Structure and Performance of Vegetable Marketing in East Shoa Zone, Oromia Region, Ethiopia

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Abstract

Analysis of marketing performance of vegetable plays an important role in an ongoing or future market development plan. The study primarily examines market structure of major actors and assessing the market performance for key vegetable marketing actors and channels by quantifying costs and profit margins. The data was generated by household survey using pre-tested structured questionnaires. This was supplemented by secondary data collected from different published and unpublished sources. The study result shows that the total gross marketing margin was 30% with producer participation margin of 70% implying higher marketing margin of smallholder producers. The market intermediaries incurred different marketing costs such as costs of packing, sorting, transportation, loading and unloading. Central wholesalers obtain relatively highest profit in channel numbered II and III, which amounted to Birr 204,827 and 58,675, respectively. The study result signifies that the first four largest volumes of vegetable purchased by first four big traders (CR4) constitute 50% of market share, which indicates the market structure for vegetable is strongly oligopolistic. OLS regression results also revealed that there are economies of scale for wholesalers at Meki market, which clearly indicates the presence of barrier to entry/exit for wholesalers in the market. Policy implications drawn from the study indicate that changing oligopolistic market structure, capacitating unions to supply inputs and outputs and supporting actors involved in local vegetable markets.

Keywords: Vegetable, market structure, market margin, Ordinary Least Square regression.

1. Introduction

The status of vegetable production has been increasing for the last four years of the Growth and Transformation Plan (GTP-I), i.e. from 2010/11 – 2013/14. The GTP-I performance report for the four years for the agricultural sector indicates that vegetable production achieved 42% of the plan and grown by 60.9% (125.3 thousand tons in 2013/14) as compared to the base year 2009/10 (49 thousand tons). Besides, the quintal per hectare yield for vegetable and fruit has increased for two successive years (2010/11 and 2011/12) from the base year 2009/10 and then declined in 2012/13 and 2013/14. This is in line with GTP I annual performance report of 2014/15 which explains a number of reasons for the decline, for low level of performance, and they are; low supply of suitable land, inability to diversify alternative markets and difficulty of obtaining necessary inputs are some of the major reasons for low performance. Export earnings (value) of vegetable and fruit has increased from 31.7 million dollar (base year of GTP) to 45.7 million dollar in the year 2013/14 (MoA 2014).

Vegetable production is becoming an increasingly important activity in the agricultural sector of the country following the development of irrigation and increased emphases given by the government to small scale commercial farmers. A report indicated that the major share of an estimated 1.4 million tons of vegetable and fruits is consumed locally and only 4.5% of the total is exported (Haji 2008). Ethiopian vegetable and fruits are mainly destined to the regional markets especially neighboring countries like Djibouti and Somalia. About 90% of Ethiopian vegetable and fruit is exported to Djibouti and Somalia even though the value generated from this is too small (EHDA 2012).

The expansion of irrigation agriculture in different parts of the country has enabled smallholders to produce vegetable even in dry season. Through irrigation, farmer's per capita production as well as area under vegetable coverage has been increasing (MoA 2014). These conditions enable smallholders to have better surplus for market. Like most of agricultural products, vegetable production exhibits seasonality in supply. This creates excess supply of vegetable to markets within limited time frames which leads to decline of prices. Furthermore, due to absence of sufficient local markets and efficient marketing system, farmers are obliged to sell their outputs at lower prices (ATA 2014).

Smallholder vegetable farms are based on low input–low output production systems. The use of improved seeds and planting material of high yielding varieties and other inputs such as fertilizer and plant protection materials is not common in the smallholder sector. Technical training and extension services on improved crop husbandry techniques are not available. As a result average productivity levels are low in the small scale farming sector (EHDA 2011).

