Innovations

Analysis of Structure Conduct and Performance of Garlic Market in Libo Kemkem District, South Gondar Zone Amhara Region, Ethiopia

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Abstract

Currently, a marketable and medicinal crop is paramount important for improving livelihood and treating health problems. Garlic is the main bulb crop produced in Libokemkem District, but the structure conduct and performance of the garlic market were not studied and documented in the study area. As a result, this study aimed to analyze the structure conduct, and performance of the garlic market at Libokemkem District. 400 garlic producers, 37 traders, and 12 consumers were selected by using multistage random sampling techniques. To evaluate garlic market efficiency, market structure, conduct, and performance approach were used. During the survey, I identified the four largest traders who captured 35.11% of the total quantity of garlic purchased. The result indicated that the garlic market in Libo kemkem District was characterized by a weak oligopoly market structure. Competition, trade license, and shortage of starting/working capital were the main barriers to entry into the garlic market. To evaluate garlic market performance, a marketing margin was computed for each value chain actor. The result indicated that 11.33% of the total gross marketing margin was added to garlic prices in the value chain. From the total marketing margin, 0.71% was gone to collectors, 4.78% for wholesalers, and 5.83% for retailers. Even though all value chain actors were benefited, weak oligopoly market structure, barriers to entry, and misconduct in price setting were indicators for the market performance of garlic was not competitive. The findings of the study pointed that, attention is given by the government and other stakeholders in supporting financial resources and following up administrative issues then improve competitive marketing practice instead of oligopoly market.

*Keyword : 1 Concentration ratio, 2. Garlic, 3. Libokemkem District, 4. Oligopoly market,
5. Structure-conduct-performance*

Introduction

Background of the Study

Garlic has a history of human use of over 7000 years and it is the most important bulb crop. It has become an increasingly popular vegetable in recent years among producers, marketers, and consumers (ITC, 2017). Garlic is the second most popular cultivated allium after onion in the world. It is considered a significant spice for food and a prominent solution for different illnesses and physiological issues. Global production during 2017 of garlic has reached 28.2 million tones cultivated on 1.58 million hectares with an average yield of 17.8 tones per hectare (Kouser *et al*., 2020)

Garlic is one of the high-value vegetable crops produced during the cold season, in rotation with pulses that have contributed to breaking the life cycle of pest problems and improving soil fertility (Gebremedhin, 2010).

Garlic holds one of the top places among other vegetables paying to the preservation of the good health of human beings. It is produced in Ethiopia primarily as a spice crop for the flavoring of foods and its medicinal values. It is widely cultivated around home gardens in Ethiopia. But nowadays, its production is practiced in some large farms areas (DARC, 2006).

Cash crop, low capital investment, flavoring in food, pharmaceutical industry, pesticide manufacturing industry, respiratory diseases, fungal skin diseases, reducing blood pressure, regulating cholesterol, halting arteriosclerosis are some of the major economic and health benefits of Garlic (Kouser *et al*., 2020).

Despite the crop having a high value, its production and productivity are very low because of production and marketing constraints. This low yield of garlic is supposed to be a lack of improved agronomic practices, lack of improved varieties, lack of soil fertility, diseases, insect pests, and lack of improved postharvest management (DARC, 2006).

Production, consumption, and marketing of Garlic are common practices in Ethiopia for a long period. But the amount of garlic supply and price of garlic is usually seasonal. During the offseason, the same amount of garlic is usually sold more than two or three times the value of onion (Getachew and Asfaw, 2000).

Garlic farming is financially profitable. The financial benefits that farmers receive balance the social benefits. Garlic producers are motivated to produce garlic because they earn a bigger profit margin (Saptana*et al*., 2021).

Ethiopia with diversified agroecological conditions is suitable for garlic production. South Gondar Zone in Amhara Region of Ethiopia is potentially endowed with favorable climatic and soil conditions for the cultivation of garlic both under rainfed and using irrigation. However, the productivity of garlic in Ethiopia in general and in the South Gondar Zone, in particular, is very low largely due to the use of unimproved local cultivars and traditional cultural practices (Dessie and Mulat, 20019).

