DAIRY MARKETING PATTERNS AND EFFICIENCY: A CASE STUDY OF AMIBARA DISTRICT OF AFAR NATIONAL REGIONAL STATE

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In partial fulfillment of the requirements for the degree of Master of Art in Rural Development.

BY

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DECLARATION

I hereby declare that the Dissertation entitled: **DAIRY MARKETING PATTERNS AND EFFICIENCY: A CASE STUDY OF AMIBARA DISTRICT OF AFAR NATIONAL REGIONAL STATE** submitted by me for the partial fulfillment of the M.A. in Rural Development to Indra Gandhi National Open University, (IGNOU) New Delhi is my original work and has not been submitted earlier either to IGNOU or to any other institution for the fulfillment of the requirement for any course of study. I also declare that no chapter of this manuscript in whole or in part is lifted and incorporated in this report from any earlier work done by me or others.

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CERTIFICATE

This is to certify that Miss Hirut Kassa Gebremedhin Student of M.A. (RD) from Indra Gandhi National Open University, New Delhi was working under my supervision and guidance of his / her project work for the course MRDP- 001. Her project work entitled **DAIRY MARKETING PATTERNS AND EFFICIENCY: A CASE STUDY OF AMIBARA DISTRICT OF AFAR NATIONAL REGIONAL STATE** which she is submitting is her genuine and original work.

Place:………………………   Signature:……………………………………….

Date:………………………..   Name:……………………………………….

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BIOGRAPHY

The author was born on November 6, 1980 G.C. in Dire Dawa and later moved to Somali region Jijiga at a teenage. She attended her elementary and secondary school at Jijiga primary and secondary school respectively and after completing secondary school joined Ambo college of Agriculture and graduated with diploma in general Agriculture on 10th of July 1989 G.C. and then she completed her BA degree on community development and leadership from Ethiopian Adventist college on August 6, 2009. Since her graduation from Ambo college of Agriculture she has been working in Afar regional state Farm Africa filed office by having different responsibilities. Beside her work at the field she attends her study on rural development at Indira Gandhi National Open University on correspondence base.

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ACRONYMS AND ABBREVIATIONS

AAPBMDA	Animal, Animal Products and by -Products Marketing Development Authority
AME	Adult Male Equivalent
ANRS	Afar national regional state.
EARO	Ethiopian Agricultural Research Organization
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
HH	Household
IFPRI	International Food Policy Research Institute
ILCA	International Livestock Centre for Africa
ILRI	International Livestock Research Institute
Kms	Kilometres
m.a.s.l	meters above sea level
MEDaC	Ministry of Economic Development and Cooperation
NGOs	Non-Governmental Organizations
NMM	Net marketing margin
OLS	Ordinary Least Squares
SPSS	Statistical Package for Social Sciences
TGMM	Total Gross Marketing Margin
TLU	Tropical Livestock Unit
VIF	Variance Inflation Factor

DAIRY MARKETING PATTERNS AND EFFICIENCY A CASE

STUDY OF AMIBARA DISTRICT OF AFAR NATIONAL REGIONAL STATE, ETHIOPIA

ABSTRACT

The study was initiated with the objectives of examining the dairy marketing patterns and efficiency. Data were collected from ANRS Amibara district two Kebeles from 61 selected HHs by using separate survey of dairy producing households and marketing middlemen. Maximum Likelihood Estimation procedure such as logit model was employed in identifying factors affecting decision to sell dairy products, Tobit model was used in investigating factors affecting decision on volume of dairy sales. Concentration ratios and marketing margin analysis were conducted in examining efficiency. Market participation decision is affected by household demographic and socioeconomic characteristics and transaction costs represented by distance to market and urban centers. Volume sale of dairy is affected by intellectual capital, transaction cost represented by distance to district capital and financial resources. unconcentrated suppliers characterize dairy market; market at the next level is also un concentrated for butter and cheese but concentrated for liquid milk. The results suggest that production and marketable surplus should be improved and adequate marketing infrastructure like roads and transport facilities should be established between rural and urban areas in the district to support enhanced market participation. With the aim of reducing transactions cost adequate marketing link should be established between the rural producer and urban consumer through institutional arrangements, such as dairy cooperatives. Relaxing the criteria required in obtaining bank and micro credit and forming a well-functioning urban and rural financial system would enable resource poor pastoral households to participate in dairy market and improve its supply.

CHAPTER ONE

INTRODUCTION

1.1 General Background

Ethiopia has one of the largest livestock inventories in Africa with a national herd estimated at 49.2 million cattle, 46.8 million sheep and goats, and 9 million pack animals. All livestock currently support and sustain livelihoods for 80% of all rural poor. Of the total population, 35 – 40 % of all livestock are located in the pastoral areas.(MoARD 2007) Female cattle constitute about 55.48% of the national herd.. Of the total female cattle population, dairy and milking cows total 16,941,361, 14.24% dairy1 cows and 20.12% milking2 cows (CSA 2008). Eighty-three percent of all milk produced in Ethiopia comes from cattle with the remainder coming from goats and camels. (MoARD 2007) Sheep's milk is not commonly collected or consumed in Ethiopia. The Central Statistics Agency (CSA, 2008) estimates 2.76 billion liters of cow milk produced by sedentary populations annually while camel milk is estimated at 16.2 million liters annually.

Agriculture is the mainstay of the country's economy, foreign exchange earnings and domestic consumption. Over eighty percent of the populations earn their livelihood from the agriculture sector. Ethiopia's pastoralist community of ten million people occupies 61 percent of the total land mass. The 29 nationalities and ethnic groups inhabit land with natural resources and a wealth of cultural and traditional heritage that remains largely untapped. Ethiopian pastoralists raise a large portion of the national herd, estimated at 42 percent of the cattle, 7 percent of the goats, 25 percent of the sheep, 20 percent of the equines and all of the camels. However, pastoralist communities are often unable to harness the immense resources of their land due to internal and external pressures related to land tenure and use. This is because the policies that relate to the use and access of pastoral land do not adequately promote pastoral rights. (Land Tenure, Administration and Use in Pastoral Areas of Ethiopia, Published 2010 by PFE, IIRR and DF)

Like in many developing countries, poverty, food insecurity and poor nutrition are persistent problems especially among the rural population predominantly dependent on low productive semi–subsistence farming. Population growth (World bank, 1989; Cleaver and Gotz, 1994), and declining agricultural productivity and inadequate market participation of producers (World Bank, 1991) are few of the factors underlie this trend.

Countries that are currently enjoying the highest standard of living are those that have a Well–developed animal agriculture as demand for animal products increases with economic development. In the Ethiopian context, despite the huge potential the country has to produce milk, there is a chronic shortage of the product in most part of the country. This arises mainly from insufficient production coupled with inhibitive cultural taboos related to consumption and absence of proper processing and marketing (Zegeye, 2003). Therefore, improving livestock productivity and their respective marketing activities may improve the sector's contribution to the GDP. Dairying is a means of providing an additional source of employment and income to small and marginal farmers. The smallholder farmers produce about 93% of dairy products (Tsehay, 1998). It is only small quantity of this production that is marketed in the form of liquid milk; the larger volume is processed into different dairy products for home consumption and sales. Large scale marketing and processing of milk is limited to the area around Addis Ababa, which is the Addis Ababa milk shed. It appears that butter dominates dairy marketing, and the transaction in the form of raw milk is limited around major urban centers. There are a few milk-processing plants in Ethiopia, one is owned and operated by the government (Dairy Development Enterprise) and others are private. The processed products of these plants are pasteurized fluid milk, table butter, and hard cheese, yoghurt and ayib (cottage cheese) (Zegeye, 2003). The low marketable output generates limitations to explore distant but rewarding markets due to high transaction costs arising from transportation and high opportunity cost of labor involved. Again dependable marketing system is not yet developed to market milk and milk products. Producers and consumers are spatially separated; most farmers around in the rural areas while consumers or profitable market is found in urban areas. Most of the milk supply is distributed from producer to consumer through informal means in both rural and urban areas. The informal market involves direct delivery of fresh milk by producers to consumers in the immediate neighborhoods. Market infrastructures and marketing facilities are not well developed in the country. This, in turn,

reduces incentives to participate in economic transactions and results in subsistence rather than market-oriented production systems. Therefore, improving the position of smallholders to actively engage in the market is one of the most important development challenges.

In Ethiopia, fresh milk sales by smallholder farmers are important only when they are close to formal milk marketing facilities, such as government enterprise or milk groups. Farmers far from such formal marketing outlets prefer to produce other dairy products instead, such as cooking butter and cottage cheese. The vast majority of milk produced outside urban centers in Ethiopia is processed into dairy products by the households, and sold to traders or other households in local markets (Debrah and Berhanu, 1991).

Most of the milk is produced in the rural areas, while the profitable market for it exists largely in the urban centers. The major portion of the milk comes from small dairy farmers with few milk animals located in the rural areas. What is produced on the animal farm has to reach the market, and the nearer the market the lesser would be the transportation charges and the lesser would be loss due to spoilage. Hence, milk being the most perishable commodity, requires an efficient marketing and market outlet. In this study, dairy marketing patterns and efficiency was examined for two communities in the Amibara district, zone 3 of Afar national Regional State, about 300 kms north east of Addis Ababa. The area and its environs have potential for both crop and livestock production which are mainly undertaken by smallholder semi subsistence farmers. There are also a growing number of commercial /investors/ farms in the area. Despite this potential and huge demand in the city and in the suburbs, current income generating capacity of dairy is not encouraging and share of final price going to the farmer is apparently small. The primary reasons, among others, seem to be low level of market participation by the smallholder farmers; the inefficient marketing that is characterized by high margins and inadequate marketing facilities. The price gap between the terminal and primary markets seems to be large. Under these conditions, farmers may have no incentives to improve the quality of their produce.

1.2 Statement of the Problem

The major constraint to increasing the welfare of smallholders is their inability to access markets. Enhancing the ability of poor smallholder pastoralist to reach markets and actively engage among themselves is one of the most pressing development challenges. Remoteness results in

reduced farm-gate prices, low returns to labor and capital, but require more input and transaction costs. This, in turn, reduces incentives to participate in economic transactions and results in subsistence rather than market-oriented production systems. Sparsely populated rural areas, and high transport costs are physical barriers to accessing markets; lack of negotiating skills, lack of collective organizations and lack of market information are other impediments to market access.

Various factors give rise to inefficiencies to a marketing system. These factors may originate in technical barriers including lack of market information, structural elements and government programmes and policies. Costs of marketing are usually high due to poorly developed physical and institutional facilities, absence of marketing services such as standardization, market information, financing arrangement, storage, transportation, processing, etc. This would otherwise result in high risk of marketing and high barriers to growth, and poorly motivated producers and inadequate marketing institutions. The primary reason, among others, seems to be the inefficient marketing that is characterized by inadequate marketing facilities and high margins. The price gap between the terminal and primary markets seems to be wider. Under these conditions, pastoralist may have no incentives to improve the quality of their produce through proper management practices (Jones, 1972). Production decisions are guided by subsistence orientation of farmers and there is limited marketable surplus. The market conditions are far from perfect and the information available to pastoralist is highly inadequate to generate any response to the market stimuli (Narain, 1965). If investment and improvements in the marketing system lag behind, then inadequate marketing arrangements become a serious constraint on the development of production and consumption. Uncertain and unrewarding farm product prices encourage the insinuation of low productivity subsistence farming. Poor pastoralist cannot afford to invest and specialize when faced with the possibility of prices below their cost of production. An efficient, integrated, and responsive market mechanism, that is, market with good performance is of crucial importance for optimum allocation of resources in agriculture and for stimulating farmers to increase output (Jones, 1972; FAO, 1999; Acharya and Agarwal, 1999). Without having convenient marketing conditions, the possible increment in output, rural incomes and foreign exchange resulting from the introduction of improved production technologies could not be effective. An improvement in marketing efficiency, thus,

attracts the attention of many countries and viewed as an important national development strategy.