Legesse *et al* (2014) reveals that wholesalers (supplying the bulk to consumers) are making the highest net margin as they have short channels between producers and consumers, and as they relatively charge a higher price using their market power. The net margin for the smallholder farmers is highest only when vegetable are sold to individual consumers through unions via consumer cooperatives (thereby reducing the numbers of middlemen across the market chain). Tegegn (2013) found out that vegetable pass through several intermediaries with little value being added before reaching the end users. Furthermore, the market chain is governed by wholesalers and exporters who have capital advantage over the other chain actors. Hence, farmers are forced to obtain a lower share of profit margin.

Market distortions are common activities of middlemen in price setting. Some vegetable are not creating time value due to their perishability. This enables actors particularly middlemen to cut price, which further reduce producers bargaining power to sell their vegetable at a price convenient for them. Under such circumstances, a study that focused on the structure and performance vegetable marketing can play substantial role towards the improvement of the existing market situation and to alleviate the market distortion.

The main Objective of study aimed at examining market structure of major actors and assessing the market performance for key vegetable marketing actors and channels by quantifying costs and profit margins. The data was generated by household survey using a pre-tested structured questionnaire. This was supplemented by secondary data collected from different published and unpublished sources. The data analyzed using SPSS version 20 and summarized into descriptive formats. The software was employed to analyze the least square regression (OLS) for determination of economies of scale for marketing intermediaries (actors). Besides, Structure, Conduct and Performance (SCP) model employed to evaluate the structure and performance of vegetable market.

This article contains four sections. The introductory section of the article, methodologies under section two and then section three explains results and discussion. Subsequently, section four summarizes the main findings of the study and draws conclusion and appropriate policy recommendations.

2. Methodology
2.1 Descriptions of study area and data used
Dugda Woreda[1] is located in East Shewa Zone of Oromia Regional State. Geographically the Woreda is located between $8^0 01'$N to $8^0 10'$North latitude and $38^0 31'$E to $38^0 57'$E longitude (see Figure 1). The total area of the Woreda is 959.45 km². The Woreda has 36 rural Kebele Administrations and four urban kebeles. Meki, the main capital of the Woreda, is located 134 km to the South East of Addis Ababa on the main asphalt road to Ziway town. The boundaries of the Woreda are Bora Woreda in the North and North West, Arsi zone in the East, Adami Tulu Jido Kombolcha Woreda in the South and Gurage zone of SNNPRS in the West (WAO 2014).

Figure 1: Study site
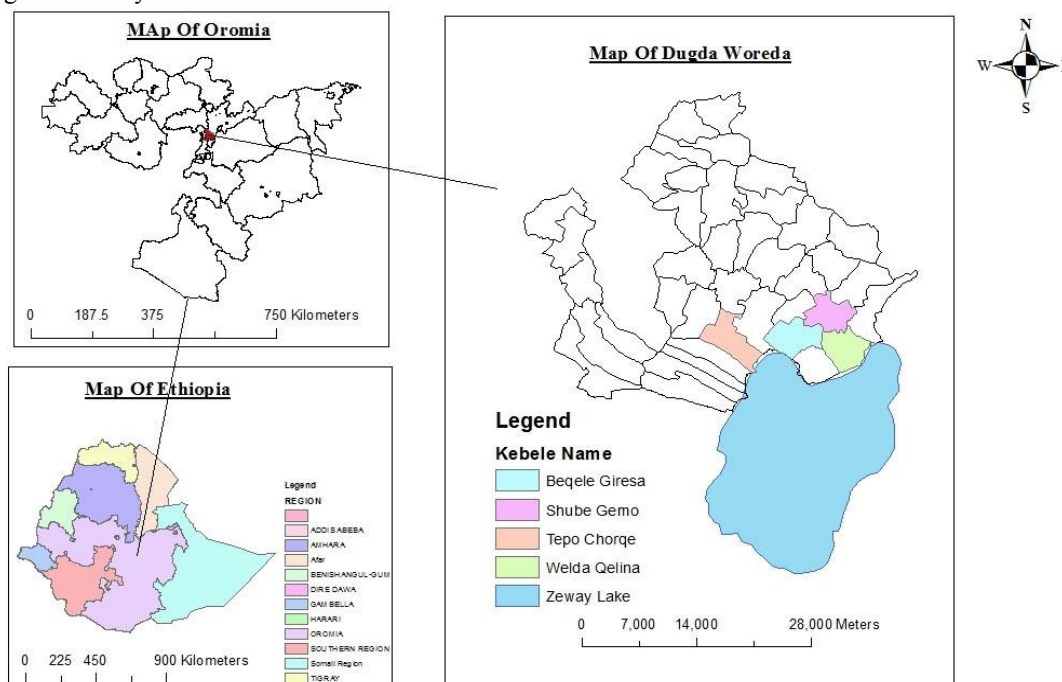
Source: Rural Land Administration and Use Directorate of the MoANR[2], 2016