Garlic in South Gondar Zone, Libo kemkem District has a great potential for producing Garlic both with rain-fed and irrigation system. But there was no study conducted about the status of

garlic production, marketing structure conduct, and performance of the garlic market in this District. Therefore, this study aimed to analyze the market structure, conduct, and performance of the garlic market and the report has been documented.

Research methodology
Description of the Study Area

Libo Kemkem District is located in the South Gondar Zone of Amhara Region. This District is situated between $12^0 39'66''$ and $12^0 42'45''$N latitudes and $37^0 26'99''$ and $37^0 28'42''$E longitudes. Libo Kemekem is bordered on the south by the Reb which separates it from Fogera, on the west by Lake Tana, on the north by the Semien Gondar Zone, and on the east by Ebenat. The District is located 645-kilo meters away from Addis Abeba and 70-kilo meters away from the Reginal city of Bahar Dar.
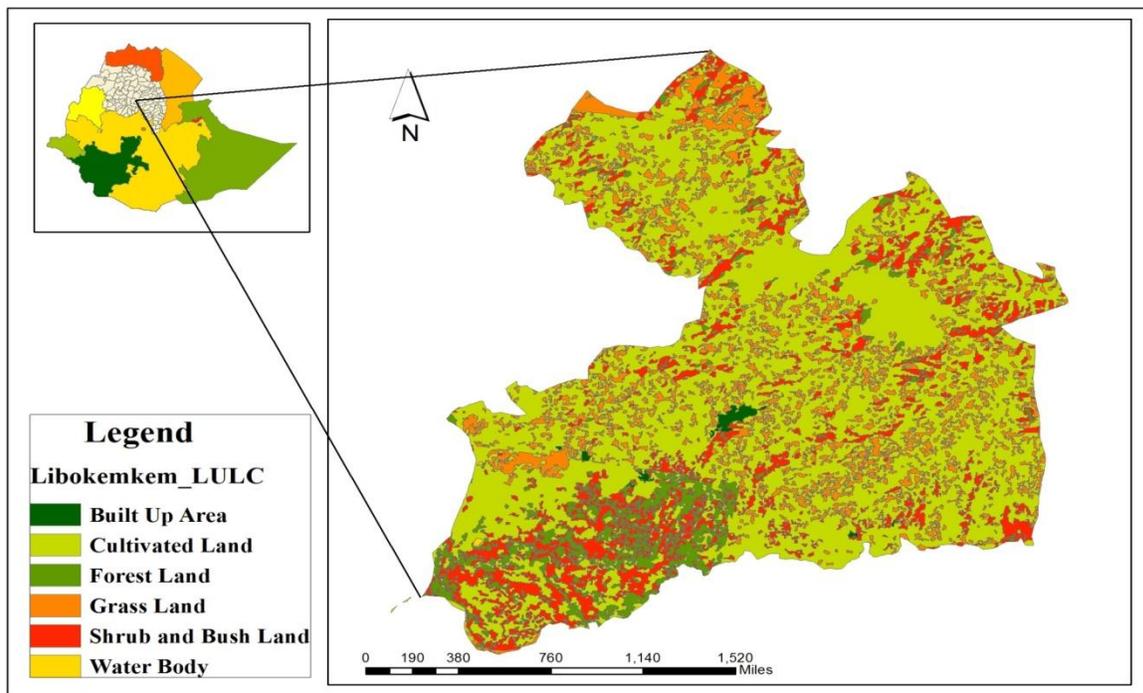

Figure 1: Location Maps
Source: Arc, GIS, 11.1

Due to the effect of altitudinal variations, there are three agro-climatic Zones in Libo kemkem. The area coverage of the agro-climatic zone of the District is Dega (18%), Weyna Dega (43%), and Kolla (39%). The total population of the Districtis 226, 958 of which 116,954 are males and 110,004 are females. Crop production is mostly rained though in some areas irrigation is practiced around the river. The major crop types grown in the area include cereals, pulses, as well as oilseeds and from vegetable and root and tuber, garlic and red onion are highly produced and marketed(LKAACO, 2021).

