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Analysis of Determinants of Red Meat Demand: The Case of Urban and Peri-Urban Areas of Dendi and Ejere Districts in West Shewa Zone, Oromia National Regional State, Ethiopia

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Abstract:

The study was aimed at analyzing determinants of red meat demand in the urban and peri- urban areas of Dendi and Ejere districts in West Shewa Zone, Oromia National Regional State. Both qualitative and quantitative data were collected for the study. The data were collected from both primary and secondary sources. The primary data for this study were collected from 155 households by using semi-structured questionnaires, site visit and personal observation. Data analysis was made using descriptive statistics and Tobit regression model. The results of the Tobit regression model indicated that quantity demanded of red meat is significantly affected by household size, religion, income, expenditure, price of the product, fat content of the product, freshness of the product, hygiene, festival and fasting seasons. The red meat demand in the study areas was seasonal and it goes down in major Orthodox Christianity fasting seasons and significantly high on cultural festivals. Therefore, the required recommendations were it is important to support, aware and force hotels and restaurants in providing quality and safety red meat products to consumers. The concerned body should be taken to ensure that the product hygienic is during transportation and handling.

Keywords:

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1. INTRODUCTION

Background of the Study

Global red meat production and consumption is expected to increase during the next decade. Population growth estimates indicate that the demands for meat will double by 2050. This increase in the demand for meat will mainly be driven by increasing demand in developing countries (Korver, 2010). Red meat constitutes one of the most important agricultural products in the world. This applies in terms of its contribution to the total gross value of production of agricultural commodities, and also in terms of its value in the value adding system of other commodities and products. For the meat sector to play its rightful role in the agricultural sector in Africa there is needed to unlock the sector's potential. It is important to catalyze productivity, value addition, market access and trade to improve competitiveness of the meat sector in Africa.

Despite substantial livestock product (meat) demand, the livestock producer currently struggles to supply quality cattle and generate income from livestock marketing. Production is highly fragmented and geographically dispersed, and there are no large commercial operations. Meat production per head of livestock in Ethiopia is low by standards of other significant livestock-producing African countries (LMD, 2013). Many livestock holders in Ethiopia prefer to keep their live animal for domestic use rather than sell them. It is commonly claimed that inconsistent supply of quality animals is a major constraint to commercialization, and this was repeatedly confirmed in the rapid appraisal. Smallholder farmers currently receive only a small fraction of the ultimate value of their output.

Ethiopia has the largest livestock inventory in Africa which are not managed to maximize their value for red meat production. Large numbers of livestock are held for several years to supply draught animal power and milk for the family in the highland areas and these old animals do not produce the best red meat. As the meat sector does not fulfill the quality requirement that the consumers (both domestic as well as foreign) demand, Ethiopia are not able to generate adequate wealth from the sector. The market set up in the country is such that farmers would sell what so ever product they produce. The product of sellers is not geared towards the consumers' needs and preferences. In other words, consumers' preferences are not taken into account while raising cattle by producer. As a result the sector is not functioning as one normally expects given the livestock population Ethiopia has. Consumer demand for red meat has been increasing rapidly in the developing countries propelled by income and population growth and urbanization. Increased demand for reliable quality, food safety and scale of delivery has also been observed, especially in urban areas, as evidenced by expanding supermarkets (Reardon *et al.*, 2003).

The marketing environment in which smallholders operate is primarily comprised of informal distribution channels where quality standards are either lacking or inadequately defined in Ethiopia. The prevalent use of locally defined standards based on consumers' preferences and responses by market actors, and the scanty empirical knowledge about which quality and safety attributes, socio-economic and demographic factors are valued by consumers justify the need for more studies. Research on determinants of red meat demand is scarce in Ethiopia and almost untouched research topic in the study areas. This entails a need to conduct research to investigate determinants of red meat demand in the areas.

Livestock production is crucial in Ethiopia as livestock and its products are important source of food and income. Despite the huge potential of livestock, red meat production has not been fully exploited and promoted in the country. The meat sector, especially the fresh red meat sector has been one of the least analyzed food sectors in Ethiopia. Limited works have been carried out in order to research into the characteristics of different groups of consumers, their demand for red meat quality and those aspects that worry them more. In addition, policy decision on assurance of quality and standards, product marketing, among others is taken in the absence of vital information on how they affect the entire value chain. Lack of clear national policies to formulate and enforce quality attributes so that producers are paid based on quality and grades further suppresses the drive by meat dealers to pay particular attention to quality matters and on

innovation in the entire value chain.

The producers often try to sell what they produce rather than producing and selling what is demanded by the market. Marketing agents and small scale processors struggle to market inferior quality products which find it difficult to penetrate conventional and niche markets that demand high quality.

The study on factors affecting red meat demand was not done in the study areas. So, this study is conducted to investigate factors affecting red meat demand in urban and peri-urban areas of Ejere and Dendi districts and availing relevant information to narrow the information gap on the topic.

Objectives of the Study

The general objective of this study is to analyze factors affecting red meat demand in the study areas. The specific objective is:

