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Structure, Conduct, and Performance (S-C-P) of Poultry markets in Arbegona and Bensa districts of Sidama Region, Southern Ethiopia

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Abstract

Poultry markets play a crucial role in the livelihoods of smallholders and rural income in southern Ethiopia, but structural, behavioral, and institutional barriers limit their growth. This research analyzes the structure, conduct, and performance (SCP) of poultry markets. It uses Heckman's two-stage selection model and a Probit regression model to examine households not engaged in selling, focusing on uncovering the system's limitations and prospects. A total of 130 participants as producers and traders were surveyed, comprising 50 traders, 40 consumers, 20 collectors, and 10 operators of hotels and 10 egg shops, and smallholder farmers were examined to evaluate how structural elements (age of household, land ownership, family size), behavioral factors (credit accessibility, distance to town, market pricing, transaction expenses), and institutional support (feed availability, technical help) affect market results. A mix of household surveys, market evaluations, focus group discussions, interviews with key informants, and direct observation was utilized. Descriptive statistics and to examine market structure, behavior, and performance, as well as factors influencing producers' market engagement and supply decisions. The analysis showed that both the egg and live bird markets exhibit oligopoly features, with concentration ratios of 52% and 37%, respectively, reflecting significant and minor oligopolistic tendencies. Main issues in the poultry sub-sector are restricted access to rare breeds, disease outbreaks, predation, shortages of inputs, price fluctuations, and varying demand. Traders encounter problems associated with unstable marketplaces and the risks of diseases. The results indicate that market structure benefits younger households with smaller landholdings, suggesting differences in participation based on generation and resources. Market behavior is strongly influenced by credit availability, pricing incentives, and shorter distances to consumers, suggesting logical yet limited decision-making. Market performance improves with institutional backing, boosting the intensity of sellers' sales and the probability that non-sellers will join the market, as demonstrated by the Inverse Mills Ratio from the Probit model. This SCP-centered examination reveals that overcoming structural obstacles, expanding market access, and strengthening institutional measures are crucial to boosting smallholder participation and overall market performance. The research adds value to both theory by

broadening the use of the SCP model to rural livestock markets in low-income settings and, practically, by offering recommendations for policymakers, development workers, and local authorities to enhance market access, fairness, and effectiveness in the poultry industry. Future studies should investigate comparative SCP assessments across regions and analyze how digital platforms and contract farming are transforming poultry market dynamics in Ethiopia.

Keywords: Market structure, concentration ratio, poultry market, market efficiency, Sidama Region

1. Introduction

Agricultural markets are essential for connecting rural producers to consumers, creating income, and enhancing national food security. In sub-Saharan Africa, where more than 60% of the population depends on smallholder farming, effective market systems are crucial for alleviating poverty and enhancing livelihoods (FAO, 2021). Livestock markets play a crucial role in household income, nutrition, and resilience, as livestock assets serve as both economic and social safety nets (Randolph et al., 2007). Among livestock categories, poultry is increasingly significant because of its low initial costs, short production periods, and relatively rapid returns. Poultry contributes significantly to high-quality protein via eggs and meat, playing a crucial role in addressing child malnutrition and enhancing household diets (Dessie et al., 2013). Worldwide, poultry ranks among the most rapidly expanding livestock sectors, and demand in developing nations is expected to continue increasing due to urbanization, growing populations, and changing diets (OECD–FAO, 2022). These demand-side elements are crucial for triggering structural transformations in poultry production, processing, and distribution. However, the majority of small-scale producers market their poultry goods to low-income buyers through informal channels. Rising urbanization and incomes are lengthening and complicating the value chains and marketing for poultry, while the safety standards required in these markets are complicating competition for smallholders. These alterations in poultry value chains often involve new participants, such as private agribusiness companies, thereby driving organizational and institutional advancements. Although poultry and poultry products have been traditionally utilized, prices for both live birds and their products have surged significantly in recent years. This is also recognized to differ from location to location. Proactive strategies and investments can help ensure the inclusion rather than the exclusion of the impoverished who engage in small-scale production and sales (Mendoza, 1995).

In Ethiopia, raising poultry helps diversify household income, empower women, and enhance food security in rural areas. Farmers in the Arbegona and Bensa districts raise chickens and sell them to support their livelihoods. The nation boasts one of the largest livestock populations in Africa; however, productivity and market integration remain low (Gebremedhin et al., 2015). Poultry, specifically, is frequently overseen by women and young people, acting as a route for inclusive growth. However, market inefficiencies, such as weak negotiating power, inadequate infrastructure, and intermediary dominance, diminish the returns smallholders can secure (Aklilu et al., 2007). These inefficiencies limit household well-being and impede wider sectoral progress. The Sidama Region in southern Ethiopia is

a place where poultry increasingly contributes to rural economies. Farmers in areas like Arbegona and Bensa depend on poultry not just for food but also as a commodity to fulfill household cash requirements. Although significant, the poultry marketing systems in Sidama are still not well comprehended. Earlier studies on livestock markets in Ethiopia have primarily focused on cattle and small ruminants (Negassa et al., 2011; Ayele et al., 2017), while poultry value chains have received comparatively less attention. Consequently, understanding the structural features of poultry markets, the actions of primary players, and the effectiveness of the results is limited. This study utilizes the Structure–Conduct–Performance (SCP) framework to examine poultry markets in the Arbegona and Bensa districts. The SCP framework, based on industrial organization theory (Bain, 1951), offers a valuable perspective for evaluating how market organization (structure) affects participants' behavior (conduct) and, in turn, how this affects efficiency and equity (performance). While SCP has been widely used in agricultural and livestock research across Africa, its use in Ethiopian poultry markets remains limited. Poultry farming is essential for the livelihoods of smallholders in sub-Saharan Africa, offering income, nutrition, and jobs, especially for rural families with scarce land and resources (Anjulo et al., 2017). In Ethiopia, poultry plays a vital role in food security and household resilience; however, market participation remains inconsistent due to structural, behavioral, and institutional barriers. Smallholder farmers face obstacles such as restricted access to credit, subpar infrastructure, insufficient market information, and weak institutional support, which together reduce both sales volumes and market participation. This research seeks to advance both empirically and theoretically by examining poultry markets through the lens of SCP. It provides evidence of the manifestation of market imperfections in rural Ethiopia, affecting producers, traders, and consumers. Theoretically, it broadens the SCP framework to encompass informal, smallholder-driven poultry markets, demonstrating its applicability to settings outside structured agricultural sectors.

This study addresses a significant gap: exploring the structure of poultry markets in Sidama, the behavior of participants within them, and the outcomes they generate for smallholder families. This comprehension is crucial for developing effective strategies to enhance equity, efficiency, and inclusiveness in Ethiopia's poultry industry. However, in the two districts, the beneficiaries of activities within the poultry production-to-consumption system remain poorly understood. Within the study area, although poultry products significantly contribute to the livelihoods of many households, their marketing and value chain dimensions remain unexamined. Understanding the interactions among household traits, market dynamics, and institutional actions is essential for crafting policies that improve market efficiency, inclusivity, and rural income levels. Even though it is crucial, empirical data on the structure, conduct, and performance (SCP) of poultry markets in southern Ethiopia remain scarce, especially in areas such as Arbegona and Bensa, where smallholder farmers lead marketing. By examining these dimensions, this research offers practical insights into the factors influencing participation and success in poultry markets, aiding broader initiatives to enhance rural value chains and foster sustainable livelihoods. Hence, this study aims to examine the market structure, conduct, and performance of poultry supply in the Arbegona and Bensa districts.