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[1] Woreda is Amharic word for district
[2] The Ministry of Agriculture and Natural Resources

According to the National Housing and Population Census, population projection of the year 2015, the population of the woreda was 185, 534 of whom 95,095 (51.3%) are men and 90,439 (48.7%) are women. Moreover, 53,314 (29%) of its population are urban dweller and the remaining 71% of its population are rural inhabitants (CSA 2015).

Accordingly, both primary and secondary data was used to deal with the objectives of the study. The primary data was collected using household survey. For primary data collection a combination of qualitative and quantitative methods was used. The quantitative data was collected using household survey. For household questionnaire survey a total sample size of 190 respondents comprising of 136 farmers, 4 farmer traders (assemblers), 8 woreda wholesalers, 10 woreda brokers, 10 woreda retailers, 6 central wholesalers and 6 central brokers and 10 central retailers took part.

For primary data collection the study used two kinds of sources; (1) Survey questionnaire for vegetable producers and actors from Meki town and Addis; (2) Focus group discussion with farmers. The survey questionnaires were designed to explore vegetable production, marketing, product follow and distribution, marketing costs and margins. To complement the structured survey focus group discussion was conducted with relevant vegetable market chain actors. Moreover, personal observation and key informant interviews (KII) were also conducted to triangulate with the structured survey questionnaire.

Secondary data was gathered from different sources such as; government institutions, Woreda Irrigation and Development Authority, Woreda Agricultural Office, survey reports, annual reports, bulletins and websites. Published and unpublished documents were also comprehensively reviewed to secure relevant secondary information.

2.2 Sampling methods

Preliminary information about the study area was obtained from Woreda Irrigation and Development Authority (WIDA) to generate important information for questionnaire preparation for the household survey and to select sample PAs. Attempts were made to select representative samples in the selection of randomly sampled PAs, vegetable producers (tomato and onion) and traders. The surveyed vegetable producing PAs were, Beqele Girisa, Shube Gemo, Tepo Choroqe and Welda Qelina.

2.2.1 Producers survey

In producers survey a multi stage sampling procedure was followed in order to collect data from representative samples that would help reflect the situation of vegetable market chain of specific commodities (tomato and onion). Accordingly, from 36 PAs in the Woreda only 18 PAs practiced irrigated agriculture to produce vegetable. First, by employing purposive sampling method Dugda Woreda was selected. In the second stage, four PAs were selected randomly from 18 PAs. Then, 140 vegetable producers were selected from identified four PAs using Systematic Random Sampling. Therefore, every household was selected from first by selecting random numbers between 1 and 3 and then selected every 3rd person from a population of 430. Thus, from four selected PAs 136 valid cases were obtained. Then by employing Probability Proportional to Size (PPS) number of smallholder farmers to be taken from each PAs is determined from producers' stratum until the required sample size was achieved. Primary data were largely collected from households and key informants using questionnaire and interview guides, respectively. The data were collected on March 25 – April 08, 2015.