1. To analyze determinants of red meat demand in the study areas.

2. To assess socio-economic and demographic characteristics and households red meat consumption status in the study areas
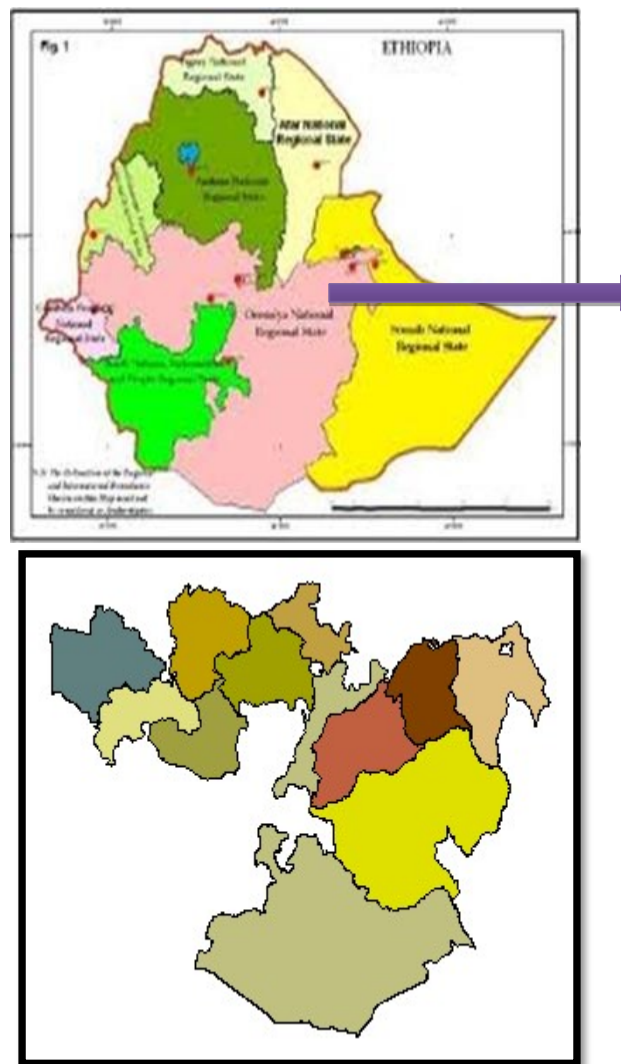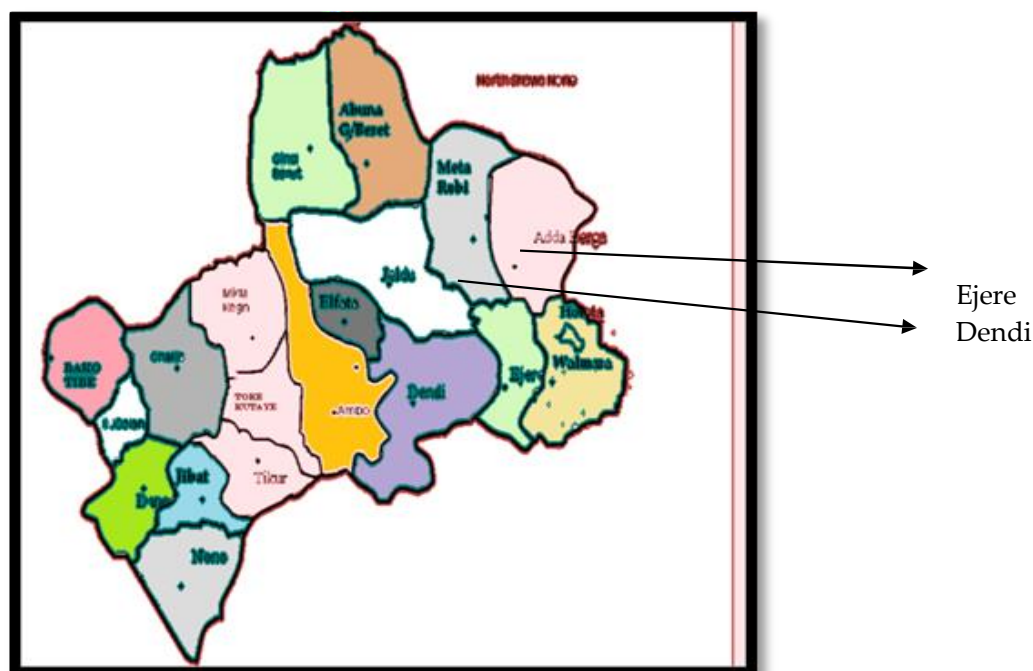
2. RESEARCH METHODOLOGY

Description of the Study Areas

This study was conducted in two districts, namely Dendi and Ejere Districts of West Shewa Zone, Oromia National Regional State, in central Ethiopia. Description of each district was given below.

Dendi district is one of the districts in the West Shewa Zone, Oromia National Regional State, in central Ethiopia. Dendi district is bordered on the south by the South west Shewa Zone, on the west by Ambo, on the north by Jeldu and on the east by Ejere. The district is located between the two main towns; Ambo and Ejere. The administrative center of this district is Ginchi. The central statistical agency (CSA) 2007, reported that total populations for this district were 165,803, of whom 83,988 were men and 81,815 were women; 25,322 or 15.27% of its population were urban dwellers. The majority of the inhabitants said they practiced Ethiopian Orthodox Christianity, with 84.98% of the population reporting they observed this belief, while 8.47% of the population practiced traditional beliefs, and 5.11% were Protestant. Dendi has an estimated population density of 165.2 people per square kilometer, which is greater than the Zone average of 152.8. The area is located 90km west of Addis Ababa at an altitude ranging from 2140-2800m above sea level, with mean annual rainfall of 1140mm and average daily temperature of 16.3°C. The economy of the district is dominated by traditional crop farming mixed with livestock husbandry. The major livestock produced in the district include cattle, sheep, goat, etc. (DWoHLDE, 2014)

Ejere district: Ejere is one of the districts found in West Shoa Zone of Oromia National Regional State, in central Ethiopia. Ejere district is bordered on the east by Walmera district, on the west by Dendi, on the north by Ada Barga and Meta Robi and on the south by Ilu district. The district is located in the 43km west of Addis Ababa. Climate of the district: average annual temperature 26-27^{0}c, average annual rain fall 910-1200mm, elevation 2400m above sea level and 45% dega and 55% woina-dega. The district is located between the two main towns; Ginchi and Holeta. Based on figures from the Central Statistical Agency in 2005, this district has an estimated total population of 13,423 of whom 6,420 were males and 7,003 were females. The dominant livestock produced in the district were Cattle (91,770), sheep (44,756), goat (9,127), etc. (EWoHLDE, 2014).