Novelty and International relevance: Although the empirical analysis is context-specific, the findings contribute to broader debates on rural market imperfections, smallholder commercialization, and value chain governance in developing economies. By demonstrating

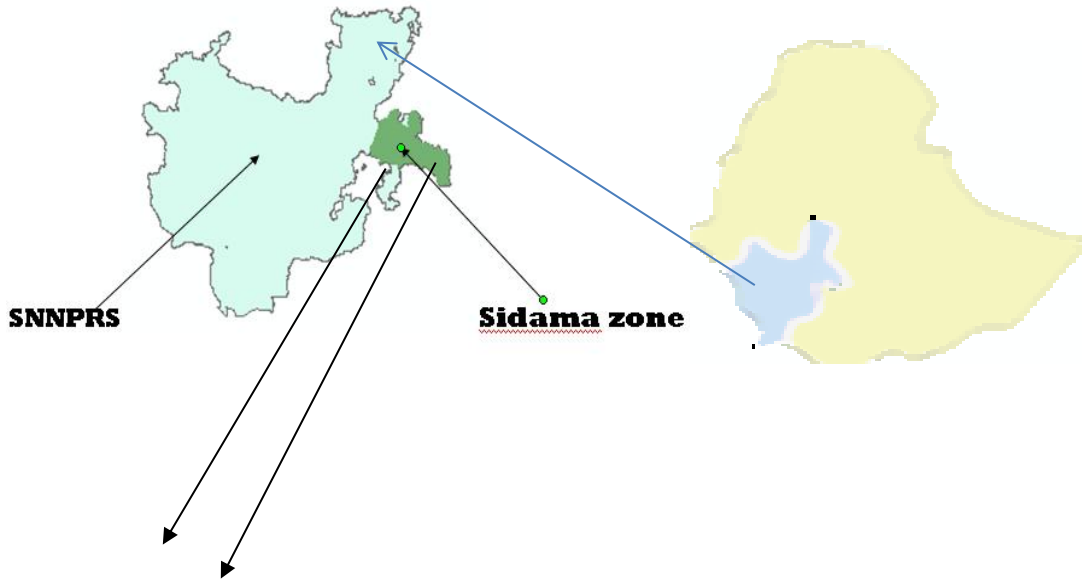
how oligopolistic tendencies, transaction costs, and institutional gaps affect market participation and value distribution, the study provides insights applicable to similar low-input livestock systems across Sub-Saharan Africa and other developing regions. The integration of SCP with household-level econometric analysis also offers a replicable framework for examining the interplay between market structure and smallholder behavior. These contributions enhance the manuscript's relevance to international audiences concerned with inclusive market development and agricultural transformation.

Theoretical Contribution: While the Structure–Conduct–Performance (SCP) framework has been widely applied in agricultural market analysis, this study contributes by contextualizing SCP within fragmented rural poultry systems characterized by informality, low entry barriers, and weak institutional enforcement. Specifically, the study extends the SCP application by integrating smallholder-level behavioral and participation dynamics into the analysis, thereby bridging meso-level market structure with micro-level decision-making processes. This approach provides nuanced insights into how structural imperfections translate into differential market participation and value capture among smallholders, offering an empirically grounded refinement of SCP in low-input livestock systems.

2. Methodology

2.1.Description of the study Area

The study was carried out in two Districts, namely Bensa and Arbegona, in the central part of the Sidama Region. Geographically, the Sidama Region is situated between the coordinates of 5045' and 6045' N latitude and 38039' and 38029' E longitude, with an altitude ranging from 1100 to 3500 meters above sea level (m asl). In the study year, the Sidama Region consists of 19 districts with a total area coverage of 10,000 km2. It has a diverse agroecology, classified as highlands (Dega), midlands (Woinadega), and semi-dry lowlands (Kolla), with 30%, 60%, and 10% coverage, respectively. The farming system of the study area is characterized as mixed crop and livestock farming. The dominant crops in the study districts are maize, wheat, enset, barley, pea, and bean. The zone is endowed with various livestock resources, including cattle, small ruminants, equines, poultry (birds), and honeybees (Figure 1).



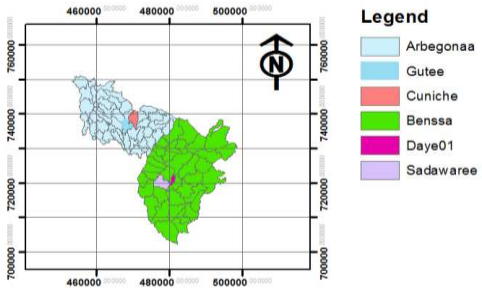


Figure 1. Map of the Study Area

2.2.Source of Data

This research utilized both primary and secondary data sources. The main data were collected from traders, and various market participants engaged in the production and marketing of the poultry subsector. The data covers the general socioeconomic characteristics of farmers and traders in this industry. The research also used data from secondary sources, including the Central Statistical Authority (CSA), Districts, and zonal Agriculture and Rural Development offices, and marketing and cooperative offices related to poultry production and marketing. The market analysis was conducted in five selected markets. The sampled markets include the Hawassa (regional large) market, the Bensa and Arbegona (Districts) markets, and one local market (kocci) from each of the Bensa and Arbegona Districts. The choice of local sample markets was determined by the quantity and accessibility of local poultry markets within the two districts. Marketing information was collected from a specifically chosen group of 130 market participants (collectors, traders, consumers, hotels/egg shops) in the chicken and egg markets, and a limited number of only poultry producer farmers. The selection was based on the number and type of traders, their mobility across the sample markets, and informal conversations with key informants within the marketing system. Discussions were conducted with participants chosen from traders, collectors, consumers, and hotels/egg shops within the poultry marketing system. A total of 130 market participants were chosen and interviewed utilizing a systematic random sampling method. Data gathered from market participants primarily concentrated on the traits of market structure, behavior, and performance. Descriptive statistics were employed to examine market structure, behavior, and performance, as well as factors influencing producers' market engagement and supply decisions.

Primary data were gathered through household surveys and participatory rural appraisal (PRA) methods. The PRA methods used in this study consist of focus group discussions (FGDs), key informant interviews (KIIs), and observations. The household survey was conducted using structured questionnaires. The household survey was conducted with selected participants (20). In addition, the household survey questionnaires underwent pre-testing to assess content clarity and incorporate new information, which would ultimately allow for question adjustments. Interviews with key informants were carried out with district horticulture specialists, and a focus group discussion took place in each village by assembling a group of eight farmers

2.3.Sampling Technique

The Arbegona and Bensa districts were purposively selected for their strategic importance in poultry production within the Sidama Region. These areas are characterized by high smallholder participation in poultry farming, diverse agro-ecological conditions suitable for indigenous and improved breeds, and increasing market integration driven by urban demand. A two-phase sampling method was utilized to collect the sample from the research area. Initially, the primary potential poultry-producing Districts were deliberately chosen. Subsequently, two villages were selected from each district. 10 producer farmers from each district were included. Finally, farmers who produce and participate in marketing were randomly selected from the representative sample. Then, the Snowball sampling method was used to add and select traders due to their interlinked networks. Using channel references, traders, processors, and end users were chosen as representatives. Furthermore, the districts have experienced notable challenges, including recurrent disease outbreaks, limited access to improved inputs, and weak market infrastructure, making them relevant case studies for examining market inefficiencies. The presence of active informal markets alongside emerging formal actors also provides an appropriate setting to analyze evolving poultry value chain dynamics and their implications for smallholder inclusion.

2.4.Proposed research variables

Expected signs are derived from theory and empirical research in smallholder livestock and poultry markets (Barrett, 2008; Aklilu et al., 2007; Njuki & Sanginga, 2013). ± suggests an unclear expected impact; the sign varies based on context or household strategy (Table 1).

Table 1: **Proposed research variables**

Variable	Definition	Expected Sign	Rationale
CONSTANT	Intercept term	–	Baseline value of poultry sales when all other variables are zero.
AGHHD	Age of household head (years)	–	Older farmers are less likely to engage actively in poultry markets; younger farmers are more market-oriented (Barrett, 2008).
FAMSIZGR	Family size growth (change in household members)	+	Larger households may keep more poultry for consumption and sales, potentially increasing market participation.
FAMSIZE	Current household size (number of members)	±	The effect depends on whether the household consumes poultry internally or markets it; larger households may retain more for subsistence.
YREXPFM	Years of poultry farming experience	+	More experienced farmers may better manage poultry production and marketing.
ANRVFMG	Annual revenue from mixed farming (ETB)	+	Higher farm revenue may enable more poultry investment, thereby increasing sales.
ANRVOFI	Annual revenue from off-farm income	±	Off-farm income may reduce reliance on poultry sales (–) or provide resources for investment (+).
LANDHLD	Landholding size (hectares)	–	Larger landholders may rely on crops/livestock rather than poultry sales; smallholders may depend more on poultry income.
POLTOWN	Proximity to nearest town (km)	+	Closer households have easier access to buyers, lowering transaction costs.
DCENRPO	Distance to central market (km)	–	Greater distance increases transaction costs, reducing participation.
AVPRCPL	Average market price of poultry (ETB/unit)	+	Higher prices incentivize greater sales.