Garlic Production Status in the Study Area

Garlic is produced for food, seed, medicine, and commercial purposes.It can beproduced by two main production seasons, namely*Belg* (Short rainy season From February to May) with irrigation water and enduring moisture and Meher (Long rainy season from June to October) production season with sufficient rainfall. However, garlic in the study area is usually produced in *Meher* production season using rain-fed than in *Belg* production season having mass production and the price of garlic somewhat lower than with that of *Belg* production season.In the production year (2020/2021) the average productivity of Garlic was reported 68quintal in both production seasons. Based on the report from sample respondents, the trend of garlic production in the last five years, 97% of sample farmers reported increasing, 1.75% of sample farmers were reported decreased and 1.25% sample farmers were said fluctuated with production season.The difference in the report was due to declining soil fertility, traditional production system, diseases and pests, local varieties, nature of price/seasonal price. Based on the District crop production and status report, the trend of Garlic production for the lastfive years is indicated in Table**1**below.

Table 1: Trends of garlic production in the study area for the last five years from 2017-2021G.C

Production year	Production Trend (%)	The area allocated in (000) hectare
2017	26.51	1.793ha
2018	12.15 (-)	8.8415ha
2019	150.73	7.1245ha
2020	81.2	7.004ha
2021	9.17	10.57

Source: Obtained from Lᴋᴅᴀᴏ, 2021
NB: Minus sign in the table indicates production decreased from 2017 -2018 Production year.

Data Type, Sources, and Collection Method

Both primary and secondary data were used. Primary datawerecollected from smallholder farmers and traders at different levels ranging from farmer traders to wholesales supply to the regional level. Primary data were collected through a household questionnaire survey using

structured questionnaires, the questionnaires were pre-tested by some households selected in each kebele at preliminary survey and after feedback, it was modified. Enumerators were trained on data collection and interviewing techniques. Focus group discussion was undertaken with the key actors using check lists. Secondary data were collected from secondary sources.

Sampling Technique and Sample Size Determination

A multi-stage random sampling technique was used to collect primary data. In the first stage, based on production potential and marketing problems taken into consideration, Libo kemkem District was selected purposively. In the 2nd stage, five garlic-producing kebeles were selected with simple random sampling producers. In the 3rd stage, using the household list of the sample kebeles, garlic producers' households were selected randomly based onPP to the population size of each kebeles.

Based on Yamane's (1967) sample size determination formula considering 95% confidence level and 5% precision were used to obtain the sample size required.

$$n = \frac{N}{1 + N(e)^2} \quad , n = \frac{52,654}{1 + 52,654(0.05)2} \approx 398 \, by \, distribution \, we \, made \, 400 \qquad Eq(1)$$

Where: n is the sample size, N is the population size of garlic producer kebeles and e isthe level of precision considered.

Table 2. Sample Size Determination in each kebele

Name of selected Kebels	Total No of Garlic Producers	No of Sample Households
Anigot	1389	75
Gizana	1716	93
Yifag	1521	82
Shewoch Tera	1490	80
Bira	1292	70
Total	7408	400

Source: Own Computation Survey, 2021

For this study, the sample size was also determined for traders and consumers, based on the number of traders found in the District. Based on garlic flow from its production site to consumers, three markets have been selected. Namely, *Adiszemen*, *Yifag* and *Woreta*. The total lists of the traders were gained from Addiszemen, *Woreta*, and *Yifag*Town trade and market development office. From 30 collectors, 6were collected, from 42 wholesalers, 26 were selected, from 18 retailers 5 were selected randomly, and finally, 12 consumers were selected randomly from the three towns then the total sample traders were 49.

Table 3. Sample Distribution of traders and consumers of Garlic

Traders	Adiszemen	Yifag	Woreta	Total
Collectors	4	1	1	6
Wholesalers	22	1	3	26
Retailers	3	1	1	5
Consumers	7	2	3	12
Total	30	7	12	49

Source: Own computation Survey, 2021

Methods of Data Analysis
Descriptive statistics (frequency, percentages, means, standard deviations, t-test, and χ2-test)and the S-C-P approach were employed.

Structure- Conduct and Performance Approach
This model investigates the relationship between market structure, conduct, and performance and it has been used by different market researchers to evaluate market efficiency.