2.2.2 Traders survey

The place for trader surveys was market towns in which a good sample of tomato and onion traders existed. On the basis of flow of tomato and onion, two markets namely Meki town and Addis Ababa, Piassa Atikilt Tera were selected purposively, one as a source market and the other as central market.

Vegetable traders such as brokers, farmer traders (assemblers), woreda and central wholesalers, and woreda and central retailers were sampled at town of Meki and Addis Ababa Piassa Atikilt Tera, respectively by employing snow ball sampling techniques. Because of the limited number of wholesale traders in the woreda the sample exhaustively contained almost all vegetable wholesalers from Meki town. In total 136 vegetable producers, 4 farmer traders (assemblers), 8 woreda wholesalers, 6 central wholesalers, 10 woreda brokers, 6 central brokers, 10 woreda retailers and 10 central retailers from Meki town and Addis Ababa, Atkilt Tera market were interviewed making a total number of 190 respondents for the study.

2.3 Analytical methodology

Primary data was entered in the SPSS spreadsheet and cleaned for irregularities. The cleaned data was summarized into descriptive statistics in terms of frequencies, percentages and central tendencies. Moreover, the software was employed to analyze the least square regression (OLS) for determination of economies of scale for marketing intermediaries (actors). Based on the primary data, average prices at different market levels were estimated, after which average price margins for different market intermediaries were computed.

2.3.1 Descriptive analysis

The study used ratios, percentages, means and standard deviation in the process of examining and describing

marketing functions, facilities, services, role of intermediaries, market and traders characteristics. Furthermore, Ordinary Least Square (OLS) regression was conducted in order to determine the existence of economies of scale for identified key actors at Woreda market.

2.3.2 Structure, Conduct and Performance (S-C-P) model

The model was employed to examine the fundamental relationships between market structure, conduct and performance, and is usually referred to as the Structure, Conduct, and Performance (S-C-P) model. Amha (1994); Musema (2007) and Tadesse (2011) also used this model to evaluate food grain, pepper and fruit market, respectively. Therefore, the study used S-C-P model to evaluate structure and performance of vegetable (tomato and onion) market in the study area.

Market structure in food marketing is analyzed based on the degree of market transparency (market information), the number of buyers and sizes of enterprises within the system, and the condition of entry to and exit from trade (Scarborough and Kydd 1992; Pender *et al* 2004). Koch (1980) reveals four salient aspect of market structure include the degree of seller concentration, the degree of buyer concentration, the degree of product differentiation and the condition of entry/exit. Accordingly, market structure of vegetable is assessed based on market concentration ratio, and condition of entry into and exit from trade are used as a clue to examine vegetable market structure.

2.3.2.1 Market concentration measure

Concentration ratio is a way of measuring the concentration of market share held by particular suppliers in a market. It is the percentage of total market sales accounted for by a given number of leading firms. Hence, a four-firm concentration ratio is the total market share of the four firms with the largest market shares. The greater degree of concentration is the greater the possibility of non-competitive behavior existing in the market. For an efficient market, there should be sufficient number of firms (buyers and sellers).

$$C = \sum_{i=1}^{r} S_i$$

<div align="center">r = 1, 2, 3…, r……………………………………….…..…..…… (1)</div>

Where, C- is concentration ratio, S_i- is market share of the ith firm and
r-is the number of largest firms for which the ratio is going to be calculated.

Kohl and Uhl (1985) suggest that as rule-of-thumb, a four largest enterprise concentration ratio of 50% or more is an indication of strongly oligopolistic industry, 33-50% a weak oligopoly, and less than that, competitive industry. The problem associated with this index is the arbitrary selection of r (number of firms that are taken to compare the ratio). Accordingly, concentration ratio was computed for this study and based on result the structure of market determined.

Market concentration refers to the number and relative size distribution of buyers and sellers in the market. For an efficient market, there should be sufficient number of firms (buyers and sellers); firms of appropriate size are needed to fully capture economies of size and need to have full market information.