The market planning process and policy preparation often take place with little or no consultation with people for whom the planned activities are intended. Many agricultural product markets have been monopolized and controlled by parastatal agencies, and because price had been set administratively rather than through market forces, the allocation of resources, therefore, had become highly inefficient (Scarborough and Kydd, 1992).

The population growth, urbanization and income growth that fuelled the increase in milk consumption during the last two decades are expected to continue in the future, creating a veritable livestock revolution. This revolution presents new and expanding market opportunities for smallholder livestock producers. Inappropriate policies and misallocation of investment resources could, however, skew the distribution of the benefits and opportunities away from those smallholders who could potentially gain the most from this revolution (Delgado et al., 1999).

Challenges and problems for dairying vary from one production system to another and/or from one location to another. The structure and performance of livestock and its products marketing both for domestic consumption and for export is generally perceived poor in Ethiopia. Underdevelopment and lack of market-oriented production, lack of adequate information on livestock resources, inadequate permanent trade routes and other facilities like feeds, water, holding grounds, lack or non-provision of transport, ineffectiveness and inadequate infrastructural and institutional set-ups, prevalence of diseases, illegal trade and inadequate market information (internal and external) are generally mentioned as some of the major reasons for the poor performance of this sector (Belachew 1998; Belachew and Jemberu 2003; Yacob as cited in Ayele et al. 2003).

1.3 Objectives of the Study
The study was undertaken with the following objectives: -
- To examine pattern of market participation of smallholder dairy farmers; and

- To examine dairy marketing costs and margins.

1.4 Hypotheses

On the basis of economic theories and empirical findings the following hypotheses were established;

- Infrastructures and socio-economic factors have no influence on the participation of smallholder dairy farmer; and
- There is no difference in dairy marketing margins between different types and sizes of farms and between farms located at different locations.

1.5. Significance of the Study

The results of this study would be useful for the government or policy makers, donors or NGOs, producers and marketing middlemen for their respective decisions. In the study it was tried to identify some important and policy relevant variables in market participation and decision on sales volume by smallholder pastoralist. The government or external donors can direct their effort towards influencing these variables at the desired level of proportion in such a way to improve market participation and volumes of dairy product supplied to market. This would contribute in addressing problem of poverty and subsequently fostering development in the country's strategy framework of Agricultural Development Led Industrialization. Market oriented pastoralist and investors interested to invest in the sub sector can use the document in their decision of resource allocation. Institutions and/or individuals who are interested to know socio-economic characteristics of the area especially dairy marketing in the district can use the document as a reference. Besides, it would be a useful reference for researchers and other personnel interested in the area of study. Therefore, it was hoped that, results from this study would have practical use mainly to this area and similar other areas and can serve as a base for any further studies to be conducted in other areas in this line of study.

1.6 Organization of the Study

Chapter one: introduction, Chapter 2 literature review on relevant topics on the study of dairy market, Chapter 3: description of study area, Chapter 4: explanation of research methodology employed in the study from questionnaire preparation to the analysis of data collected.

Chapter 5 : results and discussions, including data presentation on respondents' socio economic characteristics, the analysis of factors affecting variation in market participation, the analysis of factors affecting decisions on the volume of the most marketable dairy products, the analysis of the marketing channel or the course as the dairy products passes from producer to consumer, review of dairy market efficiency through concentration ratio and margin analysis, and Chapter 6 summary the findings of the study and policy recommendations.

CHAPTER TWO

LITERATURE REVIEW

Under the heading of literature review topics relevant to the area of study were examined. Some basic concepts were defined. Contribution of livestock in general and dairy in particular to the country's economy was briefly discussed. Butter marketing, market participation by smallholders and dairy cooperatives, efficiency of marketing system and structure-conduct-performance were reviewed.

2.1. Some Basic Concepts

Market: It may be defined as a particular group of people, an institution, and a mechanism for facilitating exchange. The market concept has also been linked to the degree of communication among buyers and sellers and the degree of substitutability among goods (John and Shahran, 1998).

Marketing: Is the performance of all business activities involved in the flow of goods and services from the point of initial production until they are in the hands of ultimate consumers.

Marketing system: Is a collection of channels, middlemen, and business activities, which facilitate the physical distribution and economic exchange of goods and services (Kohls and Uhl, 1985).

Marketing margin: Is the difference between the price received by producers and that paid by consumers or the price of the allocation of marketing services which is the outcome of the demand for and supply of such services (Tomek and Robinson, 1981).

Marketing channel: The marketing channel is a trade or distribution network and it is defined by Stern et al. (1996) as sets of interdependent organizations involved in the process of making the product or service available for consumption. The channel follows a vertical structure where products flow from producer to the ultimate consumer and in which actors meet at each market. Different marketers exist in channel arrangements to perform marketing functions that contribute to the product flow. Actors acting between producers and final users are known as intermediaries.

Transaction costs: Are the costs of arranging a contract ex ante and monitoring and enforcing it ex post (Matthews, 1986). More generally, they are the costs of running the economic system (Arrow, 1969) or figuratively, the economic equivalent of friction in physical systems (Williamson, 1985). They include the costs of searching for a partner with whom to exchange, screening potential trading partners to ascertain their trustworthiness, bargaining with potential trading partners (and officials) to reach an agreement, transferring the product, monitoring the agreement to see that its conditions are fulfilled and enforcing the exchange agreement (Holloway et al., 2002). Transaction cost measured in terms of opportunity cost of labour involved and cost of holding inventory during search for market information and trading partner (Gebremedhin, 2001). The structure of the market or industry: refers to the characteristics of the organization of the market that seem to exercise strategic influence on the nature of competition and pricing within the market. Scarborough and Kydd (1992) and Magrath (1992) evaluated this market or industry structure by examining trends in the number and sizes of firms relative to each other, and to number of customers and producers in particular time and place; the presence, absence, levels and nature of entry barriers; and the distribution of market information and its adequacy in sharpening price and quality comparisons and in reducing risk. The number of firms operating in a particular market or related markets can be indicative of the extent to which buying and selling power is concentrated amongst them. A few large firms can dominate a market and control prices. The concentration ratio, which measures the proportion of total sales in a market by a given firm, can be used to indicate the level of concentration of market share. Market conduct: refers to the behavior of firms – the strategy they use individually in competition with other firms in purchasing inputs and selling output, and in conjunction with other firms, which may take the form of informal cooperation or collusion. The principal dimensions of market conduct refers to price setting, the way in which the volume, quality, range of products, advertising and marketing strategy, research, development planning, implementation and legal tactics are determined.

Market performance: refers to the composite of end results which firms in the market arrive at by pursuing whatever lines of conduct they espouse (Bain and Qualls, 1987). For firms acting as sellers, these results measure the character of the firms' adjustments to the effective demands for

their outputs; for firms buying goods, they measure the quantity of adjustments made by firms to the supply conditions of the goods they purchase. Time series and cross section price data were used to throw light on performance of the marketing system.

2.2. Contribution of Livestock and Dairy in Ethiopia

The Ethiopian economy is highly dependent on agriculture, which in the 2004/05 fiscal year, contributed about 48% of the GDP, followed by 39% from the service sector, and 13% from the industrial sector. The agriculture sector provides employment for about 80% of the population (The Economic Intelligence Unit 2007). The livestock subsector plays a vital role as source of food, income, services and foreign exchange to the Ethiopian economy, and contributes to 12 and 33% of the total and agricultural GDP, respectively, and accounts for 12–15% of the total export earnings, second in order of importance (Ayele et al. 2003). According to FAOSTAT (2007), among the 20 major food and agricultural commodities ranked by value in 2005, whole fresh cow milk is ranked third. Milk production in the same year was estimated at 1.5 million tones which is equivalent to USD 398.9 million (FAOSTAT 2007).

Dairy production, among the sector of livestock production systems, is a critical issue in Ethiopia where livestock and its products are important sources of food and income, and dairying has not been fully exploited and promoted in the country. Despite its huge numbers, the livestock subsector in Ethiopia is low in production in general, and compared to its potential, the direct contribution it makes to the national economy is limited.

The Ministry of Finance and Economic Development (MOFED) estimated the gross value of ruminant livestock production in 2008/09 at Birr 32.64 billion. The estimate includes the values of: livestock off-take (Birr 9.653 billion), milk and milk products (Birr 19.471 billion) and other products, e.g. wool, dung and change in stock investory. Very recent recalculation of values by Behnke et al. estimated the contribution to the economy at Birr 48.07 billion, an increase of 47%. (This figure does not include the value of animal traction.) Milk and milk products contributes 63 percent to gross value of ruminant livestock production. The GOE has been underestimating the contribution of livestock and especially milk to the agriculture gross domestic product (AGDP) of the country.

The value of livestock meat, milk, hides and skins, eggs and wool, currently account for 28% of agricultural GDP, and contributes 12-16% of the total Gross Domestic Product of the Ethiopia(MEDaC 1998; AAPBMDA 1999). The sector also accounts for 12-15% of total export earnings, the second in order of importance (MEDaC 1998; FAO 1999).

Livestock's share of agricultural GDP increases to about 35% when the value of non– monetary transactions, such as animal traction, transport and manure are included and the sector also employs about one third of the country's rural population (EARO, 2000).

In Ethiopia, between 1974 and 1998, human population increased by 78% while cattle population increased by 31%, and small ruminant population decreased by 5.6%. Annual growth rate for human population was 2.5% while that for cattle and small ruminants was 1.1 and – 0.2%, respectively. During the same period meat, milk and skins and hides production have increased by 23.8%, 42.7% and 5.7%, respectively (FAO, 1999).

Share of urban population has continued to increase and this is expected to generate increased demand for dairy products. With increasing urbanization, increased demand for milk and other dairy products can only be met from the existing production through organized and formal marketing system and by further increasing production. According to Gashaw and Getachew (2001), per capita milk consumption from domestic source for the country for the year 2000 was 15.3 kg from cows alone and 19.0 kg when the other milk providing species are considered. Intensified dairying is the most regular generator of income for small-scale farmers. Dairy development has been shown to substantially raise milk production and household income in developing countries where development efforts are market-oriented and demand driven (Walshe et al., 1991). Evidence from Ethiopian highlands showed that estimated per capita food availability was 67.5% higher in households with crossbred cows than those with local cattle (Shapiro, 1994).

Some field studies showed that the policy relevant variables having the greatest impact on farmer participation in liquid milk markets are cow numbers, travel time to the milk group and visits by extension agent. The number of cows kept affects marketable surplus through both total production and the marginal costs of production. Increase total milk by the household decreases the marginal utility of milk consumption and, thus, should increase marketable surplus. In the

case where additional cow's lower marginal costs of production, this also increases marketable surplus because the household is assumed to equate marginal costs of production and milk price net of transaction costs

(Holloway et al., 2000).