Market structure
Market structure is defined as characteristics of the organization of a market that seems to influence strategically the nature of competition and pricing behavior within the market. The characteristics usually stressed are the number and size distribution of firms concerning the size of the market, the presence or absence of barriers to entry facing new firms, physical or subjective, and product differentiation as stated in Kohls and Uhl (1985). Market concentration and barriers to entry had been used for evaluating garlic market structure. In theory and practice, different measures of market concentration are known. The three common methods of measures of market concentration are; concentration ratio (CR), Herfindahl Hirschman Index (HHI), and Gini- coefficient.

The concentration ratio is one of the commonly used methods to measure the market structure of a given commodity. Despite the wide application of concentration ratio as a measure of the ratio of market concentration, there is the key criticism to concentration ratio as a measure of market concentration is referred to concerning the fact that it does not take into account all of the firms in an industry, but only a certain number of firms. It usually operates with four, eight, or twelve firms, and it rightly raises the question regarding the conclusion on market concentration in the case where this is not the final number of firms. This question is particularly important in cases where all firms have an equal market share, but, given that their number is greater than the number of firms for which concentration ratio is calculated, many firms have been dropped from consideration. The concentration ratio does not take into account the market share of the next largest firms that are not covered by calculation, and the conclusion on market power may be somewhat wrong (Pavic *et al*, 2016).

Hirschman Herfindale Index (HHI) is the second measure of market concentration and market power. Hannaford (2007)stated that Hirschman herfindale index takes into consideration all firms in the industry concerned. Specifically, it measures market concentration in the form of the sum of the squared market shares of all firms in the industry, which means that it takes into account all firms whereby, squaring their market shares, growing importance is given to firms with larger market shares. The drawback of the Hirschman herfindale index is, it is mostly used for large firms.

Gini- the coefficient is a very convenient shorthand summary measure of market concentration. It is done based on the Lorenz curve and is obtained, by calculating the ratio of the area between the diagonal and the Lorenz curve divided by the total area of the half square in which the curve lies. It is this ratio that is known as the Gin- coefficient. However, although Gini-coefficients provide useful information based on Lorenz curve shapes, a problem arises when Lorenz curves cross. It is problematic whether we can in this special case claim that a higher coefficient means a more unequal distribution, so more careful analysis is required (Todaro, 1998). The other problem associated with Gini-coefficients is that it favors inequality of market shareswithout regard to the number of equalized firms (Luebker, 2010). From the types of methods of market concentration, because of its most comprehensible measure, a widespread measure of market concentration, its popularity stems from its simplicity, in terms of calculation as well as in terms of user-friendliness; concentration ratio (CR) was used for this study.

Market concentration is defined as the number and size distribution of sellers and buyers in the market. Other factors, such as the firm's objectives, barriers to entry, the economics of scale, and assumptions about rival firms' behavior, are relevant in determining the degree of concentration, the relationship between concentration and behavior, and performance (Scherer, 1980).

$$MS_i = \frac{Q_i}{\sum Q_i} \qquad\qquad Eq(2)$$

Where MSi = market share of firm i.

Qi = amount of product Q handled by firm i.

$\Sigma\ Qi$=Total amount of product Q handled

$$C = \sum_{i=1}^{r} S_i i = 1,...n \qquad\qquad Eq(3)$$

Where C = concentration ratio handle

Si = percentage share of ith firm

r = number of the largest firm for which the ratio is going to be calculated

Market conduct

Market conduct refers to the patterns of behavior that firms follow in adapting or adjusting to the markets in which they sell or buy. Such a definition implies the analysis of human behavior patterns that are not readily identifiable, obtainable, or quantifiable. Thus, in the absence of a

theoretical framework for market analysis, there is a tendency to treat conduct variables in a descriptive manner, or as a spill-over in the assessment of market performance. The following indicators had been considered for this study, traders' price setting, purchasing, and selling strategies.

Market performance

Estimates of the marketing margin and the cost components are the best tools to analyzethe performance of the market. Marketing margin is calculated by taking the difference between producers and retail prices. Computing the total gross marketing margin (TGMM) is always related to the final price or the price paid by the end consumer and is expressed as a percentage:

$$TGMM = \left[\frac{Consumer\,price - Producer\,price}{Consumer\,price} \right] \times 100 \qquad Eq(4)$$

Where, *TGMM* =Total gross marketing margin, it should be emphasized those producers that act as middlemen also receive an additional marketing margin. The producer's margin is calculated as a difference:

$$GMMP = \left[\frac{Consumer\,price - Gross\,marketing\,margin}{Consumer\,price} \right] \times 100 \qquad Eq\,(5)$$

Where, *GMMp*= Gross marketing margin of the producer

The above equation tells us that a higher marketing margin diminishes the producer's share and vice versa. It also provides an indication of welfare distribution among production and marketing agents.