The concentration ratio was calculated for vegetable market by taking 40 valid sampled cases from wholesalers, retailers, brokers, farmer traders and cooperative unions from Meki and Atikilt Tera markets.

One of the barriers to entry that are often of critical importance in developing countries given relative factor endowments is economies of scale (Pomeroy and Trinidad 1994).

2.3.2.2 Barriers to entry

In fact, interviewing traders about barriers to entry might be difficult since all have entered the market. Rather, observation of the age, gender, and ethnic distributions of owners, numbers of employees of different sizes of enterprises, education, capital access, barriers to entry/exit and the extent to which fluctuations in the number of active traders follow rises and falls in profitability can be considered. Market structure is most commonly evaluated by examining trends in the numbers and sizes of firms relative to each other, and to the number of consumers and producer, in particular times and places (Scarborough and Kydd 1992).

OLS simple linear regression analysis was conducted in order to know whether there is economies of scale for intermediaries' involved in vegetable marketing. It was done for wholesalers and retailers at Woreda level. It is conducted by computing AC as a predicted and TP (average quantity handled) as a predictor or explanatory variable

2.3.2.3 Economics of scale

The barrier to entry that is often of critical importance in developing countries is scale economies (Pomeroy and Trinidad 1994). The study examined if there was a barrier to entry by interviewing market actors. The existence of economic scale is a condition permitting relatively large firms to market their product at considerably lower average costs than smaller firms (Pomeroy and Trinidad 1994). In this study we examine the presence of scale economies by examining the average cost function associated with the firm's marketing activities. For this we

need to collect data on total product handled, marketing cost such as transportation, storage, loading, cleaning and packaging costs, etc. Difference in economics of scale is done using least square regression (OLS) of the form:

$$AC_i = \alpha + \beta Q + \varepsilon$$ ………………………………………………..…….. (2)

Where, AC is average marketing cost per kilogram and Q is the total product handled by the firm i and ε is the error term. If AC_i is related negatively to total product Q, it implies that there is economics of scale (Pomeroy and Trinidad 1994).

2.3.2.4 Estimation of marketing costs and marketing margin

Different types of marketing costs (including transport, wastage loss, storage, and loading/unloading) relating to transaction of vegetable for producers and each traders (farmer traders, woreda wholesalers, woreda retailers, central wholesalers and central retailers) were collected per kilogram basis. Computing the total gross marketing margin (TGMM) is always related to the final price paid by the end buyer (consumer) and is expressed as percentage (Mendoza 1995). Margin determination surveys should be conducted parallel to channel surveys based on price (payment) received by actors or selling price to calculate the margin by actors involved in the market. A systematically recording price at different levels of marketing chain during a two to three week period was sufficient to calculate quite accurately the relevant marketing margins (Pomeroy & Trinidad 1994). Thus, selling price by actor was utilized to estimate marketing margins. Marketing margins for the various vegetable traders were estimated using the following formulas.

$$TGMM = \frac{\text{Retailing price} - \text{Farm gate price}}{\text{Retailing (Consumer) price}} \times 100 \text{……………..…………………….……… (3)}$$

$$GMM_B = \frac{\text{Broker price} - \text{Farm gate price}}{\text{Retailing (Consumer) price}} \times 100 \text{…………………………………………. (4)}$$

$$GMM_{FT} = \frac{\text{Farmer trader price} - \text{Brokers price}}{\text{Retailing (Consumer) price}} \times 100 \text{…....…………………………… (5)}$$

$$GMM_{WWS} = \frac{\text{Woreda wholesalers price} - \text{Farmer trader price}}{\text{Retailing (Consumer) price}} \times 100 \text{….……..…...…………… (6)}$$

$$GMM_{CW} = \frac{\text{Central wholesalers price} - \text{Woreda wholesalers price}}{\text{Retailing (Consumer price)}} \times 100 \text{…………...….……… (7)}$$

$$GMM_R = \frac{\text{Retailing price} - \text{Wholesalers price}}{\text{Retailing (Consumer) price}} \times 100 \text{…………..………….……….……. (8)}$$

$$GMM_P = 100\% - TGMM \text{ …………..…….………………………………...….... (9)}$$

Where;

