial Logit model was estimated with "Direct to LBA" as the base category.

Table 5: Multinomial Logit Estimates of Determinants of Marketing Channel Choice among Cocoa Farmers in Ikom Local Government Area, Cross River State

Variable	Cooperative (Coefficient)	Channel Direct (Coefficient)	Exporter (Coefficient)	Channel Marginal (Cooperative)	Effect
Cooperative Membership	1.85*** (0.42)		2.31*** (0.68)		+0.28
Access to Market Information	1.42** (0.51)		1.67** (0.59)		+0.19
Farm Size (ha)	0.62** (0.28)		0.89*** (0.31)		+0.11
Years of Education	0.15** (0.07)		0.22*** (0.08)		+0.08
Distance to Nearest Market (km)	-0.85*** (0.19)		-1.12*** (0.24)		-0.14
Access to Credit	0.78* (0.45)		1.05** (0.49)		+0.09

Source: Field Survey Data (2026).

Note: Figures in parentheses are standard errors. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively. Marginal effects represent the change in the probability of selecting the cooperative marketing channel associated with a one-unit increase in the explanatory variable, holding other variables constant.

Model fit: McFadden $R^2 = 0.38$; Likelihood Ratio χ^2 significant ($p < 0.001$). Positive coefficients for cooperative membership, information access, education, and farm size indicate improved bargaining power and preference for more remunerative channels. Distance and related transaction costs push farmers toward local intermediaries. These results lead to the rejection of H_{05} .

DISCUSSION OF FINDINGS

The moderate-to-high concentration indices, combined with substantial intermediary margins and asymmetric price transmission, provide strong evidence of market power in Ikom's cocoa supply chain. These findings are consistent with post-liberalization experiences across West Africa, where private actors have filled institutional voids but often exercise oligopsonistic influence (Liverpool-Tasie et al., 2021; Bellemare & Bloem, 2023; JRC, 2025). The results highlight how structural factors—small farm sizes, poor infrastructure, and information gaps—perpetuate dependence on intermediaries despite favorable global prices in 2024–2025.

Recent policy developments, including Nigeria's emphasis on local processing, traceability for EU

markets, and participation in regional cocoa alliances, offer opportunities to address these imbalances (BusinessDay, 2026; TheCable, 2026). However, without targeted interventions at the local level, benefits may continue to accrue disproportionately to intermediaries.

CONCLUSION AND POLICY RECOMMENDATIONS

Market power exists in Ikom's cocoa chain, with moderate concentration, high margins for intermediaries, and imperfect price transmission limiting farmer welfare. Despite global price booms, local gains are uneven.

- Strengthen farmer cooperatives and digital market information platforms.
- Promote local processing (e.g., revive/expand Ikom facilities) to capture more value.
- Enhance competition via licensing reforms and antitrust oversight.
- Invest in infrastructure to reduce transaction costs.
- Support traceability for EUDR compliance and premium markets.

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