Another parameter related to the marketing margin is the producer's share. The producer's share is the ratio of producer price to consumer price. The producer's share can be expressed as:

$$PS = \frac{P_x}{P_r} = 1 - \frac{MM}{P_r} \qquad Eq(6)$$

Where,   PS = the producer's share

        P_x = Producer price

        Pr = Consumer price

        MM = Marketing margin

Result and Discussion
Descriptive statistics result
Demographic Characteristics of Sample Traders

Of the total traders, 65.31% were male and 34.69 % were female traders. This implies that women's participation in garlic trading activities was lower than with male traders. The mean marital status of the traders was, 83.67%of the traders were married and the remaining 16.33 % were single. This indicated that when traders were married their labor cost for trading would increase as compared with single traders. The mean age confirmation of traders was 35.39years with a standard deviation of 11.45 which is the productive labor and increasing age group. Regarding their family size of traders were 3.55 family members per household with a standard deviation of 1.6. The educational level of traders was reported that 81.4% of the traders were joined formal education in the year of schooling and 18.6% were not joined in formal schooling and also mean educational level in the year of schooling was 7.82years with a standard deviation of 3.6. As the result indicated the majority of traders were educated. Because as the educational level increased the ability to gain new ideas and market information and new technologies exploitation becomes increased. The mean garlic trading experience of the sample traders was 9.14 years with a minimum of 1year and a maximum of 18 years with a standard deviation of 5.5. The average initial capital of the sample traders to start and expand of garlicbusiness activities was 30143.35Birr with a minimum of 1000Birr and a maximum of 155000Birr while the current average working capital of sample traders was 37732.27Birr with a minimum of 12000Birr & a maximum of 318,495Birr with a standard deviation of 44850.52 (table **4** below).

Table 4: Characteristics of sample traders

Variables	A characteristic of sample traders by continues, dummy, and Cat. Var.			
Sex	Frequency	Percent		
Male	32	65.31		
Female	17	34.69		
Total	49	100		
Marital status				
Single	8	16.33		
Married	41	83.67		
Total	49	100		
	Mean	Std.Dev	Minimum	Maximum
Age	35.38	11.46	15	56
Family size	3.55	1.6	1	8
Education level	7.82	3.55	2	12

Trading experience	9.14		5.5	1	18
Initial capital	30143.35		38902.5	1000	155000
Current working capital	37732.27		44850.52	12000	318,495

Std. Dev=Standard deviation.
Source: OwnSurvey Result, 2021.

Structure-conduct and performance of garlic market
Market structure of Garlic in the study area

Market structure refers to the trader's behavior and their market performances.

Table 5 Garlic Traders' concentration Ratio at Libo Kemkem District

Number of traders (A)	% of traders $C = \frac{A}{26}$	Quantity purchased in Qt (F)	Total quantity purchased in Qt (G)= $(A X F)$	% share of purchase $Si = \frac{G}{17,109}$	% of the cumulative purchase $\left(C = \sum_{i=1}^{r} Si \right)$
1	3.846	1558	1558	9.11	9.11
1	3.846	1546	1546	9.04	18.15
1	3.846	1524	1524	8.08	26.23
1	3.846	1520	1520	8.88	**35.11**
1	3.846	1080	1080	6.31	41.42
1	3.846	870	870	5.14	46.56
2	7.692	860	1720	10.05	56.61
1	3.846	855	855	5.00	61.61
1	3.846	432	432	2.54	64.15
1	3.846	412	412	2.41	66.56
2	7.692	820	1640	9.6	76.16
1	3.846	375	375	2.2	78.36
1	3.846	364	364	2.13	80.49

1	3.846	355	355	2.10	82.59
1	3.846	342	342	2.00	84.59
1	3.846	328	328	1.92	86.51
1	3.846	317	317	1.85	88.36
1	3.846	311	311	1.82	90.18
1	3.846	300	300	1.75	91.93
1	3.846	298	298	1.75	93.68
1	3.846	294	294	1.72	95.4
1	3.846	290	290	1.70	97.1
2	7.692	189	378	2.2	99.3
26	99.996		17,109	100.0	

Source: Own Computation from Survey Result, 2021.