TGMM is the total gross marketing margin;

GMM_B is the percentage of total gross marketing margin received by brokers;

GMM_{FT} is the percentage of total gross marketing margin received by farmer traders;

GMM_{WWS} is the percentage of total gross marketing margin received by woreda wholesalers;

GMM_{CW} is the percentage of total gross marketing margin received by central wholesalers;

GMM_R is the percentage of total gross marketing margin received by retailers and

GMM_P is the producer gross marketing margin.

3. Results and discussions

3.1. Market structure of vegetable

3.1.1. The degree of market concentration

The survey result indicated that the first four largest volume of vegetable purchased by trader's concentration ratio (CR_4) constitute 50% of market share (See Appendix) which is higher than what Amha (1994) and Desalegn *et al* (1998) report; concentration ratio of 35% and 32.58% for food grain market and Ethiopian grain markets, respectively. Thus, the market concentration ratio indicates the market structure is a strongly oligopolistic for vegetable marketing.

3.1.2 Entry barrier for wholesalers

The regression result shows average cost and total volume of vegetable handled by wholesalers in the study areas is inversely correlated.

Table 1: OLS Regression between average cost and total product of wholesalers

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	8.905	1.183		7.525	.000
TP	-0.00009	.000	-.628	-1.977	.095

a. Dependent Variable: AC

Source: Survey result, 2015

The coefficient of quantity handled by Woreda wholesalers is negative association between average cost and total product which specifies an existence of economies of scale. It implies as average total vegetable supplied to the

market increases the average cost of wholesalers decreases and vice versa. When total product handled to the market increases wholesalers have an advantage and smaller similar firms have less capital and unable to compete with the larger ones. The existence of economy of scale for Woreda wholesalers also implies large firms market their products at considerably lower average costs than smaller firms. Thus, for every one unit increase in total product (Q); average cost (AC) of wholesalers diminishes by -0.00009 Birr[3]. Thus, there is an entry barrier for smaller wholesalers, which is characteristic of oligopoly market.

3.1.3 Entry barrier for retailers

Table 2: OLS Regression between average cost and total product of retailers

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	6.869	1.452		4.730	.000
TP	.007	.013	.140	.584	.567

a. Dependent Variable: ACwr

Source: Survey result, 2015

OLS regression result for retailers at Woreda is positive for β coefficients. Thus, when total quantity purchased increases by one unit then average cost also increase by 0.007 which increase total marketing cost for retailers. Therefore, there is no entry barrier as well as economies of scale and thus the market is competitive for retailers.

3.2 Marketing performance of vegetable

3.2.1 Marketing margin

The results of the marketing margins analysis showed a total gross marketing margin of 30% (complete distribution channel) with a producer participation margin of 70%. Thus, producers have highest marketing margin than intermediaries though not necessarily indicate pure profit that goes to each actors in the margin. The gross marketing margin for vegetable producers is rather on the high side as compared to the study on hot pepper by Hounegnaw A. and Alemu D. (2013), which is about 29%.

Table 3: Vegetable marketing margin for key actors

Market Chain Actors	Selling Price (Birr/kg)	Gross Marketing Margins
Average farm gate price	7	
Average brokers price	7.10	
Average farmer trader price	7.30	
Average Woreda wholesalers price	7.80	
Average central wholesalers price	8.40	
Average retailing price	10	
TGMM		30%
GMM$_b$		1%
GMM$_{ft}$		2%
GMM$_{ww}$		5%
GMM$_{cw}$		6%
GMM$_r$		16%
GMM$_p$		70%

Source: Survey result, 2015

TGMM is 30% which designates the portion of price paid by final consumers that belongs to actors/middlemen i.e. brokers, farmer traders, wholesalers and retailers.