MARKINF	Access to market information (dummy: 1=access, 0=no access)	+	Access to market info is expected to increase sales by improving decision-making.
EDGCTN	Education level of household head (years)	+	Education improves managerial capacity and market engagement.
SXHHDHD	Sex of household head (dummy: 1=male, 0=female)	±	Men may have greater market access; women may have greater control over production, depending on context.
FEDSUPL	Access to feed supply support (dummy: 1=yes, 0=no)	+	Institutional support increases poultry performance and marketable output.
DHVEXCH	Participation in dairy/poultry/other livestock exchange programs (dummy)	+	Networking can improve market linkages and sales.
DTAKCDT	Access to credit (ETB)	+	Credit relaxes liquidity constraints, allowing greater investment in poultry and increased sales.
GTEXSCPL	Participation in government technical support programs (dummy)	+	Training/advisory services are expected to improve productivity and market participation.
PRPBRDK	Presence of improved poultry breeds (dummy: 1=yes, 0=no)	+	Improved breeds typically increase productivity, hence higher marketable output.

2.5.Model specification

This study employs Heckman's two-stage selection model to address potential sample selection bias arising from households' non-random participation in poultry markets. The first stage estimates the probability of market participation using a Probit model, while the second stage analyzes the determinants of poultry supply conditional on participation. This approach ensures consistent, unbiased estimates by correcting for selection bias via the inclusion of the inverse Mills ratio.

First Stage (Participation Equation – Probit Model):

$$\mathbf{Pi*=Zi\gamma+ui}$$

Pi= {1, 0, if Pi∗>0 (household participates in the market), otherwise

Where:

- Pi∗ = latent variable representing the propensity to participate in the poultry market
- Zi = vector of explanatory variables (e.g., sex, education, flock size, breed availability)
- γ = vector of parameters
- ui = error term

Second Stage (Outcome Equation – Supply Function):

$$\mathbf{Yi=Xi\beta+\lambda i\delta+\varepsilon i}$$

Where:

- Yi = quantity of poultry supplied to the market
- Xi = vector of explanatory variables
- β = vector of coefficients
- λi = inverse Mills ratio (IMR) derived from the first stage
- δ = coefficient measuring selection bias
- εi = error term

Inverse Mills Ratio (IMR):

$$\mathbf{\lambda i=\Phi(Zi\gamma)\ /\phi(Zi\gamma)}$$

Where:

- ϕ = standard normal probability density function
- Φ = standard normal cumulative distribution function

This two-stage Heckman model was also used in the econometric analysis to examine the factors influencing Poultry supply in the market. Then, the SCP paradigm implies causal links from structure → conduct →performance. The fundamental multiple regression model for the econometric section is defined as:

$Y = \beta X + \varepsilon$ ----------(equation 1)

Where Y = the Poultry market supply, β = a vector of estimated coefficients of the explanatory variables, X = a vector of explanatory variables, and ε = the disturbance factor

The concentration ratio was used to measure the distribution of traders. The market concentration ratio is the common method of measuring market structure.

$CR = \sum_{i=1}^{n} S_i$……. (Equation 2)

Where S_i represents the market share of i^{th} firm and n are the number of the largest firms for which the ratio is going to be calculated.

The market performance was analyzed using the marketing margin, calculated from the consumer price, producer price, and marketing cost. Market conduct was evaluated with respect to payment mechanisms and pricing strategy. Mathematically, margins can be calculated as follows:

$TGMM = \frac{\text{End buyer price} - \text{First seller price}}{\text{End buyer price}} \times 100$…… (equation 3)

Where TGMM =Total gross marketing margin

$GMMp = \frac{\text{End buyer price} - \text{marketing gross margin}}{\text{End buyer price}} \times 100$ …… (Equation 4)

Where, GMMp=the producer's gross marketing margins (producers' share) from the consumer price

NMM= (Gross margin-Marketing costs)/(End buyer price)×100……..(equation 5)

Where NMM = Net marketing margin. The SPSS and the STATA software were used for the analysis.

2.6.Analytical Framework

Descriptive statistics and econometric models were employed for the analysis. Descriptive statistics employed mean, frequency, and percentage to outline demographic and socioeconomic information. The research employed the Structure–Conduct–Performance (SCP) framework, commonly used to examine agricultural markets (Bain, 1951; Scarborough & Kydd, 1992). Market concentration ratios (CR4), entry barriers, and

infrastructure availability were used to measure structure. Conduct was evaluated by analyzing pricing strategies, information exchanges, and contractual agreements. The performance evaluation focused on price spreads, marketing margins, profitability, and efficiency. Descriptive statistics, Gini coefficients, and analyses of marketing margins were utilized. The SCP framework was chosen because it offers a comprehensive framework for linking market structure, conduct, and outcomes in fragmented rural economies.

2.7.Strengthening integration between SCP and Econometric analysis

To enhance analytical coherence, this study explicitly links the SCP framework to the econometric model by treating household market participation and supply decisions as outcomes conditioned by prevailing market structures and conduct. While the SCP analysis characterizes market concentration and behavioral patterns among traders, the econometric model captures how these structural and behavioral conditions influence producers' participation and supply responses. Thus, the econometric results are interpreted within the SCP causal chain, in which observed structural features (e.g., oligopolistic tendencies, information asymmetry) indirectly shape market performance by influencing smallholder decision-making. This complementary approach enables a more comprehensive understanding of market functioning beyond purely descriptive SCP analysis.

3. Result and discussion

3.1.Socio-economic characteristics of poultry traders

Traders of live poultry and eggs in the sampled markets were surveyed to collect data on their distribution according to various socioeconomic factors. Participants in the Bensa and Arbegona Districts are treated as a single market entity, as nearly all individuals participate in every market within the districts, unless multiple markets occur on the same day. The majority of traders in the sampled markets are male, with a small number of female traders present. Among the 40 market traders surveyed, 80% in Arbegona and 69% in Bensa are male. Twenty percent and thirty-one percent of the traders were women. Nearly all females participated in egg trading at the retail stage of the market chain (Table 2).

Table 2. **Traders' distribution based on age category**

Variables	Category	Arbegona	Bensa
Average age	Mean	29	30
Sex	Male	16 (80%)	14 (69%)
	Female	4 (20%)	6 (31%)

Source: survey data

Most bird and egg traders in the sample market are part-time traders. This implies that bird and egg trading in the two Districts is integrated with other farming and non-farming activities, and that most traders do not consider it an independent business.

Table 3: **Distribution of traders with respect to level of education**

Category of education level	Frequency	Percentage	Cumulative
not attended formal education	21	21	21
primary school (1-4)	29	29	50
secondary education (5-8)	37	37	87

high school (9-10)	13	13	98

As shown in table 3, twenty one percent of the live bird and egg traders did not attend formal education, 29 per cent had attended primary school (grades 1–4), 37 per cent junior school (grades 5–8) and 13 per cent high school (grades 9–10) and the remaining has completed 10th grade and have certificate. This implies that bird and egg trading is considered a job-creation and livelihood activity in the two Districts and is integrated with other farming and non-farming activities. The result agrees with Awol (2010) in that most traders in the sample markets, particularly in Primary markets, are very young and live with their parents. They are school-aged and mostly perform marketing activities on market days, which take place on weekends.

Table 4: **Proportion of live bird and egg traders with respect to their trading experience**

Number of years trading	Frequency	%	Cumulative
2-5	48	48	48
6-9	22	22	70
10-13	16	16	86
14-17	14	14	100

Source: survey data

The results in Table 4 show that the sample of traders interviewed about their trading experience has a mean trading experience of 3 years. Also, about 48 per cent of the traders have only two to five years' experience. This is because the traders shift their live bird and egg trading business to other large trade investments, using base and initial capital from poultry trading profits.

3.2.Market Structure of Poultry

The structure of a marketing system refers to the size and market share of firms, the relative ease of free entry and exit from the marketing chain, the degree of product differentiation, and the degree of market transparency among the chain participants within a given subsector. Concentration ratio, potential entry and exit barriers, and quality and availability of marketing information have been analyzed to evaluate the market structure of the subsector in the sample markets.