Market structure as a large impact on chain performance and the conduct and performance of individual firm at each stage of the value chain. This includes determining whether existing markets are competitive or concentrated, whether they are oligopolies or monopolies. To evaluate the market structure of the garlic market in the study area, concentration ratio and barriers to entry into the market were used.

Market concentration ratio

There were small numbers of big traders in the District who were participating in garlic trading activities. So that, District level market concentration ratio was considered to analyze the type of markets that existed. The concentration ratio was calculated by taking the total volume of garlic purchased by sample traders in the year2021.Based on the rule of thumb market structure criteria suggested by Khols and Uhl (1985), the four firm's concentration ratio (CR4) above 50% is considered a strong oligopoly; CR4 between 33% and 50% is considered a weak oligopoly and a CR4 of less than 33% is UN concentrated market. As the survey result indicated, the garlic market was a weak oligopoly CR4 (**35.11%)** market which means, the garlic market is dominated by few traders and it revealed that there was the imperfect market competition between traders. Hence, a higher/medium concentration ratio is an indication of a less competitive market. This finding is supported by Dirriba (2016) he stated that problems like oligopolistic market structure and information asymmetry made the trading business

uncompetitive and inefficient. This finding is also supported by (Ibrahim *et al*., 2021),their result showed that the vegetable market in their study area revealed a weak oligopoly market structure. In addition, (Aemro, 2018) reported that the onion market channel shows oligopolistic market nature by which it is controlled by a few large wholesalers.

Barriers to entry: Competition: While garlic trading is a profitable business activity, most big traders play a game of imperfect competition through capital, trade experience, and trading license to hamper other small/new traders entering the garlic trading business.

License: According to the survey report obtained, 58.27% of garlic traders have a trading license and the remaining 41.73% of traders have not to trade license for garlic trading business. Trade license experts strictly control unlicensed traders, this official restriction is one of the main entry barriers for unlicensed traders and they are disheartened to enter into garlic marketing activities.

Capital: Capital is the basic resource for starting and working on any business activity. As sample traders respond the lack of starting and working capital is one of the serious entry barriers. Although there are credit and saving institutions in the study area particularly Amhara Credit And Saving Institution, they have their credit criteria for offering credit service for traders especially for new traders, as compared with big traders. In line with this finding (Bekele *et al*., 2017),they concluded that capital was one of the entry barriers in potato trading activity in their study area. Hunegnaw (2015), found that lack of guarantee to take credit from banks and unavailability of credit services has also contributed to financial scarcity.

Conduct of Garlic Market

To analyze the conduct of the garlic market, purchasing and selling approach and traders' price-setting strategies were considered.

Purchasing and selling approaches

Traders attract sellers by providing optimum prices with negotiation between the two parties. There is no contractual agreement between farmers and traders in garlicproduct for supplying their product permanently, farmers sell their product for traders who offered better price and traders purchase as they get good quality and quantity. The selling strategy of traders is carried out systematically by investigating the market where the demand of the product increase and price also rise and they communicate with buyers about the amount and quality of product with mobile and other information sources. Concerning the payment mode, the survey result indicated that about 96.4% of sample traders sold their product on a cash basis and the remaining 3.6% of traders sold through cash and advanced payment basis.

Price setting approach: About 40% of sample respondents reported that price was set by negotiation with traders, 18.4% respond price was set by the market and the remaining 41.6% respond price was set by sellers. Opposing this finding, (Ibrahim *et al*., 2021), conclude that in the vegetable market majority of producers were price takers. Producers who deliver during the

off-season and who have access to price information and near to market place were not faced the price problem. The majority of farmers told that; price is the factor that affects their decision as to whom and to which market to sell. Even though garlic is marketed year-round in the study area especially in the era of COVID 19, during the surplus production period, the market price is determined by traders, and farmers were exposed to low prices. Due to the absence of a stable price-setting approach and garlic market price leads to seasonal price variation.Similar to this finding (Bekele *et al*., 2017) reported that producers set selling prices through negotiating slightly with the buyers in their study area.