Ethiopia Oromia National Regional State

West Shewa Zone; Dendi and Ejere Districts

Figure 1: Map of the study areas

Sources of Data and Methods of Data Collection

Both primary and secondary sources of data were used for the study. Various publications and reviews (from internet), material studies, data from the National Statistics Agency, Ministry of Agriculture, district offices and other relevant sources were used as secondary sources. Interviews, site visits and visual observation and information obtained from different government and non-governmental organizations were used as primary sources. Both qualitative and quantitative data were collected for the study. The qualitative data were collected using Participatory rural appraisal (PRA) tools such as: key informant interview, site visit and personal observations and quantitative data were collected using semi-structured questionnaires.

Sampling Techniques and Sample Size

Dendi and Ejere districts were selected purposively based on the existing smallholder livestock production practices, fattening activity and marketing of livestock. With the consultation of districts agricultural experts, four kebeles from each district (two from urban and two from peri-urban) namely 01, 02, Chiri and Kimoye from Ejere and 01, 02, Dano Ejersa Gibe and Garre Arera from Dendi district were selected purposively based on the potential of livestock production and fattening functions. A simple random sampling technique was used to select the required respondents. All sample units was personally contacted and interviewed in the study areas. The sample Size for collecting quantitative data

for the study was determined by using (Yamane, 1967) formula. The following formula was used to calculate sample size (n) for households.

$$n = \frac{N}{1+N\,(e)^2}$$

Where,

n =designates the sample size the research uses; N

=designates total number of households;

e = designates maximum variability or margin of error 8%; 1 =

designates the probability of the event occurring.

Table 1: Sample size of the study areas

Name of selected districts	Name of selected kebeles	Number of households	Sample size
Dendi	01	1302	23
	02	1540	27
	Dano Ejersa Gibe	655	12
	Garre Arera	579	10
Ejere	Chiri	1054	19
	Kimoye	876	17
	01	1229	22
	02	1406	25
Total	**8**	**8641**	**155**

Methods of Data Analysis

Descriptive and inferential statistics and econometric model were used for analyzing the data collected from respondents of the study areas.

Descriptive statistics

Data analysis employed descriptive statistics such as mean and percentage and inferential statistics such as t-test and chi2-test by using STATA software. Mean and t-test were used in continuous variables while percentage and chi2-test were used in categorical variables.

Econometric model

This method was used in the analysis of determinants of red meat demand in the study areas. Red meat demand has been affected by many factors, such as the annual population grow, the changes in population structure, consumer choice, product quality, price, consumer education, hygienic meat characteristics, religious beliefs and health issues except other economic reasons (Icoz, 2004). There have been many marketing researches, examined the factors affecting the demand of meat and meat products on consumers in the world. These researches used a large number of modeling methods for consumption structures of consumers (Bellemare and Barret, 2006). The censored regression analysis for cross-sectional data was deemed appropriate when zero demand of meat was present. The zero demand in micro economic analysis of household survey are common due in large part to either persistent corner solution in which income and

prices are such that no affordable quantity are purchased or to a lesser extent measurement error: people do not want to reveal their red meat consumption patterns. The later issue is perhaps even people consume positive amount of meat but the consumption is really insignificant (e.g., small amount) and thus people are shamed to reveal that true value and report zero amount. The zero consumption in microeconomic meat demand analysis of households calls for censored regression models. Tobit model is well known in this area in which zero demand is result of strict corner solutions: economic barriers are such that make it impossible to purchase the positive amount of meat (Deaton and Irish, 1984).

When cross-sectional data are used for the red meat demand analyzes, a small number of zero purchases can be reported during the survey periods. For this kind of data, an ordinary least squares estimation that is either based on all or only the positive responses, it generates biased parameter estimates (Amemiya, 1984). In addition, excluding the null responses also causes efficiency losses. Therefore, a model that takes into account the censored nature of the data must be specified. The Tobit model was widely used, but this was only appropriate if the zero observation was a corner solution (it assumes that all households potentially consume the product).

Generally, there are three reasons for zero consumption: 1) the survey period is too short to allow consumers to report the purchase of the product (infrequency of purchase), 2) Consumers are not willing to buy the product (abstention) and 3) Consumers do not purchase the product at current prices and income levels (corner solution). In this study, Tobit model was more appropriate since some consumers do not purchase red meat due to high price of the product and low income level of households. Censored regression models generally apply when the variable to be explained is partly continuous but has positive probability mass at one or more points (Wooldridge, 2002). For corner solution outcome, the standard censored Tobit model was more appropriate than OLS estimates.

The model assumes that the decision to consume a good is the same as the decision about the level of quantity demanded. Thus the variables and parameter estimates that determine the probability of observing a positive consumption of a good also determine the quantity of the good demanded in the same fashion (Yen and Su, 1995). So, in this study, determinants of red meat demand of household respondents living in the study areas were analyzed using Tobit model in STATA 12 software.

In econometric analysis, the main question is which factors determine the demand of red meat? For this aim, in this study, red meat demand is analyzed taking into consideration consumers' socio-economic and demographic factors, red meat quality and safety attributes and seasonal factors. The following model was developed to predict determinants of red meat demand in the study areas. The censored regression model (Tobit) was given by the following formula.

$$y_i^* = x_i\beta + \varepsilon_i$$

$$y_i = \begin{cases} 0 & if \quad y_i^* \leq 0 \\ y_i^* & if \ 1 < y_i^* < 0 \\ 1 & if \quad y_i^* \geq 1 \end{cases} \qquad i = 1, 2, 3, \dots, N$$

Where:

N = the number of observations,

y_i^* = an unobserved ("latent") variable, x_i = a

vector of explanatory variables, β = is a vector

of unknown coefficients. ε_i = error term

0 is the lower limit and 1 is the upper limit of the dependent variable.

In the study, it is important to check multicollinearity problem before running the model. Multicollinearity problem arises due to a linear relationship among explanatory variables; and becomes difficult to identify the separate effect of independent variables on the dependent variable because there exist strong relationship among them (Gujarati, 2003). Variance inflation factors (VIF) technique was employed to detect multicollinearity in explanatory variables. According to Gujarati (2003), VIF (Xj) can be defined as:

VIF (Xj) = $\dfrac{1}{1-Rj2}$

Where, Rj is the multiple correlation coefficients between Xj and other explanatory variables. If the value of variance inflation factor (VIF) is ten and above the variables are said to be collinear.