Live bird and Egg marketing channels

Marketing channel analysis is a useful tool for examining the series of intermediaries and their systematic linkage in performing marketing functions and in the information flow in the market chain, facilitating the flow of goods and services from the point of production to end users (Kotler *et al*., 2003). In the study area, the marketing channels of poultry are identified for both live birds and eggs. In the following section, the most important channels used for the transfer of live birds and eggs in the study area are discussed.

(a) Live bird marketing channels

The analysis of the live bird marketing channel shows that there are diverse channels through which live birds are transacted. In this study, five major marketing channels for live birds and

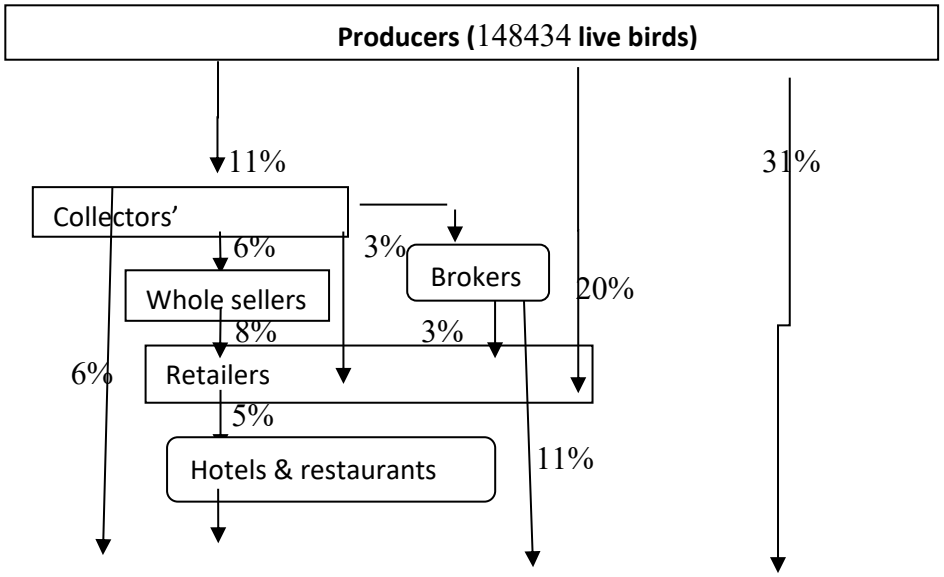
seven for eggs are identified. The findings of this study indicated that the chicken and egg markets follow similar channels, with only a few differences. However, this study sought to show the major chicken-and-egg channels independently, as depicted below.

Table 5: **Live bird and egg marketing channels**

Live bird marketing channels		Egg marketing channels	
Channel	intermediaries'	Channel	Intermediaries
I	Producer – Consumer… (**31**%)	I	Producer –Consumers... (**6**%)
II	Producer -retailer – Consumer… (**39**%)	II	Producer–collectors–Consumer... (**17**%)
III	Producer – collectors – brokers – retailer – Consumer… (**10**%)	III	Producer –collector- wholesaler - Retailer- Consumer... (**5**%)
IV	Producer – collectors - wholesalers - Retailer trader – Consumer… (**14**%)	IV	Producer –Collectors-egg shops-consumer... (**30**%)
V	Producer – collectors – processor-supermarkets – Consumer… (**6**%)	V	Producers- collectors - wholesalers-hotels & restaurants-consumers... (**15**%)
		VI	Producer-mini-shops- consumer... (**20**%)
		VII	Producer-hotel – consumer…..... (7%)

The channels in Table 5 show that transactions in poultry between smallholder farmers as producers and consumer customers are carried out via different channels: no intermediary, one intermediary, or more than one intermediary. In this study, the live bird marketing channels for both Districts are similar: the flow of product to consumers is through the same channel, with some brokers included. However, the volume of birds transacted is not equal between the two Districts (Figure 2).

As shown above, five marketing channels for live birds were identified, and their volumes were compared. As indicated in Figure 2, the buyers of live birds from producers were retailers, consumers, local collectors, wholesalers, processors, and supermarkets, and accounted for 39, 31, and 39% of the live birds, respectively.



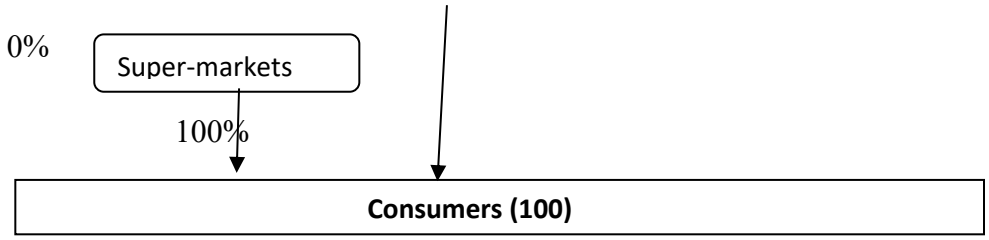


Figure 2. **Live bird market channel in study districts**

As retailers buy from producers immediately after their entry or on nearby roads without knowing the market price, the Producer-retailer-consumer market channel shared the largest volume of live birds, which is 39% of the total volume, followed by the producer-consumer channel, which shared about 31% of the total volume. Whereas the producer-local collector-consumer channel through broker, retailer, and supermarket has the least share among the above channels for live birds, accounting for about 30% of total live birds transacted in the channel.

Producer-consumer channel: a channel in which producers sell live birds directly to final users (consumers). The channel accounted for about 31% of the total birds marketed during the survey period. This channel was identified as the second most important live bird marketing channel in terms of the volume of birds transacted in the study area, due to distance: many consumers who buy live birds are located in towns, away from producers. In the live bird producer-to-consumer channel, it has a high producer share but is associated with lower volumes of birds. For instance, a study by Ayelech (2010) stated the producer-consumer channel of mango as the fifth most important marketing channel in the study area.

Producer-retailer-consumer channel: In this channel, producers sell the live birds to retailers, and the retailers, in turn, sell the live birds to consumers. It accounted for about 39% of the total birds marketed, making it the most important channel. This is because retailers buy from producers immediately upon their entry or along nearby roads, without knowing the market price. The producer-retailer-consumer market channel shared the largest volume of live birds, with a low producer share. This aligns with Adugna (2009), who explained that the producer–retailer consumer channel accounts for the bulk of fruit transactions.

Producer-collector-broker-retailer-consumer channel: In this channel, consumers purchase live birds from retailers through local collectors. This channel accounts for about 10% of the total birds marketed during the survey period. This channel accounts for a low volume of both live birds and eggs. This might be because, in the study area, local collectors are part-time traders, and a small number of brokers and retailers may not buy as many birds from collectors as they do from brokers. That is, retailers need to buy from collectors and/or directly from producers rather than through brokers. The involvement of brokers in the poultry market warrants mention.

Producer – collectors - wholesalers - Retailer - Consumer channel: In this channel, the consumers buy the birds from producers via local collectors and through retailers and wholesalers, and the channel accounts for about 14% of the total volume of birds transacted

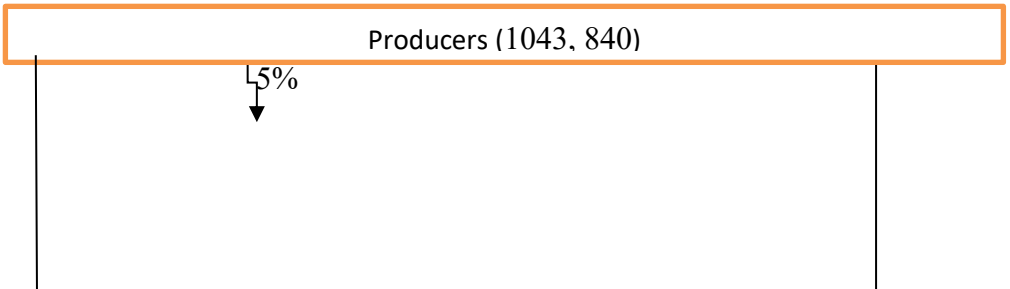
during the survey period. This is at least a share of the channel from the total volume of the birds, second only to the processors' included channel, and this might be because local collectors sell more birds to retailers than to wholesalers and consumers under a prior agreement. In this channel, it is observed that when wholesalers offer a large volume of birds at a relatively low price, retailers set their own consumer prices based on the initial cost. The result aligns with Adugna's (2009) findings, which stated that the producer–local collector–consumer channel accounted for a relatively small share of the volume of fruit that passed through it.