Performance of garlic market
Performance of garlic market was analyzed by estimating marketing margin by taking into consideration associated production and marketing cost element, and returns. Marketing margin indicates the amount received by the different marketing agents for providing their services including drying, sorting, grading, packing, loading/unloading, transportation, marketing/business taxes.

Production cost and profitability analysis: Table6. Shows average cost of production and profitability analysis of garlic in both Birr per quintal and Birr per hectare. The cost of production and value of output was determined based on the current market price in the study area. This analysis was aimed to identify and quantify different costs elements, that were incurred by farmers in the production and marketing process. Farmers incurred large costs for producing and marketing garlic. The survey result showed that farmers incurred an average production and marketing cost of10,310.78Birr per quintal and 657,200.7Birr per hectare.

Table 6.Average production and marketing cost and profitability Analysis

Production/marketing activities	Cost Birr/quintal	Cost Birr/hectare	Share %
Input buying cost			
Seed, fertilizer, and equipment	1987.2	129168	19.27
Land cost(rental value)	1964.54	114695.1	19.05
Labor cost (hired labor)			
Land preparation cost	1159.2	75348	11.24
Planting/sowing cost	988.47	64250.55	9.59
Digging/wedding cost	1211.4	78741	11.75
Harvesting/collecting cost	964.26	62676.9	9. 35
Packaging material cost	888.3	57739.5	8.62
Transportation cost			
Transportation to their home cost	460.35	29922.75	4.47
Transportation to the market cost	637.47	41435.55	6.18

Taxes payment cost	49.59	3223.35	0.48
Average total cost Birr/qt			**10,310.78**
Average total cost Birr/ha			**657,200.7**
Average selling price Birr/qt			13,302.46
Average selling price Birr/ha			848,250
Average gross profit Birr/qt			**2,990.68**
Average gross profit Birr/ha			**191,049.3**

Source: Own Survey Analysis, 2021
Note: Converting Birr/qt into Birr/ha using average productivity of sample garlic farm households=65quintal/hectare in the production year.

The land cost is an opportunity cost of land which is the rental value of land farmers can have. The rental value of land was considered by taking into account the usual rents in the study area per hectare per year for garlic production. The labor cost in the analysis was computed based on the wage of labor in the area per man day. Family labor was evaluated at the prevailing wage rates of hired labor at the local level. Hence, most estimated labor costs are opportunity costs. The largest cost incurred was input cost which accounted for 19.27% of the total cost of production compared with other production cost elements as shown in table 6above. The average gross profit Birr per quintal of garlic is 2,990.68 and the average gross profit Birr per hectare is 191,049.3. This analysis indicated that garlic production and marketing is a profitable business.

Marketing costs and margin analysis: The marketing cost of garlic mainly involves the cost of post-harvest activities incurred before reaching the final consumer. This includes the cost of drying, packaging, and labor costs, handling cost for sorting, cleaning, peeling, grading, loading and unloading, loss in transport, processing cost, telephone cost, license, and tax cost. Generally, these cost components constitute a large share in the total marketing margin between the final retailer price and the cost of production. The margin calculation was done to show the distribution throughout the various value chain actors as garlic moves from the point of production to final consumption. Marketing margin can be used to measure the share from the final selling price taken by a particular actor in the value chain. The relative size of various value chain participants' gross margins can indicate where in the value chain, value is added and/or profits are made. To calculate the marketing margin of an actor, the average price of garlic for that particular actor was taken. For instance, the buying price of consumers was obtained by taking the average purchasing price of consumers.

Table 7. Marketing cost of garlic for different marketing actors (Birr/qt)

Cost of marketing in Birr	Actors who participate in the garlic value Chain		
	Collectors	Wholesalers	Retailers
Purchase price	9057.2	9612.62	11,127.68
Labor cost packaging	203.93	193.3	349.78
Loading/unloading	206.77	193.48	315.39
Transportation cost	273.053	337.23	491.41
Sorting cost	126.23	152.07	196.14
Storage cost	186.48	153.3	278.53
Loss in transport and storage cost	394.02	340.21	481.07
Processing cost	113.45	231.9	227.5
Telephone cost	397.92	396.078	409.48
License and tax cost	184.6	544.64	376.45
Total cost	11,143.653	12,154.83	14,253.43
Selling price	13,408.53	14,125.81	15000

Source: Own Computation From Survey Result, 2021.