2.3. Butter Marketing

Butter and some dairy products are called yellow fats, which contains a number of products for spreading onto bread or for indirect consumption as ingredients in other foods. There is some debate over product definition, and different systems of classification have distinguished products according to a variety of characteristics: the source of their raw material (dairy fat, animal fat, and vegetable fat); their total fat content; their polyunsaturated fat content; and whether they are hard or soft (Traill et al., 1994). The market for newer spreads continues to grow as a share of the market. Part of the shift away from butter may be attributed to concern about health and inconvenience. Many developed countries have established the intervention price of butter. When price intervention was common for butter produced in the European Union, the wholesale price of packed butter was close to the intervention floor and the retail price a few percentage points higher: as low as 5 percent according to the Milk Marketing Board (1987), which argued that butter was keenly priced by supermarkets in order to attract customers into stores. In Ethiopia, however, dairy policy does not favors the producer farmer, no subsidy and no support of price floor is given. Therefore, dairy prices reflect the cost of producing and distributing them.

2.4. Market Participation by Smallholders and Dairy Cooperatives

Field surveys have shown that many potential liquid milk-marketing households are hours distant away from any milk group. Setting up new groups would clearly reduce the travel time to group, and the actual number of households that would benefit depends on local population densities. It is also important to keep newly emerging milk groups small and geographically limited to ensure proximity and avoid large groups that would tend to increase average travel times (Holloway et al., 2000). Another study showed that the creation of new market outlet for fluid milk brought major improvements in the production, marketing and consumption behaviour of smallholder

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households. The new marketing outlet may also promote involvement in more intensive dairying (Nicholson etal., 2000). Co-operatives, by providing bulking and bargaining services, increase outlet market access and help farmers avoid the hazard of being encumbered with a perishable product with no rural demand (Jaffee, 1994). In short, participatory co-operatives are very helpful in overcoming access barriers to assets, information, services, and the markets within which small-holders wish to produce high-value items (Jaffee, 1994). Like contract farming, producer co-operatives can offer processors/marketers the advantage of an assured supply of the commodity at known intervals at a fixed price and a controlled quality (Delgado, 1999). They can also provide the option of making collateralized loans to farmers. The schemes also provides better relations with local communities than large scale farms, avoiding the expense and risk of investing in such enterprises, sharing production risk with the farmer, and helping ensure that farmers provide produce of a consistent quality (Delgado, 1999). Dairy development along the cooperative lines was considered to be the most effective strategy for helping the rural poor without altering the village social structure and providing guaranteed market for milk at fixed prices, supply of cattle feed at a reasonable cost and efficient veterinary and extension services (Bavikar, 1988).

2.5. Efficiency of Marketing System

The movement of goods from producers to consumers at the lowest possible cost, consistent with the provision of the services desired by the consumer, may be termed as efficient marketing (Raju and von Oppen, 1982). Marketing efficiency depends mainly on costs and profits of marketing enterprise and can be measured by operational and/or allocative efficiency. Operational efficiency aspect is related to the cost of marketing and the allocative efficiency aspect includes the profit of the marketing enterprises, which depends on the level of competition (Raju and von Oppen, 1982). Marketing margins are affected by a number of factors: distance to be covered, adequacy of transport, effectiveness with which the various activities are carried out and services that are provided (FAO, 1987). When production is more scattered, supply is confined to one major season, distance are much longer and the whole marketing infrastructure is less developed, the marketing margin is then likely to be high.

2.6. Structure-Conduct-Performance (S-C-P)

The Structure – Conduct – Performance approach was developed to analyse the market organization of the industrial sector and it was later applied to assess the agricultural marketing system (Scarborough and Kydd, 1992). This approach analyses the relationship between functionally similar firms and their market behavior as a group and is mainly based on the nature of various sets of market attributes, and relations between them (Scarborough and Kydd, 1992). The direction of causation goes from structure through conduct to performance (Claudius and Mueller, 1961). The Structure-Conduct-

Performance (S-C-P) approach has been used to analyze marketing efficiency in many countries, Lele (1967) in India, Jones (1972) in West Africa and Magrath (1992). The SCP model analyses productive efficiency of individual marketing enterprises (Andargachew, 1990; Admasu, 1998). Market structure refers to the number and relative size of distribution of buyers/sellers in the market. It is generally believed that higher market concentration implies a noncompetitive behavior and thus inefficiency. But, studies also warn against the interpretation of such relationships in isolation (Scott, 1995).

Concentration in an industry is a concern when market power hinders the efficient operation of markets. For instance, a dominant firm with market power can raise the prices it charges consumers without fear of being undercut by competitors. A firm with market power might also be able to drive down the prices it pays to suppliers, reducing suppliers' profits and distorting their incentives to produce. But, concentration may also have positive economic benefits, including economies of scale and other effects (Brennan et al., 1999). Therefore, concentration is only one of a number of factors to be considered in the assessment of competition in a market.

CHAPTER THREE

DESCRIPTION OF THE STUDY AREA

The Afar National Regional State (ANRS) is situated in the North Eastern part of Ethiopia covering an estimated area of about 85, 410 km2. The estimated total population of Afar is 1,411,092 out of which 56% are males and the rest 44% females. 87% of the population is considered rural inhabitants, whereas 13% are urban. In terms of ethnic composition, the Afar represents 90% of the region' population followed in descending order by, the Amhara, Argobba, Tigrayans, Oromo, Welayta, and Hadiya that together account for the rest 10% of the population. Afar is the predominantly (90.8%) spoken language in the region and is the working language of the state with Amharic (6.68%) as the second language (ANRS, 2005 and CSA,2008). The region is one of the least developed regions in the country having 56% of the inhabitants living below the line for absolute poverty. The service and infrastructure condition is far below satisfactory. Of the total population only 42.4 % of the male and 23.4 % of the female was literate in 2004 (Welfare Monitoring Survey, 2004). Livestock production is the base of livelihood for the majority of the Afar people.

In terms of land use patterns about 14.8% of the total land area of the region is covered by grass land; 31.5 % shrub land, 1.7% wood land and 0.11 % forest land. Whereas water bodies and wet land together account for 1.37% of the total land, the vast area of the region, 49.6%, is an exposed soil, sand or rock. 7% of the region's land is also estimated to be cultivable land. The region has a large number of perennial rivers that include Awash, Mille, Kesem Kebena, Awura, Gulina, Dewie, Borkena, Telalak, Mashugala and numerous seasonal rivers. While all the perennial rivers have a potential for irrigation, some of them like Awash, Dewe and Telalak are also suitable for hydro electric power generation (ANRS, 2005).

3.1 Characteristics of research area

The region is part of the East Africa Great Rift Valley (Mohr, 1971) and is characterized by patches of scattered dry forests, Acacia woodlands, bush land, wooded savannah and scrubland (MOA, 1997). About 64% of the region's land is degraded and bare due to the harsh semi-

desert climatic conditions (Shiferaw et al., 2004). The region has 1600 and 110 metres as the highest and lowest altitudes above sea level, respectively. Mean annual rainfall is 564 mm with annual evapo-transpiration ranging between 1400 and 2200 mm (MOA, 1997). The study areas were characterized as hot to warm moist with mean annual temperature 27^0C (Shiferaw et al., 2004). June is the hottest month with maximum temperature reaching 38^0C, while November is the coldest month with a minimum temperature of $15.^0$C. The relative humidity ranges between 38 and 58%. The rainfall in the study area has a bimodal distribution July-August (main rain) and February- April (second rain).

Transhumance pastoralism is the major production system in the study areas where cattle, camel, goats and sheep are dominant animals reared (Abule et al., 2005). Livestock were kept primarily for their products (milk, milk products and meat) and income (Abule et al., 2005). In a few pockets, pastoralists also grew crops with supplementary irrigation from permanent rivers. Some people also worked as daily laborers in the large state and private farms and sell charcoal to supplement their livelihood (Tibabu, 1997).

ANRS is one of the drought-prone areas of the country, which experience repeated rainfall failure (FEWS-NET, 2006). Average livestock ownership is 3.98 Tropical Livestock Unit and usually pastoralists are dependent on food aid for survival. The socioeconomic services and infrastructures are undeveloped. The region is known for high level of illiteracy, rampant human and livestock diseases and political instability due to the chronic conflict between the local Afar tribes and the neighboring Issa tribes (Ethiopia Network on Food Security, 2002; FEWS-NET, 2006).

The study was conducted in Afar National Regional State (ANRS) Zone 3 Amibara woreda Alidege and Kurkura kebeles. ANRS is located in the north-eastern part of Ethiopia (Figure 1) covering 10% and 29% of the country's total land and lowland respectively (Yirgalem, 2001). Amibara Woreda is located around 300 kms away from Addis Ababa to the northeast on the highway to Djibouti.