Producer-collector-processors-supermarkets-consumer channel: In this channel, the consumers buy the processed meat from supermarkets. The collectors originally collected the birds from producers. The processors process the birds, and this channel accounts for 6% of the total birds transacted during the survey period. Compared with the least of the channels, this channel transacts the least volume of live birds. This is due to limited practice in processing live birds sold in supermarkets, as well as the limited consumer tradition of buying processed meat. Rather, the birds from both Districts are processed and supplied to Hawassa (regional) town supermarkets in limited quantities. Some of the birds (8%) are collected by collectors and sold directly to supermarkets, restaurants, and hotels, so-called producer-collector-hotel/supermarket channel. However, this channel is impractical and seasonal, tied to festivals. In general, the linkages are very loose, often spontaneous, and without any formal or contractual agreement. Some markets are opportunistic, targeting specific market seasons or occasions, such as major festivals. The result coincides with Ayelech's (2010) finding that the producer-collector-processors-consumer channel was the least important in terms of volume and the longest in terms of the number of intermediaries in the avocado marketing channel in the study area.

b) Egg Marketing Channels in the study districts

Analysis of the egg marketing chain shows seven major marketing channels as indicated below. This is a channel characterized by a short channel in which producers sell eggs directly to consumers, and a long, complex channel in which producers sell products to local collectors, wholesalers, retailers, and consumers. In this study, six major egg marketing channels were identified, and their volumes were compared. Accordingly, the producer-collector-shops-consumer channel accounted for the largest volume, 33% of the total, followed by the producer-shops-consumer and producer-collector-consumer channels, which accounted for about 20% and 17% of the total, respectively. Whereas, the producer-local collector-wholesaler-retailer-consumer channel has the least share (5%) of the eggs transacted in the channel. This is because many consumers buy eggs from local collectors rather than from producers and shops. The other channels account for 25% of the egg volume, which is consistent with the study by Berhanu et al. (2007).

In the following section, the operation of each chain is discussed (see Figure 3).



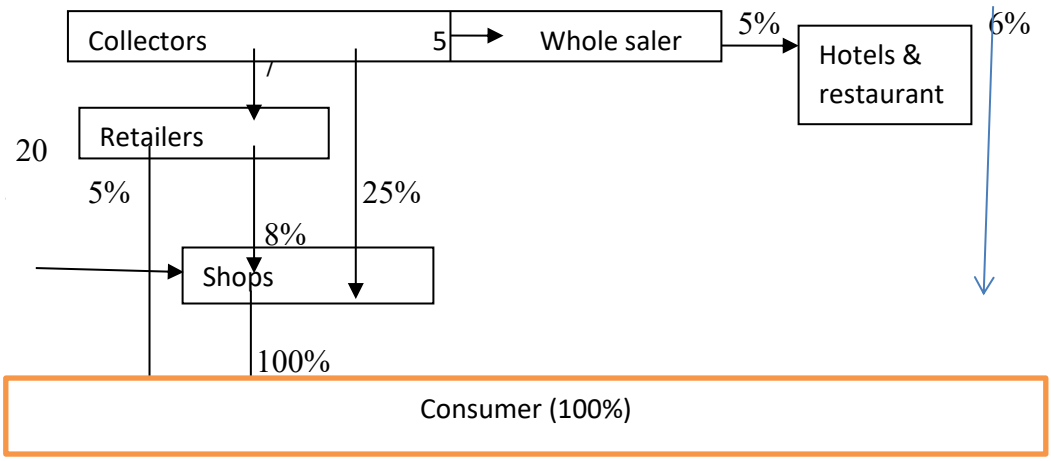


Figure 3: **Egg marketing channel Map in the study area**

Producer-consumer channel: a channel through which producers sell eggs directly to end users (consumers). The channel accounted for approximately 6% of the overall eggs marketed and ranked fifth during the survey period. Compared with the live-bird marketing chain, the producer-consumer channel accounts for a relatively small share of eggs sold, and producers likewise account for a high share. This may be because the majority of egg producers sell their eggs to consumers through collectors rather than directly, and most residents in the town purchase eggs from stores rather than from egg markets. The findings of this research align with Ayelech's (2010) study, which indicated that the producer-consumer channel for mangoes is the fifth most important marketing channel in the area examined.

Producer-collector-shops-consumer channel: In this channel, producers sell the eggs to collectors, and the collectors, in turn, sell the eggs to shops and then to consumers. It accounted for about 30% of the total eggs marketed. Thus, the channel was identified as the first important egg marketing channel in terms of volume of eggs transacted in the study areas. This is in line with Nega et al. (2015), who analyzed the producer–collector–shops–consumer channel for fruits and found that it recorded the largest volume of transactions.

Producer-collector-consumer channel: a channel in which consumers buy eggs from producers via collectors. The channel accounted for about 17% of the total eggs marketed during the survey period and ranked third in volume. This could be due to more eggs passing through producers to consumers via collectors at a minimum market price.

Producer-collector-wholesaler-retailer-consumer channel: In this channel, producers sell the eggs to collectors, and the collectors, in turn, sell the eggs to wholesalers, and then retailers buy in bulk from wholesalers and sell to consumers. It accounted for about 5% of the total eggs marketed. This is the channel with the lowest volume of eggs transacted in the study area, as it is tedious for retailer traders to count the actual number of eggs. Females play a dominant retailing role in this channel.

Producer-collector-wholesaler-hotels-consumer channel: In this channel, producers sell the eggs to collectors, and the collectors, in turn, sell the eggs to wholesalers and then to

consumers. It is a channel with the third-largest volume, accounting for about 15% of the total eggs marketed.

Producer- shop-consumer channel: In this channel, producers sell eggs directly to shops, which then sell them to consumers. It accounted for about 20% of the total eggs marketed. Thus, the channel was identified as the second-most-important egg marketing channel in terms of the volume of eggs transacted in the study area. This channel is almost the first channel in the Bensa and Hawassa case. This could be because more of the urban and nearby consumers buy from shops that they receive from customer collectors. In this case, collectors act as wholesalers with their agreed shops. The producer-hotel-consumer channel accounts for 7% of total egg volume.

Market concentration ratio

The concentration ratio CRx, as defined by Kohls & Uhl (2002), denotes the proportion of the market segment held by the X largest companies. The concentration ratio of the four largest firms (CR4) is the most commonly used measure for evaluating market structure. A CR4 greater than 50% indicates a tight oligopoly; a CR4 between 25% and 50% is typically viewed as a loose oligopoly; and a CR4 under 25% indicates no oligopoly, reflecting a competitive market. The market concentration ratio was evaluated for all surveyed traders in the study area. It was assessed by the percentage share of the total poultry bought annually by the top four traders. In this research, the market concentration ratio of traders was determined for both the Districts and the regional markets.

Table 6: **Live bird traders' Market concentration ratio**

Number of Traders (A)	Cumulative Frequency (B)	% Of Traders (C)	Cumulative % of Trader (D=B/35)	Quantity purchased (in No) (E)	Total Quantity Purchased (F=A*E)	% Share of Purchase (G=F/t)	% Cumulative Purchase
1	1	3	3	13800	13800	9	9
2	3	6	9	15040	30,080	21	30
1	4	3	12	8600	8600	7	**37**
7	11	20	32	4700	32900	22	51
7	18	20	52	3028	21198	14	70
5	23	14	66	2800	14000	9	82
6	29	17	83	2600	15600	11	93
2	31	6	89	2400	4800	3	96
4	35	11	100	1864	7456	4	100
35		100			148434	100	

Source: survey data

As shown in Table 6, the four firms' market concentration ratio for the Arbegona and Bensa live bird markets was calculated at 37%, which is below 50% and indicates a loose oligopoly market structure in the districts. This shows that these marketing systems are fairly concentrated, with a few firms dominating. This means the top four traders, or 12% of traders,

control 37% of the bird market. These concentration ratios of live birds in the district market occurred mainly because the poultry market involved too many suppliers, including many producers, traders, and collectors who sold directly to final consumers.