Table 8.Analysis of marketing margin for different actors

Actors	Selling price Birr/qt	Production/marketing cost	%GMM	Gross profit Birr/qt	% share
Producers	13,302.46	10,310.78	88.67	2991.68	37.51
Collectors	13,408.53	11,143.653	0.707	2264.88	28.4
Wholesalers'	14,125.81	12,154.83	4.78	1970.98	24.72
Retailers	15000	14,253.43	5.83	746.59	9.36
Total			99.987	7974.13	99.99

Note: GMM=gross marketing margin; Qt=Quintal.
Source: Own Computation from Survey Result, 2021

As indicated in Table 8 above, the total gross marketing margin added to garlic price when it passes through the value chain was 11.33% in the 2021 academic year only. From the total gross marketing margin obtained, 0.707% was to collectors, 4.78% for wholesalers, and 5.83% for retailers. Compared to collectors, farmers received a large portion of the profit margin. Even though there was COVID 19 and positive profit for all garlic market actors, farmers were benefited. In line with this finding (Ibrahim *et al*., 2021) and (Yaregal, 2018) conclude that producers obtained a higher percentage share of margin when they directly supplied their products to consumers. Farmers do extra work and effort as compared with other actors. The structure and conduct of the garlic market indicated a weak oligopoly market structure and misconduct in pricing setting strategy and also there are barriers to entry to the garlic market.

Therefore, all these are indicators of the deviation of the garlic market from the standards of competitive market structure. Hence, it is possible to conclude that the garlic market chain in the case of Libo Kemkem District is inefficient and incompetent. Similar to this Finding (Yargal, 2018) reported that due to lack of market transparency, entry barrier, and weak oligopoly market structure, the potato market in his study area had deviated from the competitive market structure.

Conclusion and Recommendation

Garlic is one of the main crops primarily produced for home consumption, marketable, and medicinal purpose in the Libo kemkem District. This study aimed to analyze the structure, conduct, and performance of the Garlic market. The structure of the Garlic market was evaluated by taking the share of the four largest firms from the total amount of Garlic purchased by sample traders. The four-firm concentration ratio (CR_4) indicated that the four largest traders' handled 35.11% of the total capacity purchased. Therefore, the structure of the Garlic market in the study area is a weak oligopoly market which means, it is dominated by few traders and it shows that there was the imperfect market competition between traders in the market. In the process of the Garlic market, every actor incurs costs for production and marketing activities. Marketing costs constitute a large share in the total margin between the final retailer price and the cost of production. The total gross marketing margin added to Garlic price when it passes through the value chain was 11.33%. From the total gross marketing margin, about 0.707% was to collectors, 4.78% to wholesalers, and 5.83% to retailers. Even though there was COVID 19 and positive profit for all garlic chain actors, farmers were benefited as compared with other actors. Weak oligopoly market, misconduct in pricing setting strategy and there are barriers to entry to garlic market. Therefore, all these are indicators of the deviation of the garlic market from the standards of competitive market structure. Hence, it is possible to conclude that the garlic market chain in the case of Libo Kemkem District is inefficient and incompetent. So strengthening effective market information system; creating competitive market structure, stabilizing price, supporting producers to intensify their bargaining power, and setting rules to other value chain actors for controlling their informal market practice for improving market competitiveness and to minimize oligopolistic marketing practice.

Acronyms and Abbreviations

COVID   Corona Virus Disease
CR   Concentration Ratio
DARC   Debrezeit Agriculture Research center
GMMP Gross Marketing Margin of Producers
ITC   International Trade Center
LKAACO Libo Kemkem Agricultural and Communication Office
PP   Probability Proportional
TGMM Total Gross Marketing Margin

Authors' Contributions
Gedefaw Kindu Wubet: He did, in this study, initiated the research proposal, prepared pilot project and pilot survey, analysis, and justification, wrote the proposal, prepared the actual survey, data collected, data cleaning and entry into computer, analysis, wrote a full report and finally produces the manuscript.

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