Variables Used in Red Meat Demand Analysis and Hypothesis

Most food consumption analysis of cross-sectional data derives from traditional consumer demand theory, where demand is a function of own price, the price of substitutes and complements, income and household size. This traditional specification is then commonly augmented with socio-economic variables as proxies for household and taste characteristics.

The inclusion of both quantities consumed and expenditures can then be used to derive commodity price information. The use of socio-economic variables, to augment the more traditional money income specification of household food expenditure functions from cross section data has been increasingly accepted.

The literatures on demand for meat have different forms in terms of the variables included in the model. The oldest literatures on the demand for meat treat the quantity demanded as a function of price of the meat under interest, price of related commodities and income. Later researchers tried to incorporate socio-economic and demographic factors as variables besides price, price of related goods and income. The more recent ones are giving due emphasis to quality and safety attributes besides issues discussed above (Henson and Traill, 1993).So, the quantity demanded of red meat product was determined by socio-economic, demographic factors and quality and safety attributes. Therefore, in this study, variables used in red meat demand determination were listed and discussed as follows:

Y = f (age, Sex, marital status, Religion, Education, household size, income, expenditure, Price,

Fat content, freshness, hygiene, official stamp, festival, fasting…)

Dependent variable

Quantity demanded (quatydmd): refers to the amount that consumers are willing and able to purchase at a given price over a given period (during the survey period). It is continuous variable in nature used in the Tobit model equation. It is measured in kilogram and represents the actual quantity demanded by household consumers in the survey period in the study areas.

Independent variables

Age of respondents (Age): It is a continuous variable and measured in years. Aged respondents are believed to be purchase more red meat product while young respondents have less purchase. So, aged respondents are expected to have positive effect on red meat quantity demanded. The quantity demanded of the red meat product increases as the household head age advances, suggesting that the older the head of the household, the increase in the red meat consumption (Samuel, 2007).

Sex of household heads (Sex): A dummy variable taking zero if male and one if female for variable to be considered. It is expected that male household heads purchase more red meat than female headed

households and it is believed that male household heads have positive effect on red meat demanded.

Marital status of the respondents (mrst): It is categorical variable defined as one for married, two for unmarried and three for divorce. Married household respondents are expected to be affecting the red meat demanded positively. Married meal planners are more organized and hence will purchase meat on a schedule basis (like once a week) (Samuel, 2007).

Education level of household head (ednlev): It is categorical variable defined as one for illiterate, two for primary school, three for secondary school, four for preparatory, five for certificate, six for diploma and seven for degree and above. It is believed that as education The inclusion of both quantities consumed and expenditures can then be used to derive commodity price information. The use of socio-economic variables, to augment the more traditional money income specification of household food expenditure functions from cross section data has been increasingly accepted.

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Education level of household head (ednlev): It is categorical variable defined as one for illiterate, two for primary school, three for secondary school, four for preparatory, five for certificate, six for diploma and seven for degree and above. It is believed that as education unclean. It is expected that people give value to the cleanness of the red meat while they purchase the product from different sources. This indicates that the hygienic of the product tend to positively affect the demand of red meat product.

Official stamp (stamp): A certification from the local abattoir on the meat indicating it is free from health problems or threat, which is made before and after slaughtering the animal. It is dummy variable and

defined as one for present (guaranteed) otherwise two for absent (not guaranteed). It is believed that people give more preference for red meat with presence of official stamp from abattoir, which was an indication that they were concerned about the safety of the product they purchase from butcher. In general, the abattoir stamp is regarded as a form of safety assurance to consumers that the meat is inspected and found to be disease- free and thus safe for consumption. So, presence of official stamp tends to positively affect the red meat demanded.

Festival: Consumption of red meat during festival seasons of the year. Festival is dummy variable and defined as one for low and two for high consumption. The assumption is that during festival seasons, households mostly consume meat products rather than other food commodities. Festival seasons are expected to positively affect the quantity demanded of red meat product per year.

Fasting: Consumption of red meat during fasting season. It is dummy variable and defined as zero for not consume and one for consume. The hypothesis is that orthodox Christians did not consume red meat during fasting seasons. This tends to that fasting seasons negatively affect the annual quantity demanded of red meat by household consumers.

Table 2. Summary of variables, nature of variables and their descriptions

Variables	Nature of variables	Description of variables
Quantity demanded	Continuous	The amount that consumers are willing and able to purchase at a given price over a given period.
Age	Continuous	Age of respondents in numbers.
Sex	Dummy	Sex of the household head. Defined as male = 0 and female = 1
Marital Status (mrst)	Categorical	Marital status of the respondent. Defined as 1. Married 2. Unmarried 3. Divorce
Education level (ednlev)	Categorical	Education level of household head. Defined as 1. Illiterate 2. Primary school 3.Secondaryschool 4. Preparatory 5.Certificate 6. Diploma 7. Degree 8.Above
Household size (fmsiz)	Continuous	Household size of the respondent in numbers.
Religion (relign)	Categorical	Religion of household head. Defined as 1. Protestant 2. Wakefata 3. Muslim 4. Orthodox
Income	Continuous	The monthly total household income in Birr
Expenditure (expdre)	Continuous	The monthly total household red meat expenditure in Birr
Price	Continuous	Proposed price of red meat per kg for the specified profile.
Fat content (fatct)	Dummy	The fat contained in the red meat. It is defined as 1.Low 2. high

Freshness (freshs):	Dummy	The state of length of stay of the meat after slaughtered. It is defined as non-fresh = 0 and fresh = 1
Hygiene	Dummy	The cleanness of the butcher shop or other sales outlet formeat and meat sellers' neatness or cleanliness. It is defined as clean and unclean. clean = 0 and unclean =1
Stamp	Dummy	A certification from the abattoir on the meat indicating it is free from health problems or threat, which is made before and after slaughtering the animal. It is defined as absent=0 and present=1
Festival	Dummy	Consumption of red meat during festival seasons of the year. Defined as 0 = low and high = 1
Fasting	Dummy	Consumption of red meat on fasting season of the year. Defined as 0 = not consume and consume = 1