Figure.1 Map of Afar National Regional State showing the research site

Source: http://www.ocha-eth.org/Maps/downloadables/AFAR. pdf

Research site
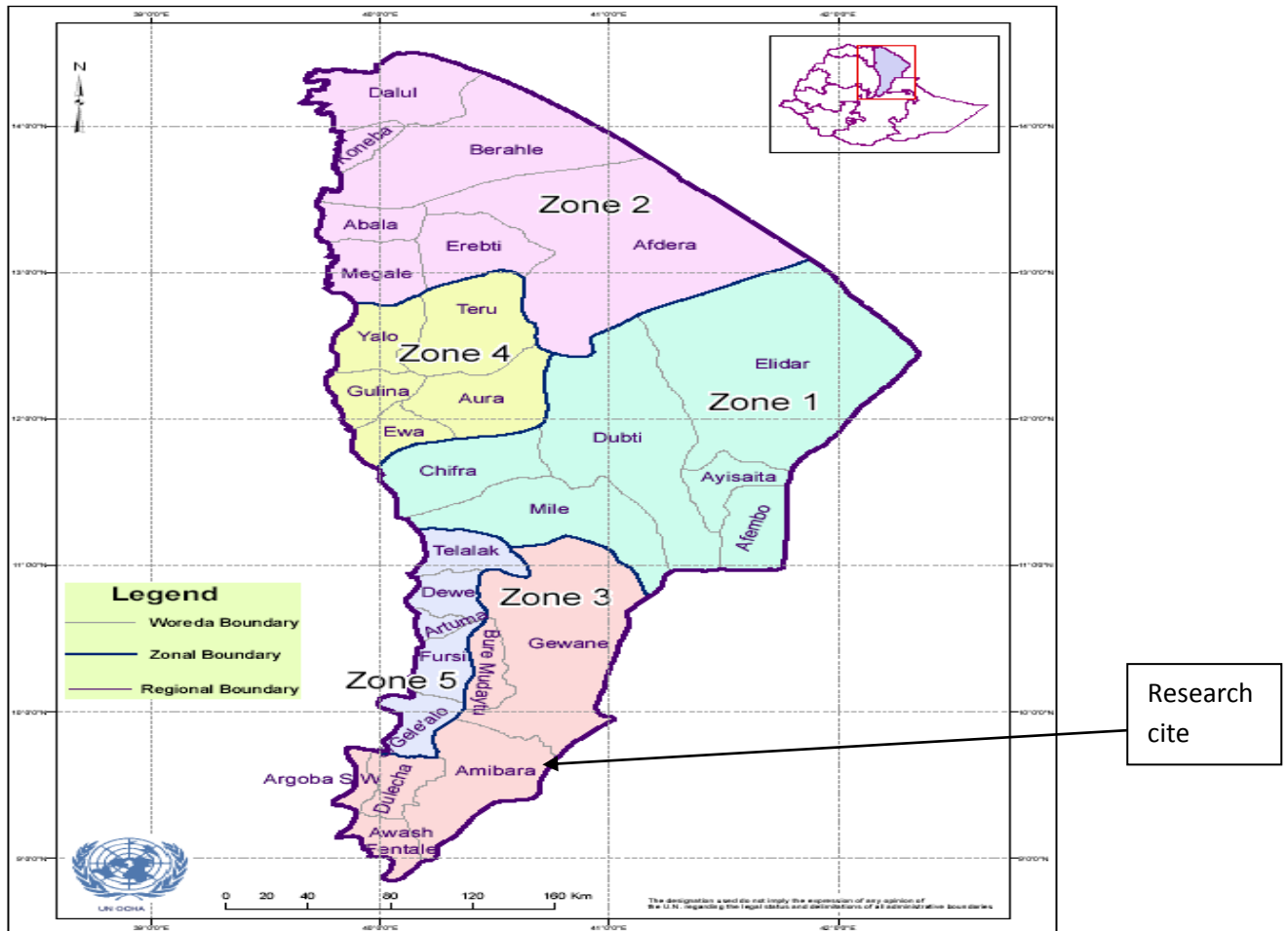
CHAPTER FOUR

REESEARCH METHODOLOGY

In this chapter, the choice of the district and peasant associations, sample farm households and traders for sample study were discussed. Types and sources of data and methods of data collection and analysis were depicted. Models used in the study of; dairy market participation and volume decision, market structure and efficiency were illustrated. Factors affecting participation and volume of dairy sales decision were identified. Variables employed for empirical investigation were also defined.

4.1 Choice of the District and Peasant Associations

The sample dairy producing households were drawn from two peasant associations or

kebeles, i.e., Alidege and sidhafage. Alidege is about 45 kms from the awash town and Sidhafage is about 25 km from awash town. The district has the potential for both crop and livestock production, which is mainly undertaken by smallholder farmers and investors around Awash River. There are also a relatively growing number of commercial pastoralist. The district is ideal to investigate the relationship between rural and urban markets, the marketing problems and constraints of the smallholder pastoralist.

Amibara Woreda was selected for the research because it was the one that the biggest rangeland is found huge amount of cattle population and main source of milk for nearby towns like Awash and Melkawerer, the organization hosting the research has been working in the area since 1998 and has built a good rapport with the local people, who would benefit from the research facilitation. Moreover, the Woreda is located adjacently, which helped to use the limited time available for the research effectively.

4.2 Type and Source Data

Both secondary and primary data were used for the study. Information were collected on market participants, trader's ownership of assets, transaction costs, distance to market, barriers to entry and exit, education and experience, and other socio-economic characteristics of the households.

Other data, like market information system, exchange arrangement, system of processing, storage, production, consumption, transport, infrastructure development, incentives and disincentives and credit facilities towards dairy marketing, were collected from sample informants through personal interviews using structured questionnaire.

The target population was defined as all households in two peasant associations (kebeles) and marketing middlemen found in the district. Informants were individual farmers (dairy producers), private traders, and dairy marketing cooperative, private and government processing industries. Other organizations, which directly or indirectly involve in dairy production or marketing, were also used as sources of data.

4.3. Methods of Data Collection

Sometimes questionnaires for field data collection are constructed to collect as much information as possible, with the hope that the use and relevance of the data were appear during analysis or that the data may be used for some future objectives (Malik, 1993).

However, this approach is not without disadvantages mainly because respondents become bored with long interview/questionnaire resulting in poor data quality and unwillingness to cooperate in subsequent surveys, omission of relevant information due to overloading the survey instrument, and inefficient use of resources when analysis eventually makes use of only a fraction of the data collected (Jabbar et al., 1997). Information collected should be relevant and useful in answering specific questions and/or testing hypotheses already stated.

A series of discussions were held with the chairmen and elders in the kebele to explain the purpose of the study. Following the discussion, list of households whose cows were lactating at the time of the survey were prepared. Through random sampling technique using household list prepared on kebele basis 61 farmers were selected. Five producers from each peasant association were additionally selected as reserves to replace peasants who might not appear for the interviews or who might decline the request.

Manageable sample of reliable and knowledgeable thirty marketing middlemen were selected by combining purposive with a random sampling. There was variation between marketing

middlemen in terms of resources used in the business, type of dairy products and mobility. Thus, on the bases of resources, commodity type and mobility dairy traders were stratified and more than 30% of representative traders were selected. A market survey was carried out to obtain information on prices to know the direction of dairy products flow and market conduct. Also, different types of data were collected from concerned organizations and individuals involved in the sector.

4.4 Data Analysis

The concentration of firms in the market, as an indicator of the structure, were estimated using the common measure of concentration ratio. Marketing margins were analyzed for the most marketable dairy products such as milk, butter and cheese. The market participation of the smallholder dairy farmers with dairy products (milk, butter and cheese) was analyzed using logit model. A Tobit model was used to analyze the relative Importance of different determinants of volume of butter sale. Dependent variable in logit model were analyzed sale of any form of dairy products.

4.4.1. Concentration ratio

Concentration ratio has been widely used as numerical index of industrial organizations for measuring the size of firms in market (Shughart, 1990). It is calculated as:

$$C = \sum_{i=1}^{r} r \ s_i \quad i = 1,2,3 \ldots \ldots r$$

...................................(1)

Where Si is the percentage market share of ith firm and r is the number of largest firms for which the ratio is going to be calculated. There are a number of measures of market concentration, but the most commonly used is the concentration ratio, which measures the percent of traded volume accounted for by a given number of participants. Empirical studies in the fields of industrial organization suggest certain levels of concentration at which non-competitive behaviour of

market participants begin in different industries. For example, Kohl and Uhl (1985) suggest that as a rule-of-thumb a four-firm concentration ratio, that is, the market share of the largest four firms, of less than or equal to 33% is generally indicative of a competitive market structure, while a concentration ratio of 33% to 50% and above 50% may indicate a weak and strongly oligopsonist market structure, respectively.

4.4.2. Marketing margin

Total gross marketing margin (TGMM) is the final price of the produce paid by the end consumer minus farmers' price divided by consumers' price and expressed as a percentage (Mendoza and Rosegrant, 1995).

$$\text{TGMM} = \frac{\text{Consumers' price} - \text{Farmers' price}}{\text{price paid by the consumer}} \text{ X } 100 \dots\dots\dots\dots\dots\dots\dots \text{ (2)}$$

The Net Marketing Margin (NMM) is the percentage over the final price earned by the marketing middleman as his net income once his marketing and transaction costs are deducted. From this measure, it is possible to see the allocative efficiency of markets. Higher NMM or profit of the marketing intermediaries reflects reduced downward and unfair income distribution, which depresses market participation of the smallholder. An efficient marketing system is where the marketing costs are expected to be closer to transfer costs and the net margin is near to normal or reasonable profit.

$$\text{NMM} = \frac{\text{Gross Margin} - \text{Marketing and Transactions Cost}}{\text{price paid by the consumer}} \text{ X } 100 \dots\dots\dots\dots\dots \text{ (3)}$$

Where: TGMM = Total Gross Marketing Margin

NMM = Net Marketing Margin

4.4.3. Market participation and sales volume decision of smallholders

It was assumed that smallholder pastoralist who produced milk and other dairy products for various reasons may or may not participate in marketing, i.e., may sale or not sale. This dependent variable is discrete consisting of two outcomes, yes or no, so the use of

Ordinary Least Square technique for such variables poses inference problems, and thus not appropriate for investigating dichotomous or otherwise limited dependent variables. In such circumstances, maximum likelihood estimation procedures such as logit or probit models are generally more efficient (Gujarati, 1988). A Tobit procedure was employed in identifying factors affecting volume sales decision of dairy products. The logic behind the use of the Tobit model was covariates affecting participation decision might be different from covariates affecting sales decision, and the magnitudes of the effects of parameter estimates is also different (Lapar et al., 2002).

4.4.3.1. Market participation

Models, that include a yes or no type dependent variable, are called dichotomous or dummy variable regression models in which determinants of an event happening or not happening are identified. These include the linear probability function, linear discriminant function, logistic distribution function (logit), and normal distribution function (probit). Tese functions are used to approximate the mathematical relationship between explanatory variables and dependent dummy variable, which is always, assigned qualitative values (Gujarati, 1988; Maddala, 1992; Feder et al., 1985; Pindyck and Rubinfeld, 1981)

The major point that distinguishes these functions from the linear regression model is that the outcome variable in these functions is binary or dichotomous (Hosmer and Lemeshow, 1989). Besides, the difference between logistic and linear regression is reflected both in the choice of parametric model and in the assumptions. The logit and probit models are comparable, the main difference being that the logistic function has slightly flatter tails that is, the normal curve under logit function approaches the axes more quickly than in the case of probit function. Ignoring minor differences, Liao (1994), Gujarati, (1988), Pindyck and Rubinfeld (1981) pointed out that probit and logit models are quite similar. They usually generate predicted probabilities that are almost identical, though the logit model is preferred over the probit and it is simpler in

estimation than the probit model (Aldrich and Nelson, 1984; Pindyck and Rubinfeld, 1981). Following Liao (1994) Gujarati (1988) and Aldrich and Nelson (1984), the logistic distribution for the market participation decision is expressed as;

$$\rho i(y = 1)\frac{1}{(1+e^{-zi})} = \frac{e^{zi}}{(1+e^{zi})} \quad \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{(4)}$$

Where ρi = is the probability of participating in the market for the ith dairy producer and ranges from $0 - 1$.

e^{zi}: Stands for irrational number e for the power z_i

z_i Is a function of a number of explanatory variables, which is also expressed as;

$$z_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} \dots + \beta_n X_{ni} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{(5)}$$

Where $X_1 X_2 \dots X_n$ are explanatory variables and β_0 is the intercept, β_1, β_2 ... β_n are parameters (slopes) to be estimated.

The interpretation of logistic regression coefficients (Bi) is considered by using odds ratio and the natural log of the odds ratio (Liao, 1994). The odds value gives the expected change in the odds ratio of being increase versus non-increase in market participation per unit change in an explanatory variable. The logistic regression slope, the coefficient, is interpreted as the change in the natural log of the odds ratio associated with a unit change in the independent variable (X_1).

$$\rho_i = \frac{1}{1+e^{-(\beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} \dots + \beta_n X_{ni})}} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{(6)}$$

If ρ_i is the probability of market participation decision then $(1 - \rho_i)$ is otherwise.

Now $\frac{\rho_i}{(1 - \rho_i)}$ is simply the odds ratio in favor of market participation.

It is the ratio of the probability that dairy producer would participate in the market to the ratio he/she would not.