GMM$_b$ indicates total gross marketing margin received by brokers which is 1%.

GMM$_{ft}$ shows total gross marketing margin received by farmer traders which is 2%.

GMMcw indicates total gross marketing margin received by central wholesalers which is 6%.

GMMr indicates total gross marketing margin received by retailers which is 16%.

GMMp is the portion of price paid by end consumer that belongs to farmer as a producer which is 70% (100% - 30%).

Therefore, the purchase price by a marketing actor can be determined with the information on the selling price given by the actors that comes first in the marketing chain (Table 3). Gross marketing margin of farmers is 70% which is high as compared to Tefera T. (2014) finding which is 54.2% for chickpea producers.

3.2.2 Marketing costs

Marketing costs are estimated to compute the share of profit captured by key actors in the marketing chain. The main costs for middlemen's were transport, cleaning, sorting and grading, service fee, storage, offloading and other

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[3] Eth. Birr 20.78 = US $1 in April, 2015

expenses. Data was calculated on Birr/Kg basis for each element and then merged to total marketing cost.
Table 4 indicates different types of marketing cost related to the transaction of vegetable by farmer traders, woreda wholesalers, woreda retailers, and central wholesalers and central retailers. The marketing cost of actors in the channel indicated transport cost is the highest (5937 Birr) followed by offloading cost (2316 Birr).

Table 4: Marketing cost for different marketing actors (Birr/Kg)

Marketing Cost	Actors					
	Farmer Trader	Woreda Wholesaler	Woreda Retailer	Central Wholesaler	Central Retailer	Mean
Wastage loss	797.5	1150	1215	210	605	795.5
Cleaning, sorting and grading	1600	1300		2000	600	1100
Transport	13500	5600	255	9500	830	5937
Service fee[4]			-	1000		200
Storage		2800	5		450	651
Offloading	7000	4520	60			2316
Other expense		3600	34	4000	467	1620.2
Total cost	22897.5	18970	1569	16710	2952	-

Source: Survey result, 2015

3.2.3 Marketing Profit

Gross profit of traders is summarized in Table 5 based on unit profit /kg basis. Profit of woreda retailers are Birr 2939 in channel I. This profit was made by direct purchase from farmers through total elimination of other intermediaries i.e. woreda brokers, woreda wholesalers and farmer traders, and directly sale to consumers. The unit profit /kg obtained by central wholesalers were highest in channel II which is Birr 204,827. Farmer traders are benefited in channel IV because of direct purchase from farmers.

Table 5: Gross profit for different actors by unit profit /kg (Birr)

Actors	Indicators	Vegetable marketing channels			
		I	II	III	IV
Farmer Traders	Purchase price				218250
	Marketing cost				22897.5
	Selling price				268350
	Gross profit				27,203
Woreda Retailer	Purchase price	12700			
	Marketing cost	1569			
	Selling price	17,208			
	Gross profit	2,939			
Woreda Wholesalers	Purchase price			637500	
	Marketing cost			18970	
	Selling price			811500	
	Gross profit			155,030	
Central Wholesalers	Purchase price		122,198	436,587	268350
	Marketing cost		16710	16710	16710
	Selling price		343735	343735	343735
	Gross profit		204,827	-109,562	58,675
Central Retailers	Purchase price		20260	20260	20260
	Marketing cost		2952	2952	2952
	Selling price		24905	24905	24905
	Gross profit		1,693	1,693	1,693

Source: Survey result, 2015

Profit is high for central wholesalers in channel II (204,827 Birr) and this is because of direct purchase from farmers at farm gate. However, in channel III central wholesalers incur a loss (-109,562 Birr). The loss occurred due to price fluctuation in the market and wastage loss. All marketing channels are profitable except channel III of wholesalers. In general, subsequent to Channel II of central wholesalers, channel III of Woreda wholesalers, and channel IV of central wholesalers is comparatively the top three profitable (economically efficient) channels that generated Birr 204,827, 155,030 and 58,675, respectively for sale of vegetable in the study area.