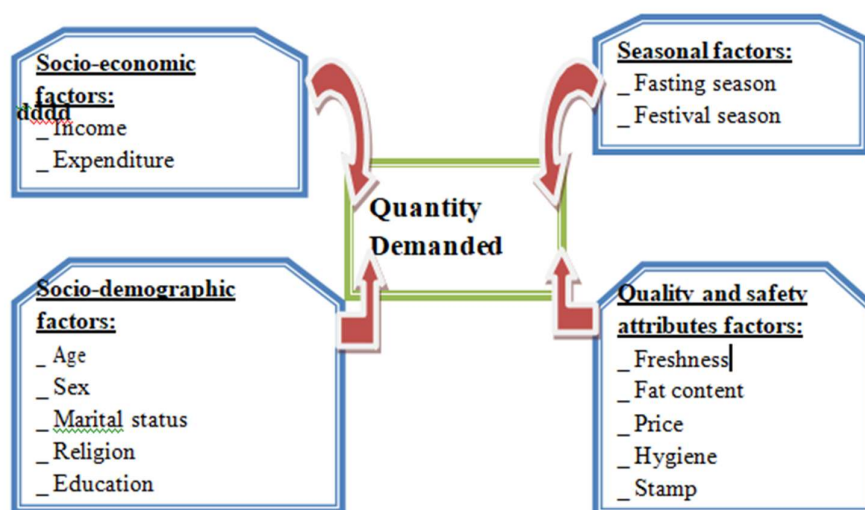The conceptual framework of determinants of red meat demand is summarized as follows:

Figure 2. Conceptual framework of factors affecting red meat demand

3. RESULTS AND DISCUSSIONS

This chapter presents the major findings of the study. It has two main sections. The first section deals with descriptive statistics of the sample households. The second section present results of econometric analysis which contains the determinants of red meat demand by using Tobit model in STATA software.

Socio-Economic and Demographic Characteristics of the Household Respondents

Socio-economic and demographic characteristics of the household respondents are given in (Table 3 & 4). Table 3 showed that the total average of household size for the sample was 4.52.The average household size

of the respondents in Ejere and Dendi districts was 4.19 and 4.90, respectively. Household size showed significance variation at less than 5% significance level in the two districts. According to Belay *et al.* (2012), the average family size was 5.6 in Dendi district. This is because the present study has focused only on the urban and peri-urban areas which have less family size as compare to rural areas. The total average age of the respondent was 37.51 years. The average age of respondents in Ejere district was 36.70 years and 38.44 in Dendi district. Age of the respondents in the two districts has no significance difference. The average monthly household income in Ejere and Dendi districts was ETB 2000.05 and 3142.64, respectively and the total average monthly household income in the two districts was ETB 2530.80. Average monthly household income in the two districts has significance difference at less than 1% significance level. The combined average monthly household expenditure on red meat product of the two districts was ETB 136.64 and there is no significance difference between the two districts. The average price of red meat per kg in Ejere and Dendi districts was ETB 130.12 and 124.86, respectively. Average price of red meat per kg in both districts was ETB 127.68 and has significance difference at less than 1% significance level (Table 3). According to SPS-LMM (2009), the retail price of beef in Addis Ababa and its surroundings ranged from ETB 47 to 64 per kilogram. This shows that the price of red meat per kg is highly increasing.

Table 3. Socio-economic and demographic characteristics of household respondents (continuous variables)

Variables	Average in the two districts			
	Ejere	Dendi	Total	t-test
Age of respondents in years	36.70	38.44	37.51	-1.11
Household size in numbers	4.19	4.90	4.52	-2.04**
Monthly total household income in birr	2000.05	3142.64	2530.80	-3.90***
Monthly total household expenditure on red meat inbirr	136.48	136.82	136.64	-0.02
Price of red meat per kg in birr	130.12	124.86	127.68	3.34***
Annual quantity demanded per household in kg	12.96	14.71	13.77	-1.02
Annual per-capita quantity demanded in kg	2.76	2.73	2.75	0.15

*** = significant at p ≤1% level, ** = significant at p ≤5% level Source: field survey, 2015

Average annual quantity of red meat demanded by the sample households was 12.96kg in Ejere and 14.71kg in Dendi district. In both districts it was 13.77 kg and there was no significance difference between the two districts. Taking the whole year including the fasting periods, the average annual per capita red meat demanded at home was 2.75 kg in both districts and there is no significance difference between the two districts. From here it was easy to understand that per capita red meat consumption per year in the study areas was very small as compared to the low income countries standard. This is because the present study has focused only on red meat consumption at home. According to Negasa *et al.*, (2008), Ethiopia's domestic meat consumption for 2006-07 has been estimated at 2.4 kg per capita per year for beef, 0.7 kg per capita per year for sheep meat and 0.4 kg per capita per year for goat meat. Ethiopians remained slightly below the

meat intake of all low-income countries consuming 9 kg per capita annually (FAOSTAT, 2004). This was also quite surprising as Ethiopia is one of the countries in Africa with largest number of livestock population. According to FAOSTAT (2004), Developing countries struggled to maintain a diet with only 25kg of meat per capita annually, while the United States had an average meat intake of over 120kg per capita annually.