Table 7: **Market concentration ratio of egg traders**

Number of Traders (A)	Cumulative Frequency (B)	% Of Traders (C)	Cumulative % of Trader (D=B/67)	Quantity purchased (in No) (E)	Total Quantity Purchased (F=A*E)	% Share of Purchase (G=F/t)	% Cumulative Purchase
3	3	20	20	142000	426000	41	41
1	4	7	27	110000	110000	11	**52**
1	5	7	34	98000	98000	9	61
1	6	7	41	60,200	60200	6	67
1	7	7	48	48000	48000	5	72
2	9	13	61	28400	56800	5	77
4	13	26	87	18210	72840	7	84
2	15	13	100	86000	172000	16	100
15		100			1043,840		

Source: survey

The four firms' market concentration ratio for the Arbegona and Bensa egg market was calculated at 52% (Table 7). This means the top four traders, or 27%, control 52% of the egg market. This figure shows tight oligopolistic behavior in egg trading. This is because there are egg collectors and wholesalers in the Arbegona and Bensa Districts who collect and transport eggs to Aleta Wondo, Hawassa, and other nearby markets, cafeterias, and shops, and to consumers without any limit, with some price transmission. However, these tight oligopolistic characteristics of egg in terms of volume had nothing to do with egg price setting and on entry to egg market in the market chain because, there were large number of producers who were mainly engaged in market-oriented egg production and supplying large number of eggs to the market and egg traders without any barriers and thus, egg prices were found not to vary noticeably, which also coincides with the finding of Tadelle (2002).

Conditions of entry and exit for live bird and egg trading

The barriers to market entry reflect the competitive relationships between existing traders and potential entrants. If the barriers to entry are low, new traders can easily enter the poultry markets and compete with established traders. According to the market survey, there are no significant entry and exit barriers.

3.3.Market conduct of the poultry

The live bird and egg markets in the study area were identified as having a loose and a tight oligopoly, respectively. In the major markets in the study area, live bird markets were seasonally supplied by a large number of producers from surrounding rural villages. On the other hand, the egg market at the buyer's level includes a large number of small-scale legal and illegal cafeterias and shops, consumers, and a small number of restaurants and hotels.

Price setting strategy: The survey results showed that nearly all transactions in bird and egg sales occurred through direct interactions between buyers and sellers. Wholesalers frequently purchase a greater quantity of birds and eggs from rural assemblers, producers, and collectors at the markets in Hawassa, Bensa, and Arbegona. Furthermore, approximately 39% of the sample traders determine their own purchase prices, 21% indicate that the market sets their prices, and 31% set prices through negotiation. The peak in bird sales coincided with the year's significant social and religious celebrity events. These include the Ethiopian New Year (September), the Ethiopian Christmas (January), the Ethiopian Epiphany (January), the Ethiopian Easter (April), and Muslims' Arafa. The buying price indicated an increase from 2007/08 E.C., the study year. The times of reduced bird sales overlapped with the pre-Easter fasting season, which spans roughly two months, from February to March. During that period, the buying cost decreased. Conversely, a notable increase in egg and chicken prices was observed from June to August, primarily due to feed shortages. In comparison, the live bird market is more seasonal than the egg market. The behavior in the marketing of live birds and eggs is examined and described, with a focus on the factors influencing price determination and payment terms. The survey has shown that roughly 39% of the sampled traders sell eggs and birds independently, while the remaining 31% rely on employees (hired workers). The egg and live bird traders purchase eggs and live birds either directly from producers at the PA market (Kocci) or from collectors. However, they prefer to sell the commodity in other large markets nearby on the next day or in the coming seasons. According to the survey results of marketing behavior in table 16, about 44% and 51% and 56% and 70% live bird and egg sample traders and producers from Arbegona and Bensa respectively responded that purchase price was set by agreement with the producers, about 59 and 60% egg and 44% and 47% bird traders and producers reported that traders set purchase price. At the same time, 10% traders and producers reported that the suppliers set the purchase price. In live bird trading, the same trend holds: 75% agreement between traders and suppliers, 50% and 47% in the market, and 15% among traders, mirroring the market price in Hawassa and the District's major markets.

Terms of payment mechanism: Both the household survey and the key informant interview reveal that poultry marketing is conducted in cash or hand-to-hand as soon as the poultry are sold. The proportion of producers who indicated that poultry marketing is carried out through direct cash payment is 96%. The remaining 4% of respondents marketed both on credit and on a cash payment. This justified the fact that almost all producers market their poultry through the direct/spot market/cash transfer.

3.4.Performance of the poultry market

The market performance of live birds and eggs was analyzed using the marketing margin method. Marketing margins refer to the percentage of the final weighted-average selling price taken by each stage of the marketing chain. It is also the difference in price that the actors gain at two market levels in the market channel. Moreover, it refers to price differences between other points in the marketing chain, for example, between the producer and the wholesaler, or between the wholesaler and the retailer. The detailed analysis of marketing costs and benefits

in the marketing system involving Hotels and restaurants, processors, and supermarkets is not included in the analysis of margins and costs due to the difficulty of obtaining the necessary data. However, as seen from the marketing chain map of the subsector.

Cost and Profitability Analysis of bird and egg marketing

In this analysis, the primary channels were considered. If the industry's market structure resembles a monopoly rather than pure competition, then one anticipates subpar market performance. The poultry market's performance was analyzed by assessing related costs, returns, and marketing margins. Table 8 below shows the marketing margins of chicken traders as a percentage of the final consumer price and the overall channel marketing margin. The data in Table 8 shows that feed accounted for the highest share of market costs, with 20% in channel II, 43% in channel III, and 78% in channel IV. According to Table 8, the share of the total consumer price going to the producer was 100% in channel I, 76% in channel II, and 88% and 65% in channels III and IV, respectively. This indicates that 20% of the overall consumer price in channel II is due to traders' marketing efforts.

Table 8. **Marketing costs and profit margins of live bird traders (Birr/chicken)**

Group of market players	Cost/profit item	Channel I	Channel II	Channel III	Channel IV
Collectors	Buying price	65	70	70	64.5
	Transport			5	10
	Feed/waterier			10	5
	cost			-	-
	store			-	-
	Others			21.5	33
	Profit margin/bird			85	86
	Selling price/bird				
Traders	Buying price		84	87	
	Transport		5	8	
	Feed cost		5	5	
	store		5	5	
	Others		5	5	
	Profit margin/bird		12	12.5	
Consumer's price		65	116	122.5	86
Total marketing margin		25	**46**	**52.5**	**21.5**
Producers share		100	**76**	**88**	**65**

Source: Own computation of a survey result

Remark: Channel I- Producer selling directly to consumer

Channel II - Producer selling to consumers through retailers

Channel III - Producer selling to consumer through collectors, several brokers, and retailers

Channel IV - Producer selling to Consumer through collector, wholesaler, and retailer

About 18% of the total consumer price in channel IV is also due to traders' marketing activities. In comparison, 38% of the total consumer price in channel III consists of trader margins and marketing costs. The high producers' share was in channel I, while the producers' share decreased in channels II and IV. From Table 8 below, it can be observed that egg breakage during transport-related costs was the largest marketing cost, representing 17% in channel II, 19% in channel III, and 21.9% in channel IV. From Table 23, the farmer's share of the total consumer price was 100% in channel I, 89% in channel II, 84% in channel III, and 80% in channel IV. This suggests that 28% of the total consumer price in channel II, 26.7% in channel III, and 40% of the total consumer price results from marketing activities by traders.

Table 9: **Marketing costs and profit margins of egg traders (Birr/egg)**

Group of market actors	Cost/profit item	Channe I	Channel I	Channel II	Channel V
Collectors	Buying price	1.90	1.50		
	Transport		0.20		
	Tax related		0.10		
	Others		0.50		
	Profit margin/egg		0.60		
	Selling price/egg		2.10		
Traders	Buying price			1.50	1.55
	Transport			0.25	.18
	Tax related			0.15	0.29
	Others			0.35	0.25
	Profit margin/bird			0.50	0.65
	Selling price				
Consumer's price		1.90	2.0	2.70	2.83
Total marketing nargin			**0.50**	**1.25**	**1.37**
Producers share		100	**84**	**78**	**74**

Source: Own computation of the survey

Remark: Channel I- Producer selling directly to consumer

Channel II - Producer selling to consumers through collectors and mini shops

Channel III - Producer selling to consumer through collectors

Channel IV - Producer selling to Consumer through collector, wholesaler, and retailer

Table 9 shows the marketing margins of egg traders as a proportion of the final consumer price and the total channel marketing margin. In channel II, the collector's market margin constituted 45% of the final consumer price and 100% of the total marketing margin. In channel III, the retail trader's market margin constituted 37% of the final consumer price and 100% of

the total marketing margin. In channel IV, the retail traders' market margin accounted for 38% of the final consumer price, while the wholesaler's market margin accounted for 20%. This shows that a large proportion of the total marketing margin (1.37 Birr) generated in channel IV is allocated to retail traders (50% versus 20%). However, live bird and egg market margin analyses showed that producers had a substantially high share of 74-78% of consumer prices, with the intermediaries.