4.4.3.2. Factors affecting sales volume of dairy sale

A Tobit model was used in analyzing factors affecting sales volume of dairy. The key aspect of using the Tobit model is the use of latent quantities of marketable surplus of nonparticipating households. The dependent variable takes on positive and zero values. When a zero value is observed, it is assumed that the household in question, rather than possessing an excess of the marketable product, actually has the demand for the commodity (that is, a negative supply) (Lapar et al., 2002). Hence, sales quantities are left censored at 0 and Tobit model is also known as censored regression model. Following Tobin (1958), this is expressed as:

$$Y_i^* = \beta_0' + \sum \beta_i' X_i + e_i \text{ and } e_i \text{ is } N(0,\sigma) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots..7$$

Where $Y = Y^*$, if $Y^* > 0$, $if \ y = 0 \ if \ Y^* \leq 0$ and $Y = max(Y^*, 0)$

Y_i^* represents dependent variable and quantities of dairy supplied to the market by farm households which contains observed and censored data, Xi represents a set of covariates and the reduced form equation of sales depends on explanatory variables, which are categorized into resources, the household socio-economic characteristics, and travel time or distance to dairy product market or district capital.

X_1=Number of household members,

X_2= Experience in dairy production,

X_3= Educational level of household head,

X_4= Educational level of spouse,

X_5= Number of extension visits,

X_6= Number of local bred dairy cows,

X_7 Number of cross bred dairy cows,

X_8= Return time from the market,

X_9= Return time from the district capital,

X_{10}= Amount of loan received last year,

X_{11}= Financial income from non dairy sources, and

X_{12}= Grain production

X_{13}= Sex

β_0 Represents the constant term,

$\beta_1, \beta_2 \ \beta_3$ ……. β_{13} Represents parameters to be estimated, and

e_i Represents the disturbance term.

The model parameters are estimated by maximizing the Tobit likelihood function of the following form;

$$L = \prod_{Y^*>0} \frac{1}{\delta} f \frac{(Y - \beta_i i X_i)}{\delta} \prod_{Y^* \leq 0} F \frac{(-\beta_i i X_i)}{\delta}$$

…………………………………………………………………8

Where F (z) is the cumulative standard normal distribution function and f (z) is the value of the derivative of the normal curve at a given point, z is the Z-score for the area under normal curve, β is a vector of Tobit Maximum Likelihood estimate and δ is the standard error of the error term. $\prod_{Y^*>0}$ Means the product over those i for which $Y^* > 0$ and $\prod_{Y^* \leq 0}$ means the product over those i for which $Y^* \leq 0$.

The marginal effect of an explanatory variable on the expected value of the dependent variable among the whole sample was expressed by the following formula:

$$\frac{\partial E(Y_1)}{X_1} = -F(Z)\beta_1$$ …………………………………….………………...9

Where, Y_1 is dependent variable and X_1 is a vector of independent variable β is a vector of Tobit Maximum Likelihood estimate and F(z) is the cumulative standard normal distribution function.

The change in the volume sale of dairy with respect to change in explanatory variables among the participating households under Ceterus Paribus assumption was given by;

$$\partial E \frac{(Y/Y^*>0)}{\partial X_1} = \beta \left[1 - Z \frac{f(z)}{F(Z)} - \left[\frac{f(z)}{F(Z)} \right]^2 \right]$$………………………………..10

Before taking the selected variable into the model, it is imperative to check for the existence of multicollinearity among the continuous variables and verify the degree of association among

discrete variables. Variance Inflation Factors (VIF (Xj)) technique was employed to detect the problem of multicollinearity among continuous variables. Large VIF are indicators of multicollinearity and those explanatory variables with VIF >10 were excluded from the regression analysis (Maddala, 1988).

$$VIF\ (X_j) = (1 - R_j^2\ )^{-1}\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots..\dots\dots11$$

Where, R^2 is the coefficient of multiple determinations when the variable X_j is regressed on the other explanatory variables.

Similarly, there may also be interaction between two qualitative variables, which can lead to the problem of high association. To detect the problem, the contingency coefficients were computed from the survey data and contingency coefficient greater than 0.75 is indication of multicollinearity among qualitative variables.

$$C = \sqrt{\frac{x^2}{N+x^2}}\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots.\dots\dots12$$

Where, C is contingency coefficient, x^2 is chi-square test and N is total sample size.

4.4.3.3. Definition of explanatory variables

Dairy production: The variable is expected to have a positive contribution in market participation of smallholder pastoralist. A marginal increase in dairy production has obvious and significant effect in motivating market participation. Production beyond consumption has two fates based on various reasons; either sold as fluid milk or processed into different dairy derivatives. The processed part of the product may be used for home consumption or sales. Production in turn varies directly with the number of crossbred and other lactating dairy cows. As the number of cows increases production, also increases and the percentage share of consumption declines and sales increases. Adoption of technology, such as crossbred dairy cows, improves the milk yield, through increased milk yield per lactation, increased lactation length, yield per day and short dry period. Some field studies have shown that the policy relevant variables having the greatest impact on farmer participation in liquid milk markets are cow numbers, the number of cows kept affects marketable surplus through both total production and the marginal costs of production (Holloway et al., 2000). Thus, marketable surplus subsequently participation and sales increase with Distance to market: The closer the market the lesser would be the transportation charges,

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reduced transaction costs, reduced trekking time, reduced loss due to spoilage, and reduced other marketing costs, better access to market information and facilities. This improves return to labour and capital and increase farm gate price and the incentives to participate in economic transaction.

Distance to district capital: Most of dairy production is found in rural areas while the demand and profitable market is found in the district capital. The closer the urban centre the lesser would be transaction and marketing costs. Distance to urban centres is a proxy to transactions cost which negatively affect participation and sales volume decision of dairy products. Small-scale dairy producers face many hidden costs that make it difficult for them to gain access to markets and among the barriers are transactions cost (Staal et al., 1997)

Education of the household head: Intellectual capital or education, measured in terms of formal schooling of the household head, is assumed to have positive effect on the market participation and sales decision. Sometimes, however, because of cultural and socioeconomic characteristics education has opportunity costs in alternative enterprises (Lapar et al., 2002). So it is not possible to have a definite expectation of the effect of education on market participation and sales volume

Education of spouse: Intellectual capital or education, measured in terms of formal schooling of spouse, is assumed to have positive effect on the market participation and sales decision. However, like education of household head education of spouse can have opportunity costs in alternative enterprises and not possible to have a priori expectation.
Experience in dairy: This variable is measured in terms of the number of years of dairying of the household head; it is expected to have a positive effect on market participation and sales volume.

Age of the household head: Is measured in terms of number of years of the household head, aged households are believed to be wise in resource allocation and use, and it is expected to have a positive effect on participation decision and sales volume of dairy products. Sex of the household head: In mixed farming system, both men and women take part in livestock management. Generally, women contribute more labour input in areas of feeding, cleaning of barns, milking, butter and cheese making and sale of milk and other products. However, obstacles, such as lack

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of capital and access to institutional credit, competing use of time, and access to extension service, may affect women's participation and efficiency in ruminant livestock production (Tanga et al., 2000). Therefore, it is not possible to tell a priori about the likely sign of the coefficient of sex, in market participation and sales volume.

Children below the age of five: Mostly milk is a major food for children and its importance in children growth is widely accepted and recognized both in rural and urban areas. Children have natural priority in consumption of milk in the household, and increase in the number of children in this age category usually decreases the marketable surplus and reduces the ability of the smallholder in market participation.

Number of household members: Family size measured in terms of adult equivalent (Strock, 1991) was included in the model as a variable explaining variation in market participation. Families with more household members tend to have more labour. Production in general and marketable surplus in particular is a function of labour. Thus, family size is expected to have positive impact on market participation but larger family size requires larger amounts for consumption, reducing marketable surplus. Number of students in school: Households who have students in school besides the reduced labour required for different activities incurs additional cost in the form of school fees, better clothing and for the purchase of different materials as learning aids for the students. These households are, therefore, expected to participate in the market because of increasing financial obligation.

Financial income from non-dairy Sources: These are originating from off farm activities and different forms of remittances obtained by household head, spouse and other household members. Through improving liquidity, this income makes the household more able to expand production and/or purchase from market. It also strengthens the household position in coping with different forms of risks and enters into economic transactions.

Amount of loan received: Amount of loan received has similar impact with financial income from different sources in improving market participation decision and sales volume of the farm households. Dairy income is continuous so families may not face problem in loan repayment.

Number of extension visits: The number of visits made by extension agent in the year measures the variable. Number of extension visits improves the household's intellectual capitals, which improves dairy production and divert product resources to market such as different forms of dairy products. These dairy products would otherwise be consumed by the household or wasted. Therefore, number of extension visits has direct influence on market participation and sales volume. Studies have shown that visits by extension agent improve participation and volume decision of dairy sale (Holloway et al., 2000).

Grain production: In subsistence smallholder farming, production of grain is mostly meant for household consumption. Grain is sold when it is only surplus or beyond the consumption need of the household. On the other hand, when the household is deficit in grain production, it must either borrow or buy through money secured from different sources. Families who are deficit in grain production should likely participate in the dairy market and allocate much of the income for the purchase of grain. High protein dairy products are often sold to buy high-energy grains at favourable terms of trade (Kerven, 1987; Grandin, 1988). Livestock keepers also exchange high value commodities like meat and milk for cheaper and larger quantities of food, such as cereals (Bouis and Haddad,1990).

4.4.3.4. Estimation procedure

The model used for the study of market participation was logit model and the model adopted for analyzing factors affecting dairy sales volume was Tobit model. Before fitting the selected important variables in the model, it was desirable to sort out problems of multi co linearity among continuous variables and check associations among discrete variables. The reason for this is that the existence of multi co linearity affects seriously the parameter estimates. Omitting significant interaction terms incorrectly will lead to specification bias. In short, the coefficient of the interaction of the variables indicates whether one of the two associated variables need to be eliminated from the model analysis (Kothari, 1990). Accordingly, a Variance Inflation Factors (VIF (Xj)) technique was employed to detect the problem of multicollinearity for continuos variables (Gujarati,1995).

After the identification of the explanatory variables of the models, a test was conducted for the existence of multi co linearity among the independent variables. Multi co linearity is the existence of a "perfect" or significantly high linear relationship among some or all explanatory variables. If multicollinearity is perfect, the regression coefficients of the explanatory variables are indeterminate and the standard errors are infinite. If multi co linearity is less than perfect but high, the regression coefficients, although determinate, possess large standard errors, which mean the coefficient cannot be estimated with precision (Gujarati, 1995).

CHAPTER FIVE

RESULTS AND DISCUSSIONS

This chapter presents the results of descriptive and econometric analysis of the study. The descriptive analyses were done to describe the general characteristics of sample households and dairy traders. The econometric analysis was done to identify factors that affect households' decision to participate in dairy market.

A product–focused method of investigation was made of milk, butter and cheese either as finished products or intermediate ones. These three products were chosen because they were the three most important traded dairy products in the district. Butter was used for household consumption and cosmetics, while milk and cheese were used as food only.