Table 4. Socio – demographic characteristics of household respondents (categorical variables)

Variables	Categories	Percent of respondents			
		Ejere	Dendi	Total	Chi2-test
Sex of respondents	Male	81.93	80.56	81.29	
	Female	18.07	19.44	18.71	0.05
Marital status of the respondents	Married	72.29	81.94	76.77	
	Unmarried	22.89	16.67	20.00	2.62
	Divorce	4.82	1.39	3.23	
Education level of household head	Illiterate	15.66	6.94	11.61	
	Primary school	30.12	38.89	34.19	
	Secondary school	24.10	16.67	20.65	
	Preparatory	4.82	6.94	5.81	5.68
	Certificate	4.82	6.94	5.81	
	Diploma	9.64	8.33	9.03	
	Degree and above	10.84	15.28	12.90	
Religion of respondents	Protestant	22.89	30.56	26.45	
	Wakefata	0.00	6.94	3.23	10.61**
	Muslim	0.00	2.78	1.29	
	Orthodox	77.11	59.72	69.03	

** = significant at p≤ 5% level

Source: field survey, 2015

Table 4 showed that about 81.29% of the respondents in the two districts were males while the remaining (18.71%) were females. From this 81.93% were male headed households and only 18.07% were female headed in Ejere district and 80.56% were male headed households and 19.44% were female headed in Dendi district. Sex of household head has no significance difference between the two districts. The same table showed that 76.77% of the respondents were married, 20% were unmarried and 3.23% of them were divorce and there was no significance difference between the two districts. About 77.11% of the respondents in Ejere district and 59.72% in Dendi district were followers of Orthodox Christianity. Religion of respondents has significance difference at less than 5% significance level in the two districts (Table 4). According to Samuel (2007), almost 68% of the respondents were followers of Orthodox Christianity while the remaining 32% were Muslims, Protestants and others in Addis Ababa city.

Households red meat consumption status

Red meat consumers are domestic consumers in the study areas who buy either processed meat from butchers or who, as a group, buy animal to slaughter and then share the meat. There are also consumers that buy small ruminants and slaughter at home for consumption. Consumers may consume red meat at household (home) or away home. The study focuses on red meat consumption at home only.

Sources of red meat produce for consumption: In the study areas, majority (51.81%) of sample households purchases red meat from butchers as shown in (Table 5). But, on the sources of red meat there is significance difference between the two districts at less than 5% significance level. The sources of red meat from butchers in Ejere and Dendi districts were 66.67% and 38.64%, respectively (Table 5).According to Onurlubaş (2011), it was reported that the butchers were the first preference of the consumers to purchase red meat (51.1percent) in Turkey country. The consumers preferred the butcher to purchase red meat for the following reasons: freshness, hygiene, safety, easy to access and fast. According to Tosun *et al.* (2009), the families considered mostly the freshness and hygienic conditions when purchasing red meat.

Table 5. Sources of red meat produce for consumption by sample households

Percent of respondents				
Sources	Dendi district	Ejere district	Total	Chi2-test
Home production	20.45	17.95	19.28	
Shared slaughter/kircha	34.09	15.38	25.30	8.72**
Butcher	38.64	66.67	51.81	
Others	6.82	0.00	3.61	

** = significance at $p \leq 5\%$ level Source: field survey, 2015

Type of red meat for consumption: Red meat consumption is composed of beef, mutton and chevon. Beef ranks first (62.65%); followed by sheep (25.30%) and goat meat (12.05%) in the red meat consumption by type of animals in the study areas and no significance variation on type of red meat for consumption between the two districts (Table 6). According to Atay *et al.* (2004), beef (80 percent) was the first preference of the families for red meat.

Abbey (2004), reported that 51% beef, 19% sheep, 14% goat and 15% poultry contributed to a meat diet composition in Ethiopia.

Table 6. Type of red meat produce for consumption by sample households

	Percent of respondents			
Type	Dendi district	Ejere district	Total	Chi2-test
Beef	59.09	66.67	62.65	
Mutton	27.27	23.08	25.30	0.53
Chevon	13.64	10.26	12.05	

Source: field survey, 2015

Frequency of purchasing red meat: Regarding frequency of purchasing red meat by sample households, majority (42.17%) of the respondents reported that they purchase red meat once a month while about

32.53% of them purchase 3 to 4 times a year. There is no significant variation in both districts on frequency of purchasing the product by sample households (Table 7).Samuel (2007), reported that majority (37%) of respondents purchase beef once weekly at Addis Ababa city. This variation could be attributed to the lower income of the sample households in the current study areas than sample households in Addis Ababa city.

Table 7. Frequency of purchasing red meat by household respondents in the study areas

	Percent of respondents					
Districts	At least once a week	2-3 times a month	About once a month	3-4 times a year	Once a year	Never
Dendi	4.55	6.82	50.00	29.55	4.55	4.55
Ejere	2.56	20.51	33.33	35.90	5.13	2.56
Total	3.61	13.25	42.17	32.53	4.82	3.61
Chi2-test		5.01				

Source: field survey, 2015

Reasons for high or low frequent purchase of the product: Frequency of purchasing red meat may be affected by different factors. Many reasons are identified in the analysis that influences the high frequent purchase/high demand or low frequent purchase/low demand of red meat by sample households. Reasons for high frequent purchase/high demand of red meat by sample households per year were mostly higher income (31.33%), festival (24.10%), lower price (14.46%) and high nutritive value (12.05%). Reasons for low frequent purchase/low demand on the other hand were lower household income (34.94%), high price of the product (30.12%) and fasting seasons (27.71%) and no significance difference between the two districts on reasons for low or high frequent purchase of the product (Table 8). From this we can easily understand that the higher the household income the more demand for red meat produce than lower household income in both districts. This indicates meat demand is believed to increase with increasing family income. Meat consumption is often an indicator of economic status of a country or an individual. People with a higher social or economic status demand a greater amount of high-quality meat products. The per capita consumption of meat in developed/industrialized countries is much higher than in developing countries (FAOSTAT, 2004).According to Samuel (2007), reasons for high meat consumption are festival (89.7%) and cold season (7.7%) and reasons for low consumption on the other hand are fasting (89%), decrease in household size (5.3%) and product unavailability (3.7%).

Table 8.Reasons for high or low frequent purchase of red meat by sample households.