Table 10. **Cost and profitability analysis of live bird production and trading (Birr/chicken)**

Cost/profit item	Channel I	Channel II	Channel III	Channel IV
Transport	75	-	-	-
feed	8.50	8	8	8
Housing	5	5	5	5
interest	3.50	3.50	3.50	3.50
others	0.00	0.00	0.00	0.00
Profit margin	65.5	59.3	55.15	50.00
Selling price/head	75	78.5	65	60
Consumer price/head	75	84	86	76.5
Total marketing margin	**-**	**5.5**	**21**	**16.5**

Table 10 demonstrates that a cost and return element was analyzed to assess the profitability of poultry production. Expenses and returns were computed on a channel basis. The mean selling price per person was 75 for channel I, 78.5 for channel II, 65 for channel III, and 60 for channel IV. Among the cost components, feed expense accounts for the largest share, approximately 53% of the overall cost. Simultaneously, among various participants, the Producer selling to the consumer via collectors and traders in channel III achieved the highest NMM of consumer's price at 21%, followed by the Producer selling to the Consumer through collectors in channel IV, which represented 16.5 percent of the consumers' price. Overall, the outcome of marketing margin assessments showed that the distribution of consumer prices functioned effectively between poultry producers and the corresponding intermediaries in the poultry products market channels. The outcome aligns with Amos (2006), who highlighted that the primary factors influencing egg production in Ondo State, Nigeria, are the high costs of feeding and veterinary medications. Implementing appropriate strategies, such as offering business development services, establishing industrial parks, providing relevant skills training, enhancing technology, and improving access to credit, supports various income-generating activities and self-help initiatives in Ethiopia (Gebretsadik, 2016).

Table 11: **Cost and profitability analysis of egg trading (Birr/egg)**

Cost/profit item	Channel I	Channel II	Channel III	Channel IV
Transport	2.80			
Others	-			
Profit margin	2.50	2.80	2.90	2.90
Selling price/head	2.80	2.85	2.90	2.80

Consumer price/head	2.80	2.90	3.00	2.95
Total marketing margin	-	0.10	0.10	0.05

Source: own computation of survey data

Table 11 shows that the selling prices of eggs in channels I, II, III, and IV were 2.80, 2.90, 3.00, and 2.95, respectively. Total marketing margin is computed by subtracting the farmers' selling price from the price consumers pay. In the initial channel, the price consumers pay matches the price producers charge, as this channel links producers directly to consumers. The maximum consumer purchase price per egg is noted in channel III as 3.00. The net marketing margin for the egg purchase price is the same across channels II and III, at 0.10. The minimum net marketing margin in the egg marketing price is observed in channel VI, at 0.05.

3.5. Heckman's Two-stage (Outcome Equation – Supply Function)

The analysis of marketing margins in the subsector showed that producer shares and the net marketing margins retained by various chain participants differ significantly across marketing channels.

Table 12: **Parametric estimates of the Probit Outcome Equation-Supply Function and (SCP).**

Variable	Coefficient	Std. Error	t-ratio	Significance	Marginal Change (Whole)	Marginal Change (Sellers)	Change in Probability	SCP Aspect
CONSTANT	181.60	18.04	10.06	***	–	–	–	–
AGHHD	-8.09	2.18	-3.71	**	-6.08	-7.62	-0.063	S
FAMSIZGR	15.08	17.20	0.88	–	20.80	29.36	0.255	S
FAMSIZE	-1.96	15.80	-0.12	–	-3.04	-3.32	-0.203	S
YREXPFM	-0.071	0.49	-0.15	–	-0.018	-0.052	-0.112	C
ANRVFMG	-0.009	0.01	-0.90	–	-0.005	-0.005	-0.331	C
ANRVOFI	0.007	0.02	0.35	–	0.021	0.031	0.255	C
LANDHLD	-21.80	11.20	-1.95	***	-32.80	-35.86	-0.014	S
POLTOWN	31.51	11.90	2.65	***	47.13	51.49	0.001	C
DCENRPO	-10.73	5.47	-1.96	***	-10.81	-17.32	-0.014	C
AVPRCPL	10.08	3.91	2.58	***	9.21	10.05	0.009	P
MARKINF	-16.88	59.70	-0.28	–	-18.27	-30.87	-0.299	C
EDGCTN	-26.01	53.90	-0.48	–	-65.94	-72.00	-0.312	P
SXHHDHD	12.86	10.50	1.22	–	28.20	52.63	0.307	S
FEDSUPL	106.08	10.70	9.92	*	50.31	164.15	0.109	P
DHVEXCH	21.18	11.47	1.85	–	13.09	26.10	0.228	C
DTAKCDT	140.33	112.20	1.25	***	184.71	540.28	0.000	C
GTEXSCPL	21.45	32.21	0.67	–	10.18	15.48	0.169	C
PRPBRDK	20.99	32.73	0.64	–	26.70	51.08	0.337	P

Dependent variable: **VALTOTAL** (Mean = 252.604; S.D. = 268.0328), Observations = 80; Parameters = 18; Degrees of freedom = 78, **R^2 = 0.6094**, Adjusted R^2 = 0.6090 **F (17, 78) = 13.20**, Prob. > F = 0.0000, Log-Likelihood = -1404.570; Restricted Log-L = -1206.724

From Table 12, the Outcome Equation – Supply Function model assesses the factors influencing the value of poultry sales (VALTOTAL), addressing both the likelihood of involvement and the extent of sales. Because the model adjusts for censoring, as numerous rural households might not engage in poultry sales, it offers a highly appropriate framework for examining poultry markets in rural Ethiopia (Wooldridge, 2010; Greene, 2018). The results of the, the Outcome Equation – Supply Function model offer unique insights into the structure, behavior, and performance of poultry markets in the Arbegona and Bensa districts.

Market Structure- Factors such as the age of the household head (AGHHD), land ownership (LANDHLD), increase in family size (FAMSIZGR), total family size (FAMSIZE), and the gender of the household head (SXHHDHD) reveal structural trends in market involvement. Elderly household heads are less inclined to engage actively in poultry marketing, indicating differences in generational adoption of market-focused practices. Less extensive landowners are more involved in poultry sales, suggesting that poultry primarily caters to smallholders rather than being a significant pursuit for large landowners. Although the growth in family and household sizes has had limited or negligible effects, this suggests that household-level demographic factors play a role in market engagement. However, they are not the only determining factors. Households led by males tend to achieve higher sales, suggesting possible gender disparities in access to resources. In general, the market's structure benefits smallholders with limited land, and differences in generation and gender influence participation levels (Ayele & Gebretsadik, 2024). Consequently, market participation is focused on smallholders, with younger, male-headed households more engaged. Land resources and population traits influence the initial involvement. This generational aspect of market participation has been recorded in broader livestock and crop markets (Barrett, 2008; Bellemare & Barrett, 2006). Landholding size (LANDHLD, -42.840, significant at 1%) has a negative correlation with poultry sales, suggesting that larger landholders typically depend on crop production or larger livestock operations. In contrast, poultry plays a more crucial role for smallholders and farmers with limited land. This result aligns with previous research indicating that poultry serves as a “livelihood asset for the impoverished” and a low-cost income source (Aklilu et al., 2007; Guèye, 2009), and that market orientation relies more on structural and economic factors than on family size alone (Udo et al., 2006; Wana, 2016).