5.1. General Characteristics of Dairy Producers

5.1.1. Characteristics of market participants and non-participants

Table 1 Differences between market participants and non-participants

	Participation		
Variables	**Yes=22**	**No=39**	**Significance.**
Demographic Characteristics			
Age of the household head (years)	51 (2.79)	53 (2.36)	0.607
Number of household members	8.68 (1.07)	7.64 (0.48)	0.315
Household members below the age of five	0.91 (0.22)	0.64 (0.14)	0.283
Intellectual Capital			
Farming experience (years)	28.68 (2.92)	34.92 (2.36)	0.109
Experience in dairy production (years)	20.14 (3.48)	30.77 (2.91)	0.027**
Years of schooling of the household head	2.54 (0.85)	1.87 (0.48)	0.458
Years of schooling of spouse	2.0 (0.89)	0.56 (0.48)	0.052*
Number of students currently in school	2.68 (0.36)	2.89 (0.35)	0.694
Number of extension visits received/ year	1.95 (0.42)	1.79 (0.4)	0.797
Travel time			

Return time from the nearest main market	1.37 (0.24)	1.48 (0.18)	0.692
Return time from the district capital	2.92 (0.40)	3.74 (0.27)	0.082*
Wealth and Financial Sources			
Number of local breed cows	1.54 (0.19)	1.59 (0.11)	0.830
Livestock unit owned (TLU)	8.12 (1.88)	8.66 (0.70)	0.750
Total grain produced last year/household	26.45 (8.17)	29.69 (2.83)	0.654
Amount of loan received last year (Birr)	1419 (896.2)	580.69 (104.4)	0.225
Income from the sale of livestock (Birr)	2043.18(1352.2)	307.4 (97.25)	0.093*
Financial income from different sources (Birr)	2186.27 (782.3)	528.49(137.9)	0.009***

Source: Field survey, standard errors are in parentheses.

* Significant at 0.1 probability level

** Significant at 0.05 probability level

*** Significant at 0.01 probability level

5.1.1. Characteristics of market participants and non-participants

From a total of 61 dairy producing sample households, 22 (36.1%) were market participants as they sold some form of dairy products at the time of the survey, while the rest 39 (63.9%) did not. The market participating households with more number of household members and labour expressed in Adult Male Equivalent (Table 1). As expected, farm households with larger family size, who have larger output per household had higher marketable surplus than small farmers. The difference in the ratio of sale to output between larger and smaller pastoralist is disproportionately low because of much larger consumption.

Intellectual capital was measured by educational level of household head and spouse, the number of visits made by extension agent, farming experience and experience in dairy production. The level of education of participating households was relatively higher than the non-participating households. Significant difference is observed between education of spouse of participating and non-participating households with the former greater than three times than the later. Market participating households were found to be less experienced in dairy production and get more regular extension visit.

Travel times from the household to the market and district capital both have lower values for participating households. Market participating households were relatively close to market and district capital.

Milk production is an already important rural and increasing urban activity especially for the marginal and poor pastoralist in the district. Dairying supports many small, marginal and landless farmers. Marginalized, poor and small pastoralist account for 23% of the total milk production, and 45% of the total market participation.

Poor smallholder pastoralist does engage in non-farm works such as petty trade, dairy trade, selling of tea and other non-farm activities than rich households. This is mainly because inadequate land leaves them with surplus labour and the relative return to labour of non-farm work is greater for the poor than for the rich. As described in Table 1 income from off-farm activities, from other income source of household heads and spouses, income of other family member is three times greater and income from the sale of livestock is also more than six times greater for dairy market participants than non participants.

Participating households had also better access and participate in credit more than two times than non-participants. The problem, however, was that the credit system was not well developed, the commercial banks are predominantly state owned, private banks are not eager to finance agriculture in general and dairy production in particular because of the associated high risk in dairy production and marketing activity. Therefore, money to finance dairy sector is hardly available from financial institutions.

Micro credit is typically short-term loan that can help in financing working capital, but not investment capital required to improve market participation. Informal credit from conventional lenders was often quick and less difficult to obtain, but because of the risk involved, it was very restricted in amount, and involve restrictive conditions in terms of repayment and interest. Informal lenders, such as usurers in rural areas charge more than 100 percent annual interest rate on loans. This high cost of borrowing was due to shortages of credit and facilities, which in turn reduces the size of working capital. Besides abnormally high interest rate of these loans,

opportunity costs of rural households are also high as they are supposed to sell dairy products to pay back the loans quickly.

Credit from family or friends (love capital), bears often no-interest, are also a significant source of finance. Five percent of the sample households obtained credit from family and friends in the survey year. A farmer, for example, obtained as much as 100 USD long term credit from a relative in order to expand the already operational small-scale dairy farm.

Cattle in the area are kept mainly for draught power. Milk production is only secondary. Dairying is used in the district to diversify operations and provide a continuous income especially for the poor. In the district, it is woman who decides how much to milk and how much to sale, and children before school mostly perform the herding. Women who have exclusive right over income from dairy when the income is not significant sell surplus milk and other dairy derivatives.

Significant difference was observed in physical wealth and financial income between participating and non-participating households both at 1% probability level.

5.1.2. Characteristics by sample location

Table 2 Differences by sample locations

Variables	Locations		
	Alidege. (N=30)	Sidhafage(N=31)	Significance.
Demographic characteristics			
Age of the household head (years)	52.33 (2.61)	52.26 (2.54)	0.984
Number of household members	7.57 (0.48)	8.45 (0.52)	0.374
Household members below the age of five	0.83 (0.17)	0.64 (0.16)	0.434
Intellectual Capital			
Farming experience (yrs)	33.43 (2.59)	31.93 (2.72)	0.692

Experience in dairy production (yrs)	27.23 (3.47)	26.64 (3.15)	0.900
Years of schooling of the household head	1.03 (0.38)	3.16 (0.73)	0.012**
Years of schooling of spouse	.20 (0.09)	1.93 (0.66)	0.013**
Number of students currently in school	2.57 (0.38)	3.06 (0.35)	0.342
Number of extension visits received/ year	2.57 (0.48)	1.16 (0.29)	0.015*
Travel time			
Return time from the nearest main market	0.95 (0.16)	1.92 (0.20)	0.000***
Return time from the district capital	5.01 (0.14)	1.93 (0.18)	0.000***
Wealth and Financial Sources			
Number of local breed cows	1.43 (0.11)	1.71 (0.15)	0.159
Number of crossbred dairy cows	.00 (0.00)	.45 (0.23)	0.055*
Livestock unit owned (TLU)	7.37 (0.90)	9.51 (1.30)	0.185
Total grain produced last year/household	25.23 (3.37)	31.71 (5.90)	0.348
Amount of loan received last year (Birr)	654.90 (114.1)	1103.9 (641.5)	0.500
Income from the sale of livestock (Birr)	215.97 (77.90)	1627.7 (964.7)	0.157
Financial income from different sources (Birr)	560.67 (146.75)	1673.8 (579.4)	0.072*

Source: Field survey, standard errors are in parenthesis

* Significant at 0.1 probability level

** Significant at 0.05 probability level

*** Significant at 0.01 probability level

Age of the household head, farming experience and experience in dairy production were comparable for the two kebeles and for Alidege and Sidhafage the figures were relatively lower. Appreciable difference was observed in intellectual capital between the two kebeles. Education of the household head and spouse had higher values for Alidege and Sidhafage. Sample households in Alidege had no crossbred dairy cows and none of them sold liquid milk but sold dairy products such as butter, which have better shelf life. The volume of sale of butter per household was also relatively higher for Alidege pastoralists. Here the effect of distance can be clearly demonstrated in dairy market participation and volume of sales. In the rural areas of the district far from urban centre where there was little or no saving and accumulation of capital, the existing cultural and traditional taboos were inhibitive of selling of dairy products (locally called "the whites"). Much of the product consumed during cultural and religious celebration. Those households were aged or had more experience in dairying and better per capita grain production. Households that were far from the district capital were more bound to their cultures than households close to urban centers.

As in the Table 2 mean test for Alidege and Sidhafage kebeles reveal that there was no significant difference in household demographic characteristics between the two kebeles. Significant difference was observed in intellectual capital in terms of education of household head and spouse at 5% probability level. The difference in the mean values in the number of extension visit was also significant at 5% probability level. Sample farm households in Dire received better number of extension visits because of personal characteristics of development agents and was also confirmed that in some studies households far from urban centres were getting better number of extension visits than otherwise.

Most markets in the district are only regularly held, the average distance for the main markets for the sample, as a whole was nine kms. This distance was as high as 13 kms for Alidege kebele, where it takes on average, almost more than five hours return time. Alidege kebeles were located close to district capital and main market as compared to Sidhafage and it takes nearly two hours of return time from the district and main market. The longer distance implies that people less often go to market and more time was required to get to market.

The other significant difference was observed in the mean values of travel time from the market and district capital both at 1% probability level. Significant difference was observed in physical and financial wealth between the two kebeles in number of cross breed dairy cows and financial income from different sources at 10% level.

5.1.3. Forms of dairy sale by households

Table 3 Households selling different forms of dairy products

Market participating households	Number	Percentage
Households selling butter	16	26.0
Households selling milk	7	11.5
Households selling cheese	7	11.5
Households selling butter and cheese	6	9.8
Households selling butter and milk	2	3.0
Households selling milk and cheese	2	3.0
Households selling butter, cheese and milk	2	3.0

Source: Survey results

The most marketable product both in rural and urban areas is butter. Of the total 36% of market participating households, 26% participated in butter sale. Equal number of households of 11.5% participated in selling milk and cheese, spatially the sale of the former is restricted to urban and peri urban areas while the sale of the later is undertaken elsewhere in the district. As depicted in Table 3, households have a tendency of selling one dairy product at a time.

Many households participate in selling butter and market participating farm households tend to sell one type of dairy product at a time. Equal number of sample households sold milk and cheese. Better combination was observed between butter and cheese. The combination of milk with other dairy products was weak and this shows that milk selling households try to specialize in selling milk

5.1.4. Uses of income from dairy

Table 4 Percentage expenditure of income from dairy by sample households (percent)

Expense category	Rated as first	Rated as second	Rated as third
Students' materials	31.8	18.2	22.7
Other food and coffee	27.3	50.0	54.6
Buy grain	18.2	9.1	9.1
Soap and clothes	9.1	13.7	4.5
Loan repayment	4.5	4.5	9.1
Cows' feed and management	9.1	4.5	-
Total	100	100	100

Source: Computed from survey data

Many households in the study area are not market oriented and much of dairy product is, therefore, allocated for household consumption. Large amount of dairy products especially butter is used during cultural and religious festivals as cosmetics and preparation of varieties of cultural foods. Only little surplus left is taken to the market to meet different financial obligations of the households.

Dairy income is used to cover expenditures on students' school material and purchase of grain and food items, farm inputs and replacement stock (Table 4). More than 31% of the sample households allocate their income to cover student expenses as their first priority. Around half of the households allocate income from dairy for the purchase of different kinds of food items and coffee in their first, second and third expenditure category. The main advantage of selling dairy products for buying grain was the favourable terms of trade as observed by Kerven (1987) and Grandin (1988). This was also true for the study area, and one kilogram of butter was traded on average for 15kg of different grains. It was like bringing dairy products especially butter in a small packet (pocket) and taking grains in a basket. There were better terms of trade right after crop harvest which had been continuously reducing till the next crop harvest. Terms of trade deteriorates in summer when prices of crops escalating and opposite movement of prices of dairy

products .Therefore, trading dairy products for grain far more support poor people in the district. Again selling dairy products for grain during periods of food shortage improves food security of the poor because of its favourable terms of trade and continuous income.

Few households who keep crossbred dairy cows spent relatively much of the income for the purchase of feed, different forms of roughages and concentrates, and for other management expenses. Only 4.5% of the households used dairy income for loan repayment both as first or second expenditure category.

5.1.5. Dairy product movement

Table 5 Utilization of milk among sample households

Dairy products	Liters	Percent
Milk for human consumption in the household	230	21.24
Milk sold	402	37.12
Milk processed into butter	409	37.76
Milk processed into yoghurt	42	3.88
Total milk produced	1083	100

Source: Computed from survey data

Sample households produced 1083 litres of milk per week. Most of the milk produced, 409 litres (37.76%), was processed into butter and 402 litres (37.12%) was sold in liquid form (Table 5). The remaining 230 litres (21.24%) was consumed in the household in milk form, and 42 litres (3.88%) was processed into yoghurt.