	Categories	Percent of respondents in the two districts			
		Dendi	Ejere	Total	Chi2-test
Reasons for high frequent purchase/high demand	Higher income	36.36	25.64	31.33	
	Availability	4.55	2.56	3.61	
	Lower price	18.18	10.26	14.46	
	High nutritive value	6.82	17.95	12.05	5.84
	Festival	18.18	30.77	24.10	
	High household size	6.82	7.69	7.23	
	High quality and safety attributes	4.55	2.56	3.61	
	Proximity to source point	4.55	2.56	3.61	
Reasons for low frequent purchase/low demand of red meat	Fasting seasons	31.82	23.08	27.71	
	High price	27.27	33.33	30.12	
	Low quality and safety attributes	6.82	2.56	4.82	1.87
	Low household income	31.82	38.46	34.94	
	Decrease in household size	2.27	2.56	2.41	

Source: field survey, 2015

Econometric Model Results

Determinants of red meat demand in the study areas

The study showed that determinants of red meat demand in the study areas were consumers' socio-economic and demographic factors, seasonality and red meat quality and safety attributes. Determinants of red meat demand of sample households living in the study areas are analyzed using Tobit model in STATA 12 software. For the parameter estimates to be efficient and unbiased, multicolliniarity detection test is performed using appropriate test statistics. There was no multicollinearity problem since VIF results were less than 10. The Tobit regression is estimated in STATA 12 software. (Table 9) presents the Tobit regression marginal effect parameters. The dependent variable was the red meat demanded by household in kg per year. The model had a log likelihood of -289.556 and is done for 155 observations of which 9 were left-censored at share of annual household expenditure on red meat equal to zero for households that did not purchase the product due to corner solution and 146 were uncensored. The value of coefficient of determination (R^2) was 97.70%. This R^2 value indicates that the independent variables were responsible for 97.70% contribution on the dependent variable. This implies that the independent variables are good explanatory variables or explain the variation in the dependent variable for sample households.

Table 9. Tobit regression results

Variables	Coefficients	Marginal effects (dy/dx)	Std. errors	P. values
Age (numbers)	0.028	0.028	.02493	0.260
Sex (male = 0)	0.138	0.138	.36984	0.708
Marital status (single = 2)	-0.075	-0.075	.36397	0.837
Education level (schooling years)	0.101	0.101	.10971	0.359
Household size (numbers)	0.418	0.418**	.17257	0.015**
Religion (non-orthodox)	0.447	0.447*	.24267	0.066*
Income (birr)	0.001	0.001***	.00017	0.000***
Expenditure (birr)	0.048	0.048***	.00365	0.000***
Price (birr)	-0.064	-0.064**	.03147	0.041**
Fat content (high = 2)	-0.726	-0.726*	.46228	0.086*
Freshness (fresh = 2)	1.806	1.806**	.78758	0.022**
Hygiene (hygienic/clean = 2)	1.558	1.558*	.88278	0.078*
Official stamp (presence = 1)	0.678	0.678	.77435	0.381
Festival (high consumption = 2)	3.219	3.219***	.63817	0.000***
Fasting (not consume = 0)	-1.026	-1.026*	.68171	0.092*
Log likelihood	-289.556			
No. of observations	155			
Prob> chi2	0.000			
R-Squared	0.977			
No. of left-censored observations	9			
No. of uncensored observation	146			

Notes: Dependent variable is the red meat demanded by household in kg per year; *** = significant at $p \le$ 1%, ** = significant at $p \le$ 5% and * = significant at $p \le$ 10% level.

Source: own survey regression results, 2015

From the Tobit regression results in the (Table 9), it can be said that average annual red meat demanded by sample households is explained by age of respondents, sex of household head, marital status of respondent, education level of household head, household size, religion of household head, monthly household income, monthly household expenditure on the product, price of the product, fat content of the product, freshness of the product, hygiene of the premises, official stamp, festival and fasting seasons. More than half (66.67%) of these variables were statistically significant at different significance levels and others (33.33%) were statistically insignificant. Based on the results (Table 9), each of the significant

variables is discussed as follows.

Household size (hhsiz):-The marginal effect (0.418) for household size showed that an increase in household size by one person increases the probability of quantity demanded of the product by 0.418kg times and it was statistically significant at less than5%significance level. The size of household was one of the important determinants of red meat demand. The effect of an additional person in the family increases the likelihood of purchasing more red meat. From this it was easy to understand that as household size increases the quantity demanded of the product by the sample households is increased. Household size had a significant effect on the consumption pattern of food items. As the family size increases,there is tendency for the household to consume more food and the percentage of food goingto each member of the family decreases (Adeniyi, 2012).

Religion of respondents (relign):- The marginal effect for respondents' religion (non- orthodox) was positive and statistically significant at less than 10% significance level. This means that non-orthodox followers of the respondents were 0.447kg times more likely to purchase red meat product per year than orthodox religion followers. For orthodox households, red meat eating months are non-fasting seasons and they do not consume red meat product during fasting seasons. This showed that religion of the respondents may affect the quantity demanded of the product per year. So, religion was the factor that generates seasonality in red meat demand in the study areas.

Monthly household income (income):- Household income was one of the main factors of determining the household consumption behavior. From the marginal effect (0.001) for monthly household income, it showed that one unit (1 birr) increases of monthly household income, the probability of quantity demanded of the product increases by 0.001kg times, holding other factors constant and it was statistically significant at less than 1% significance level. This variable is included in the model because high income families may consume highred meat product. Higher income households tend to demand more red meat than lower income households (Bahri *et al.*, 2007).

Monthly household expenditure (expdre):- Household expenditure on red meat product hada significant (positive) effect on the quantity demanded of the product. That means as the households' expenditure for the product increases, the proportion of the quantity demandedof the product increases. The marginal effect for monthly expenditure on red meat was 0.048kg and statistically significant at less than 1% significance level. This indicates that increasing the household expenditure on red meat by one unit (1 birr), increases the probability of quantity demanded of the product by0.048kg times, holding other factors constant. This was an agreement with an increase in food expenditures leading to a high consumption of that product (Bahri *et al.*, 2007).