Conduct reflects how market players react to incentives and seize opportunities. Access to credit (DTAKCDT) has the most substantial positive influence on sales, indicating that liquidity constraints significantly hinder participation and that financial support could help overcome them. Proximity to town (POLTOWN) and distance to market (DCENRPO) demonstrate how spatial factors and transaction costs influence behavior: farmers nearby sell more. At the same time, those farther away are deterred by transportation costs. The unit price of poultry (AVPRCPL) has a positive effect on sales, indicating a rational response to market signals. Other variables related to conduct, including access to market information (MARKINF), use of veterinary services (DHVEXCH), and technical training (GTEXSCPL), exhibit mixed or limited significance, suggesting that although access to services supports conduct, physical and financial limitations remain the primary factors influencing market

behavior. Consequently, Farmers react logically to pricing indicators, loan availability, and proximity to purchasers. Transaction expenses and restricted service access hinder ideal market performance. Comparable results have been observed in smallholder agricultural and animal markets in sub-Saharan Africa (Jaleta et al., 2009; Abate et al., 2019). Poultry prices (AVPRCPL, +12.008, significant at 1%) are positively correlated with sales, indicating that farmers respond logically to price incentives, consistent with microeconomic theory and confirmed by empirical research in livestock markets (Key et al., 2000; Barrett, 2008). Closeness to towns (POLTOWN, +61.512, significant at 1%) boosts market involvement, whereas increased distance from markets (DCENRPO, -20.713, significant at 1%) diminishes it. Both findings highlight the influence of transaction costs on behavior, aligning with research on smallholder commercialization (Goetz, 1992; Fafchamps & Hill, 2005) and, potentially, indicating a lack of trust in or inefficiency of information sources, implying that physical accessibility is more critical than information dissemination on its own (Okello et al., 2012).

Concerning **market performance**, Performance demonstrates results regarding revenue, effectiveness, and business achievements. Institutional backing, such as feed provision (FEDSUPL), boosts sales and enhances market performance, underscoring the importance of focused efforts to improve productivity and commercialization. Education (EDGCTN) exhibits a negative yet insignificant impact, potentially suggesting that more educated households engage in off-farm activities. Breeding practices (PRPBRDK) exert a moderate positive impact, indicating potential performance improvements via enhanced management. These results suggest that market success is tightly connected to favorable policies, input availability, and the alignment of price incentives with production activities. Hence, support from institutions, market rates, and better management techniques boost earnings and productivity. Flaws in information transfer and training have a slight effect on business results, suggesting that policies like feed subsidies or input provision can boost commercialization, aligning with policy-focused evidence on smallholder poultry advancement (Alders & Pym, 2009) and, possibly, suggesting that educated households pursue off-farm income opportunities instead of concentrating on poultry (Bezu & Holden, 2014). In a similar vein, the gender of the household head (SXHHDHD, +62.867, not significant) indicates that households led by men generally engage in higher poultry sales. At the same time, women continue to play a vital role in poultry production but may encounter challenges in marketing attributed to cultural norms and limited resources (Njuki & Sanginga, 2013; Kristjanson et al., 2014).

Ultimately, the significance of the Mills ratio in the Outcome Equation – Supply Function model is that it accounts for censored data, as many households do not engage in poultry sales. Key factors like access to credit, proximity to town, and feed assistance not only boost sales for current sellers but also increase the likelihood that households that previously did not participate will join the market. This shows that both extensive (entry) and intensive (sales volume) margins are affected by structural and conduct-related factors, underscoring the need to address barriers that prevent farmers from accessing the market. For example, the availability of credit ($\lambda \approx 0.00000$) and proximity to towns ($\lambda \approx 0.00073$) significantly increase the likelihood of participation and boost sales volume. This emphasizes that structural obstacles

such as distance, land ownership, or insufficient credit not only reduce sales but can also completely prevent households from engaging in the market, whereas advantageous conditions facilitate both increased entry and greater intensity (Heckman, 1979; Wooldridge, 2010). In conclusion, the SCP (Structure–Conduct–Performance) analysis indicates that smallholders with limited land primarily control poultry markets in rural Ethiopia, whereas older farmers are minimally involved. Market behavior is influenced by rational responses to credit, location, and pricing incentives, yet constrained by elevated transaction costs and poor information systems. Performance improves when institutional and price incentives are in harmony, yet inefficiencies persist due to obstacles to access and participation. The Mills ratio of the Outcome Equation- Supply Function model assesses the importance of tackling both participation and intensity margins: successful interventions must reduce entry barriers while enhancing the capacity of existing participants to increase their sales.

4. Conclusions

The examination of poultry markets in the Arbegona and Bensa districts reveals how structural, behavioral, and institutional factors interact to shape market outcomes. In terms of structure, poultry markets are largely controlled by small-scale farmers with limited land, and younger heads of households are more involved, highlighting generational and resource-related disparities in participation. Regarding market behavior, farmers' actions are strongly influenced by credit availability, proximity to urban areas, poultry prices, and transaction costs, suggesting rational choices within constraints. Institutional measures, including feed provision and technical assistance, significantly improve market outcomes, increasing the sales activity of current sellers and the likelihood that non-sellers can access the market. Essential participants in the egg and poultry markets consist of producers, collectors, retailers, traders, shops, wholesalers, and consumers. Brokers are mostly missing, and consumption of processed poultry meat is low. The egg market exhibits oligopolistic characteristics, yet dominant players do not regulate pricing. Among marketing channels, the greatest net marketing margin (NMM) was recorded in the producer–collector–wholesaler–retailer–consumer sequence (21%), followed by the producer–collector–consumer sequence (16%). The Inverse Mills Ratio indicates that favorable conditions not only boost sales volume but also increase market participation. This SCP-centered examination suggests that addressing structural challenges, expanding financial access, reducing transaction costs, and bolstering institutional support are vital to fostering efficient, inclusive, and sustainable poultry markets. The most direct and effective channel was sales from producer to consumer. Direct sales accounted for just 31% of live birds and 6% of eggs. The longest channels included intermediaries, resulting in increased gross margins but reduced producer shares. The overall gross marketing margin (OGMM) for live poultry hit 52.5% in Channel III, with producers obtaining as much as 89% of the final selling price in certain channels. For eggs, the producer's share ranged from 74% to 84%. Econometric analysis identified key elements affecting market participation and supply: the gender of the household head, the purpose of production, the availability of breeds, the number of birds, educational level, feed supplementation, access to credit, and extension services.

Based on the findings of this study, among different actors in the live bird channel, producers selling to consumers through the retailer's channel transact more volume of birds, but have a lower producer's share than channel I. The producer's share was higher in channel I, and decreased in channels III and IV. Therefore, attention should be given to the producer-to-consumer channel by increasing the number of poultry producers to produce, participate, and supply quality products to the market. Besides, in channel **I**, **a lower volume of eggs is transacted, but a** higher producer share is observed. The traders, hotels, and restaurants survey showed that the practice of supplying poultry meat meals is not prevalent in the study districts because no marketing actors participate in the processing and value-added business of poultry products, as per consumer interest. The development of this sector would make a substantial contribution to the increasing demand for livestock products. The availability of poultry breeds has a positive and significant influence on smallholder farmers' participation in poultry marketing, shaping their decision to start or expand poultry production. Poultry market participation was positively and significantly associated with the household head's level of formal education. However, in traditional production, the education level had nothing to do with the limited number of village poultry production. The initial study was intended to focus on Arbegona and Bensa, but due to time constraints and other factors, it is not assured that this study fully represents the whole Sidama Region, and, therefore, it is recommended that further research focus on the whole zone. The research offers practical guidance for policymakers to create targeted interventions that improve smallholder commercialization and income generation, while also advancing theoretical understanding of the interactions among structure, conduct, and performance in rural livestock markets.

Theoretical Contribution: The research situates SCP analysis within informal, subsistence-based rural markets, broadening its relevance beyond industrialized economies.

Practical Implications: Policies must focus on upgrading infrastructure, reinforcing cooperatives, enabling market information systems, and regulating trader control to boost fairness and efficiency. Development interventions must incorporate gender aspects, acknowledging the crucial role of women in poultry value chains.

Future Research: Further research is needed to analyze SCP results across different regions, investigate how digital platforms can reduce asymmetry, and assess the effects of collective marketing models led by cooperatives.

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Data availability statement

Data used are available from the corresponding author upon reasonable request.

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Conflict of interest

The researchers affirm that there were no financial or commercial ties that could be perceived as a potential conflict of interest during the research.

Ethics approval

The Hawassa University, Wondo Genet College of Forestry and Natural Resources Graduate Research Committee approved the study with the Reference ID. **No MSc s0021/13**. All methods were performed in accordance with the relevant guidelines and regulations of the Graduate Research Committee of the University.

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