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[4] Service fee is commission paid to brokers

4. Conclusions and recommendations

4.1 Conclusions

The study aimed at examining market structure of major actors and assessing the market performance for key vegetable marketing actors and channels by quantifying costs and profit margins. The study could help to make appropriate decisions by the smallholder farmers, consumers, traders, investors, and others who need the information for their own purposes.

During survey period some of the gaps encountered were data collection, some actors particularly brokers and wholesalers were not cooperative for interview for fear of legal and other personal concerns. Some of central wholesalers in Addis Ababa provided inaccurate information because they were scared of extra tax from local custom authority.

Market concentration ratio was calculated for vegetable by taking 40 valid sampled cases from wholesalers, retailers, brokers, farmer traders and cooperative unions from Meki and Atikilt Tera markets. The result indicated that the first four largest volume of vegetable purchased by traders (CR4) constitute 50% of market share which indicates existence of strongly oligopolistic market structure for vegetable marketing.

OLS analysis conducted specifies existence of economies of scale which implies as average total vegetable supplied to the market increases the average cost of wholesalers decreases and vice versa. Thus, there is an entry barrier for smaller wholesalers. The existence of economy of scale for Woreda wholesalers also implies large firms market their products at considerably lower average costs than smaller firms.

Profit is somewhat high for central wholesalers in channel II and this is because of direct purchase from farmers at farm gate. On the other hand, in channel III central wholesalers incur a loss probably due to price fluctuation in the market and wastage loss. Subsequent to Channel II of central wholesalers, channel III of woreda wholesalers, and channel IV of central wholesalers is comparatively the top three profitable (economically efficient) channels for sale of vegetable in the study area. Profit of woreda retailers is Birr 2939 in channel I. This profit was made by direct purchase from farmers through total elimination of other middlemen (woreda brokers, woreda wholesalers and farmer traders), and directly sale to consumers. The profit obtained by central wholesalers was highest in channel II which is Birr 204,827.

4.2 Recommendations

- **Changing oligopolistic market structure**

Due to the strongly oligopolistic market structure of vegetable, intermediaries face difficulties to enter or exit freely in the market. Thus, to address oligopolistic tendency, it requires change of the existing imperfect market structure so as to be competitive, through engaging all actors to freely participate in the process of vegetable marketing. To this effect, local administration has to play a key role in participating potential actors (e.g. brokers and woreda wholesalers) to trade vegetable on free market bases by creating convenient environment for all.

- **Capacitating unions to supply inputs and outputs**

To ensure delivery of fertilizers for irrigated production and pesticides of the required quality at the right time producers organizations in the area (like Meki-Batu unions) should be strengthened (they have to offer their services during off season with early planning so as to address the problem). Moreover, the union should be capacitated in order to fully engage in serving all its members in delivering of their vegetable products (outputs) for markets.

- **Supporting actors involved in local vegetable markets**

The Woreda Trade Office should be capacitated in a way that it could create/promote fair market for smallholder producers and all actors. Encouraging of actors by giving incentives and awareness creation through supporting and building capacity through providing training is essential in order to turn the oligopolistic market structure.

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Appendix

Total volume bought by marketing actors

No	Total volume purchase by Actors Involved					
	Wholesalers	Woreda Retailrs	Central Retailers	Central brokers	Farmer trader	Meki-Batu Union
1	25000*	100	200		15000	20000*
2	25000*	200	300	9000	5000	
3	60000*	300	150	4000	7500	
4	15000	110	155	5500	10500	
5	10000	100	575	5500		
6	8000	310				
7	11000	170	420			
8	5000	120	500			
9	1000	300				
10	3000	100	200			
11	6000					
12	2800					
13	3000					
Total	**174800**	**1810**	**2500**	**24000**	**38000**	**20000**

* The four largest traders selected to estimate concentration ratio

Source: Survey result, 2015