Dairy products in the hands of market participating and non-participating farm households had different uses. Non-participating households use dairy products in a variety of ways. Depending on the households' preferences, consumption was either in the form of liquid milk or processed into different dairy products. Market-participating households besides consuming some milk at the household allocated some amount of dairy products for sale in different forms. These households also consumed and sold dairy products of different forms, non-participating

households prefer to consume processed dairy products 371 litres (73%) and participating households sale most of dairy products in the form of milk, 402 litres (70%), as depicted on Figure 4.

Dairy products with market participating households move through longer marketing chains. This is the result of additional activities performed by dairy producers and value adding functions (processing, transporting and storage) of marketing middlemen in terms of form, time and place.

The movement of dairy products with market participating households can be compared with the flow of a river. Innumerable dairy producers at the one end are forming the source of flow and many consumers at the other extreme forming destinations. Marketing middlemen on the other hand act as a link between the two extremes and form course of a river and giving organization to the flow. Price differences among geographical locations or spatially separated markets are a gravity initiating the flow and giving direction.

Figure 2 Dairy product movements

Figure 2 Dairy product movements

Figure 2 Dairy product movements
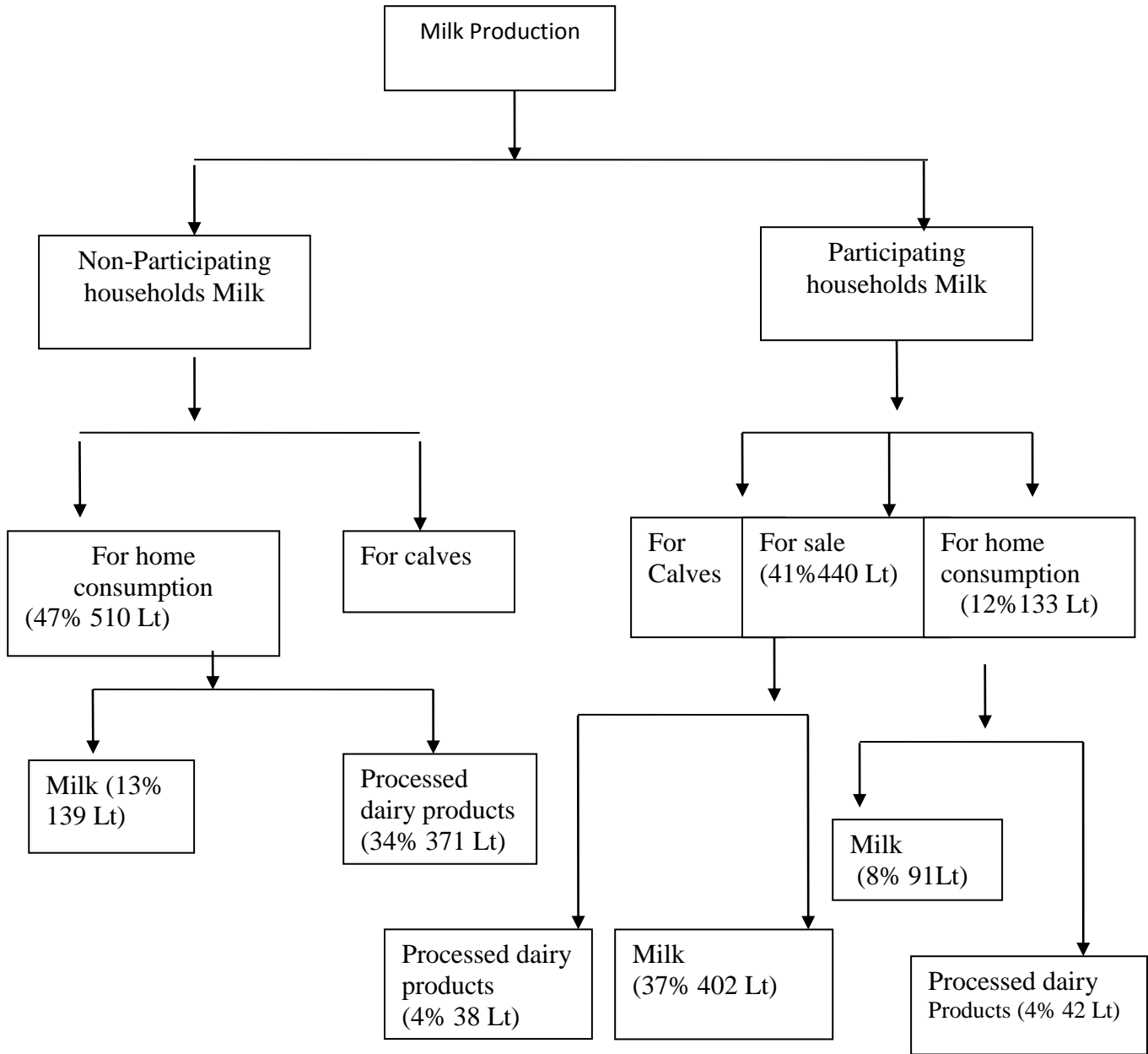
5.1.6. Problems of smallholders in dairy marketing

Table 6 Problems of dairy marketing of smallholders by commodity type

Marketing Problem	Milk	Butter	Cheese
No problem	5	8	7
Far from market or town	22	0	0
Low price	4	5	5
Low production	22	39	40
No tradition of selling dairy	8	9	9
total	61	61	61

Source: Survey results

Because of inherent physical and chemical properties of different dairy products related to sale and other external problems these products have different sales problems. Generally, as explained by respondents, the major constraints in dairy marketing in the district were low marketable surplus, remoteness from markets and urban centres, low prices and lack of tradition in dairy marketing. As indicated in Table 6, 22(36.1%), 39(63.9%) and 40(65.6%) of the respondents prioritized low volume of production as a major constraint in milk, butter and cheese marketing, respectively. Low production itself seems to be the result of the reduced per capita natural pasture due to increasing demand for land for crop production and increasing population. Again, the majority of dairy cows are indigenous animals, which have low milk production performance with an average age at first calving of 53 months and average calving interval of 25 months.

Processed dairy products, which have lower volume and perishable nature, such as butter and cheese, were sold within the villages where market outlets and producers bargaining power were limited.

Remoteness coupled with high perishability and bulky natures of liquid milk have important effects on market participation decision and its volume of sales. Some respondents, 22(36.1%), indicated that because of their long distance from markets and major urban centers, they were unable to participate in the milk markets (Table 6). This has restricted their participation in spatial arbitrage and profitable transaction. This reduced market involvement in turn is expected to lead into reduced dairy production and low farm income. Distance has relatively minimum effect on butter and cheese sales because of reduced volume and perishability.

Equal number of respondents about 5(8.2%) and 9(14.8%) have- pointed out that lower price and lack of tradition, respectively in butter and cheese sale inhibited them from involving in dairy markets (Table 6). Sample pastoralists inherently know the resource allocative power of price and tend to allocate resources according to relative returns expected to be realized from producing for the market.

Sales of cattle in general and dairy cows in particular are very low. Most households were reluctant to sell or cull poor performing dairy cows. Only 18 (30%) and 3 (5%) of the sample households sold livestock and dairy cows, respectively, in the year preceding the survey.

Increasing dairy production through the increase in the number of poor performing dairy cows is very limited because of the continuously decreasing pasture and forage.
Overstocking the land with livestock degrades the land and further diminishes fodder supply. Increase in the dairy production, therefore, should be achieved through the adoption of high yielding dairy cows which can be both local and crossbred.

Market infrastructure tends to be deficient in the district. There is lack of appropriate roads, communication means, and electricity and there is also lack of appropriate storage for perishable dairy products. This resulted into significant deterioration costs. As the consequence, market supply heavily depends on quantities produced alone and not adjusted from stock. This situation reinforces seasonality and price volatility like reduced supply and associated high price in dry season as opposed to wet season.

5.1.7. Livestock extension services

Table 7 Definition of explanatory variables

Explanatory Variable	Type	Description	Unit
GRAINPRO	Continuous	Grain production	Tones
FINANCE	Continuous	Financial income from different sources	Birr
LOAN	Continuous	Amount of loan received	Birr
EDUCATIONS	Continuous	Educational level of spouse	Years of schooling
EDUCATIONH	Continuous	Educational level of household head	Years of schooling
EXPDAIRY	Experience in dairy production Continuous	Number of years	
EXTENSIONV	Continuous	Number of extension visits received	Number
CHILDREN<5AG	Continuous	Children below the age of five	Number
FAMSIZE	Continuous	Number of household members	Number
AGE	Continuous	Age of the household head	Number of years
RETRNTMMRT	Continuous	Return time from the market	Hours
RETRNTMDISCA P	Continuous	Return time from the district capital	Hours
SEX	Discrete	Sex of the household head	0=female, 1=male
STUDTS	Discrete	Number of students	0= no student, 1=student in School
BREED	Discrete	Breed of dairy cows	0= local, 1=crossbred
#DAIRYCOWS	Discrete	Number of dairy cows	0=1, 1>1 dairy Cow

Market extension was a peripheral issue in the extension scenario in the district. Market extension was not given the attention it deserves. Extension services, therefore, was concerned mostly with livestock production and health. Farm households replied that they were not getting enough and relevant extension services. Many of them indicated that (51% 31) they got no or insufficient extension services in the year preceding the survey. The remaining got services related to livestock feed and health and look for services such as artificial insemination with the aim of improving poor performing local dairy cows.

5.2. Econometric Analysis

5.2.1. Factors influencing farm households' participation in dairy market

Participation in dairy market was defined as a dichotomous variable taking the value of 1 for participants and 0 for non-participants and used as a dependent variable. Market participation here means sale of any kind of dairy products mainly liquid milk, butter or cheese from own production. In order to explain farmers' participation in dairy market, continuous and discrete variables were identified based on economic theories and the findings of different empirical studies and these variables are described in Table 7.

Table 8 Partial correlation coefficients between continuous explanatory variables

	EXP DAI RY	FA MSI ZE	CHILD REN<5 AG	EDUC ATIO NH	EDUC ATIO NS	RETR NTM MRT	RETRN TMDIS CAP	EXTE NSIO NV	FIN AN CE	GRA INP RO	L O A N
EXPDAI RY	1.00										
FAMSIZ E	0.12 3	1.00									
CHILD REN<5 AG	- 0.36 2	0.50 4	1.00								
EDUCA TIONH	- 0.39 0	0.18 8	0.042	1.00							
EDUCA TIONS	- 0.22 7	0.31 6	0.073	0.377	1.00						
RETRN TMMRT	0.16 8	- 0.11 6	-0.199	-0.138	-0.026	1.00					
RETRN TMDIS CAP	0.11 2	- 0.13 1	0.019	-0.418	-0.365	-0.087	1.00				
EXTEN	-	-	-0.042	-0.019	-0.079	0.138	0.232	1.00			

SIONV	0.112	0.151									
FINANCE	-0.216	0.130	-0.036	0.514	0.480	-0.152	-0.325	-0.159	1.00		
GRAINPRO	-0.078	0.303	0.284	0.213	0.183	-0.208	-0.187	-0.048	-0.039	1.00	
SEX	-0.082	-0.052	-0.115	0.016	-0.043	0.141	-0.130	-0.026	-0.109	0.076	1.00
STUDTS											
#DAIRY COWS											
BREED											

Table 9 Contingency coefficient for discrete variables

	SEX	STUDTS	#DAIRYCOWS	BREED
SEX	1.000			
STUDTS	043	1.000		
#DAIRYCOWS	.096	.096	1.000	
BREED	-.062	.117	.261	1.000

Before running logistic regression and Tobit models both continuous and discrete explanatory variables were checked for existence of multicollinearity. Partial correlation coefficients and Variance Inflation Factor (VIF) for continuous variables (Table 8 and appendix IV) and contingency coefficients for dummy variables (Table 9) were computed to see the existence of multicollinearity among variables. There was no problem of multicollinearity between the variables that were used in the models.