Price of the product (price):- As the price of red meat increases, its quantity demanded by households significantly decreased, holding all other factors constant. Price is one of the important variables affecting demand of red meat. The marginal effect of this variable was negative (-0.064) and statistically significant at less than 5% significance level. This showed that for every one unit increase in price(1 birr/Kg) of the product, there would be decrease in the probability of quantity demanded of the product by 0.064kg times, holding other factors constant. The result indicates that household consumers were more sensitive to price and negative relationship between price and quantity demanded of the product, especially for lower household incomes. Most demand projections, however, are positive in light of income and population growth even if prices remain above international levels.

Fat content of the product (fatct):- The marginal effect associated with fat content was negative and statistically significant at less than 10% significance level. This means that presence of high fat content of the product negatively affect purchase decision of the respondents. Majority (80.64%)of household respondents choose beef with less fat content because those people are more worried about high medical expense of accumulated cholesterol through eating fatty beef. In the result, the negative marginal effect (-0.726) showed that for high fat content of the product the probability of purchasing the product reduced by 0.726kg times, holding other factors constant.

Freshness of the product (freshns):- The marginal effect for freshness of the product was positive and statistically significant at less than 5% significance level. This means that people prefer fresh beef as compared to the non-fresh one which in turn affect purchase decision. The positive marginal effect of freshness showed that for fresh product the probability of quantity demanded of the product increases by 1.806kg times, holding other factors constant. The market outlets widely visited to purchase beef were butcheries in local markets and those who bought from butcher shops usually prefer fresh beef. As many butcher shops did not have the means to preserve beef for long periods, their customers were mostly demanded that the product be fresh.

Hygiene: -The marginal effect for hygiene of the butcher shop and the butcher man himself was positive and significant at less than 10% significance level. The positive marginal effect of the hygiene shows that for the clean premises and butcher man the probability of quantity demanded of the product increases by 1.558kg times, holding other factors constant. This means that hygienic was one of the determinants of red meat demand and beef purchase decision was made by looking at the neatness of the butcher shop and the butcher man himself. Almost all of the household respondents (although the degree differs) give value to the neatness of the premise and the personnel while they purchase beef from butcher.

Festival: -The marginal effect for festival season was positive and statistically significant at less than 1% significance level. The positive marginal effect indicates that festival season increases the probability of annual quantity purchased of red meat by 3.219kg times, holding other factors constant. During festival seasons, households mostly consume meat products rather than other food commodities. According to Samuel (2007), one of the reasons for high meat consumption in Ethiopia is festival seasons.

Fasting:- The marginal effect for fasting seasons was negative and statistically significant at less than 10% significance level. The negative marginal effect showed that fasting seasons decreases the probability of annual quantity demanded of the product by 1.026kg times, holding other factors constant. In the study areas, majority (69.03%) of the respondents was orthodox Christians and they did not consume red meat during fasting seasons. During the study, the researcher observed that all butcher shops are closed and there were no meat food commodities from hotels during fasting season at Ginchi and Ejere urban. This condition made seasonality for red meat demand in the study areas. According to AGP-LMD (2013), Ethiopia's meat consumption per capita is low by regional standards. This is perhaps in part due to high domestic prices, but is also due to Orthodox Christians' (around 40 percent of the population) fasting. Fasting prevails for about 250 days per year, reducing aggregate domestic consumption by about 20-35 percent.

4. SUMMARY, CONCLUTIONS AND RECOMMENDATIONS

Summary and Conclusions

The study was aimed at analyzing determinants of red meat demand in urban and peri-urban areas of Dendi and Ejere districts in west Shewa zone, Oromia National Regional State. Both qualitative and quantitative data were collected for the study. The data were collected from both primary and secondary sources. The primary data for this study was collected by using semi-structured questionnaire, site visit and visual observation. The data analysis is made using descriptive and inferential statistics and Tobit regression model.

The Average household size for the sample in Ejere district was 4.19and 4.90 in Dendi district and household size has significance difference at less than 5% significance level in the two districts. The average age of the respondents was 37.51 years and there was no significance variation between the two districts. The total average monthly household income in the two districts was ETB 2530.80. The average monthly household income in Ejere district was ETB 2000.05 and 3142.64 in Dendi district and it has significance difference between the two districts at less than 1% significance level. The combined average monthly household expenditure on red meat product of the two districts was ETB 136.64 and there is no significance difference between the two districts. From the household respondents, 81.29% were male and the rest 18.71% were female headed households and there was no significance variation between the two districts. Majority (69.03%) of respondents was followers of orthodox Christianity in the study areas and has significance difference at less than 5% significance level in the two districts.

Majority of sample households purchase red meat from butcher and their average annual quantity demanded per sample households was 12.96kg in Ejere district and 14.71 in Dendi district. Red meat consumption composed of beef, mutton and chevon and beef ranks first. Results show that frequency of purchasing/demand of red meat affected by household income, price of the product, fasting seasons, festivals and household size.

The results of the study showed that there were many determinants of red meat demand by household respondents in the study areas. The result of the tobit regression model indicates that annual quantity demanded of red meat was significantly affected by household size, religion of the household head, household income, household expenditure on the product, price of the product, fat content of the product, freshness of the product, hygiene premise, cultural festivals and fasting seasons.

The overall conclusion from the results was that the quantity demanded of red meat product was affected by income, price, expenditure, household size, religion, freshness, fat content, hygiene, festival and fasting variables. Although the absence of official grades and standards; there exist a local informal attributes in the red meat demand which depends up on quality and safety attributes as perceived by consumers. The red meat demand in the study areas was seasonal and it goes down in major Orthodox Christianity fasting seasons and significantly high on cultural festivals.

Recommendations

The following recommendations are made based on the study results and conclusions:

- ✓ Majority of hotels and restaurants purchase small ruminants from different sources and slaughter at backyard without pre-examination and retail the product without post-examination which is risky for consumers. So, it is important to support, aware and force hotels and restaurants in providing quality and safety red meat products to consumers.
- ✓ Red meat transportation and handling from abattoir was unhygienic which is a major concern of the consumers. So, the concerned body should be taken to ensure that the product hygienic is maintained by the abattoir.

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