5.2.2. Factors affecting dairy market participation

Table 10 Factors influencing dairy market participation

Variables	Coefficients Standard error	Odds ratio	Wald statistics
FAMSIZE	0.07 (0.18)	1.08	0.17
EDUCATIONH	-0.43** (0.221)	0.65	3.83
EDUCATIONS	0.44* (0.26)	1.55	2.76
EXTENSIONV	0.35* (0.20)	1.42	3.023
RETRNTMMRT	0.40 (0.51)	1.50	0.63
RETRNTMDISCAP	-1.99** (0.83)	0.14	5.73
FINANCE	0.001** (0.00)	1.00	5.69
GRAINPRO	-0.03 (0.02)	0.97	1.85
#DAIRYCOWS (1)	1.02 (0.88)	2.78	1.36
Constant	1.23 (1.62)	3.44	0.58

*, ** Significant at 0.1 and 0.05 probability level, respectively.

Log likelihood ratio index (Mc Fadden R2) 0.53

-2LL ratio = 56 **

Chi-square x^2=29**

Overall percentage 85.2

Percentage correctly predicted participants 72.3

Percentage correctly predicted non participants 92.3

Number of observation = 61

Source: Model output

Important household physical wealth affecting market participation decision is local bred and crossbred dairy cows. As it was expected, they are posited to affect market participation decision significantly. However, investment in high yielding exotic breeds or crossbred dairy cattle would also seem a difficult option because of high initial cost, limitation of feed and fodder and with the increasing population and demand to allocate more land for crop production small and marginal areas are left for pasture. This has resulted into an ever-decreasing pasture both in quality and quantity. Therefore, only few urban and peri urban market oriented farmers possess crossbred dairy cows.

Financial capital includes income from different sources such as off-farm activities of household head and spouse, remittances and income by other household members other than the household head and spouse. Financial capital from different sources has positive coefficient, indicating that such resources strengthen the ability of smallholder dairy producers' for coping with different risks of production and consumption and enter to economic transactions and significant at 5% probability level.

Household members represent labour resources and, hence, are posited to be directly related to engagement in production and marketing activities. In agricultural studies, it was shown that household members represent labour resources and directly influence market participation. In this particular case number of household members have positive coefficient and large households with greater members tend to participate in the market.

Transaction costs are hypothesized to impede market participation because they impose added cost burdens to the dairy marketing activities. Distance to market is considered as a proxy for transaction costs and is hypothesized to negatively affect market participation; that is, the farther away is a household from the market, the more difficult and costly it would be to get involved in the market. Consistent result was found in this study. Distance to district capital has negative coefficients affecting market participation and significant at 5% probability level. However, distance to the market and district capital has indirect effect on household output and also affect market participation position of the household.

Rural households who have sufficient per capita grain production shun the idea of market participation altogether. Relatively wealthy households consume a high portion of milk extracted from cows with surplus turned to butter, which partly indicates that that dairy consumption exhibits higher income elasticity of demand in the rural households. The dietary habits and cultural significance of milk and dairy products in the diet of the rural people in the district suggests that the demand for milk and dairy products increase with increase in income. It is not unusual to see these households waste substantial amount not being able to sell because of distance as well as cultural taboos. In such a situation, producers lose income and consumers are denied these products. In this particular study, negative coefficient of crop production indicates

inverse relationship with dairy market participation decision. Relatively rich households, when they find crop production to be more profitable less likely to engage in dairy marketing and other off-farm activities. This shows that under such undeveloped situations, specialization of relatively wealthy households in crop production may be a norm. On the other hand, poor households with limited per capita crop production try to diversify income source from farm and non-farm activities. The poor with limited per capita crop production is observed to participate in the dairy market and negative coefficients of crop production corroborate this fact. The sales of dairy products mainly by smallholders in rural areas, therefore, may be regarded as a symptom of increasing poverty.

As it was expected most participating households in the sample have more than one dairy cow and as the number of dairy cows increases households are likely to participate in dairy market. The increasing number of quality local and crossbred dairy cows is an important policy relevant variable in stimulating the smallholder to market entry and benefit from economic transaction.

The priori expectation was that households with better intellectual capital stock would be positively related to market participation. However, the expectation may be reversed when there are competing and more remunerative employment opportunities available in the area that require skills that are enhanced by more education. In a similar study in Ethiopia (Holloway, et al. 2000) found that education of the household has negative coefficient and inverse relationship with market participation decision, which is contrary to the usual expectation. In the current investigation, the effect of intellectual capital is captured in the variables "education" (number of years of schooling of the household head and spouse) and "extension" (access to extension services). Education of the household head and spouse has positive and negative coefficients respectively. In this study, most of the household heads are males, and educated males look for other employment opportunities during the off-farm period and women take over the household management. This suggests the strong competing effect of diverting skill to other off-farm employment opportunities. It is also found that the area is accessible to expanding industrial investments and major urban centres where employment opportunities are available.

The extension variable, on the other hand, has a positive coefficient, suggesting that exposure to extension agents exerts a positive influence on market participation and this is consistent with expectation.

The log likelihood ratio test indicates that the explanatory power of the independent variables taken together was significant at less than 5% probability level. This indicates that the hypotheses that the coefficients except the intercept equal to zero rejected. The value of chi-square shows the goodness of the model at less than 5% probability level. The likelihood ratio index indicates that the logit model explains approximately 53% of the variation in the independent variable. Another measure of goodness of fit of the model is based on a scheme that classifies the predicted value of events as one if estimated probability of an event is equal or greater than 0.5 and 0 otherwise. From all sample farmers 85.2% were correctly predicted into market participants and non participant category by the model. The correctly predicted participants and correctly predicted non participants of the model were 72.3% and 92.3%, respectively.

5.2.3. Sensitivity analysis of dairy market participation

Market participation of dairy producers cannot be equally affected by all explanatory variables. To rank these variables in terms of their relative importance in improving market participation decision, one needs to define a 'typical farmer' in terms of the most frequent values of explanatory variables, discrete variables and mean values of the continuous variables.

5.2.4. Factors influencing volume of dairy sales

Table 11 Factors influencing farm households' volume of dairy sales

Variables	Coefficients (Standard error)	t- value
	B	
FAMSIZE	0.094 (.0611)	1.53
EDUCATIONH	-.189 (.087)**	-2.17
EDUCATIONHS	0.057 (.064)	0.89
EXPDAIRY	-0.009 (.009)	-1.06
EXTENSIONV	0.152 (.074)**	2.03
RETRNTMMRT	0.047 (.138)	0.34
RETRNTMDISCAP	-.281 (.119)**	-2.35
FINANCE	.00027 (.00013) **	2.08

LOAN	.00053 (.000081)***	6.61
GRAINPRO	-0.016 (.009)*	-1.74
SEX (1)	-0.540 (0.33)	-1.64
#DAIRYCOWS	(1) -0.191 (0.334)	-0.57
BREED	(1) 2.94 (1.393)**	2.11
(Constant)	0.216 (0.725)	0.30

$R2 = 0.53$ $\delta = 1.28$

Chi-square = 80 $f(z) = 0.120$

Log likelihood = -36 $F(z) = 0.338$

n = 61

Source: Model output, Dependent Variable: kg of butter sold

      *** Significant at 0.01 probability level

      ** Significant at 0.05 probability level

      * Significant at 0.1 probability level

Of the total 61 observations 40 were left censored at less or equal to zero and with 21 uncensored observations. The appropriate model for estimation under this condition is Tobit model. Households first make discrete decision to sell or not to sell.

Then they decide how much to sell. The dependent variable in the Tobit equation was volume of dairy sales, such as butter and milk. Observed samples of farm household selling milk were few. Volume of milk sold, therefore, converted into butter equivalent. The set of covariates used were household demographic characteristics, transactions cost represented by distance to market and district capital, physical and financial wealth and intellectual capital represented by education of household head and spouse and number of extension visits received by farm households during the year. Demographic characteristic believed to affect volume decision of dairy was number of household members. Farm households with better number of household members believed to have more labor to participate in economic transactions. The effect of number of household members on volume sale of dairy was positive but insignificant. Sex of the household head has important influence on household volume sale of dairy. Of the total 61 sample households 51 (84%) are male headed and the rest 10 (16%) are female headed. From the study the female-headed households have better predisposition to entry into dairy market and volume supply.

The volume of dairy sales is expected to be affected by various continuous and discrete independent variables. Explanatory power of the model is given by pseudo R2 that is 53%. This is low but reasonable given the small sample size. However, it also indicates possible non-inclusion of other relevant variables.

Intellectual capital hypothesised to affect the volume decision of dairy sale is educational level of household head and spouse and number of extension visits. This stock level may be related in a contradictory way when other employment opportunities are available and was no prior belief about the likely sign of education. Intellectual capital of the household expressed as educational level of the household head and spouse had negative and positive coefficients, respectively. Education of household head was significant at 5% level while education of spouse was insignificant. Extension visit on the other hand was consistent with a priori expectation and exhibited a positive coefficient and significant effect at 5% level (Table 12).

The priori expectation was that transaction costs are likely to play a major role impeding volume of dairy sale and it was assumed that transactions cost increase with greater distance to market and district capital and which causes surplus to decline. In the absence of precise information concerning the values of these costs, two proxies were used instead return time from the market and the district capital. Return time from the market had positive and insignificant effect on the volume of dairy sale while return time from the district capital had negative and significant at 5% level. Farm households located close to urban center (District Capital) benefiting in two ways; besides the reduced transactions cost imitates the success of institutions found in the town. They try to imitate the success story of the Dairy Cooperative and its members. The possibility that the behavior and characteristics of one's neighbors have an effect on one's behavior has received growing attention among economists (Ludwig et al., 2000).

Physical capital variables expected to exert a positive impact on volume decision of dairy were number of dairy cows and type of dairy breed, such as local and crossbred dairy cows. The effect of number of dairy cows was insignificant, as households were keeping poor performing dairy cows. The effect of crossbred dairy cows was positive and significant at 5% level. Households

who keep crossbred dairy cows are market oriented and because of higher productivity marketable surplus also increases with crossbred dairy cows.

Financial capital such as loan (credit) and income from different sources other than dairy were expected to exert a positive impact on volume sales of dairy. Thus, the effect of these covariates was positive and significant at 1% and 5% level, respectively.

The priori expectation was that households with surplus and sufficient crop production tend to participate less in dairy market, and poor households with less per capita grain production sell dairy products and allocate much of the income for the purchase of grain at favourable terms of trade. Grain production per household exhibited negative coefficient as expected and was significant at 10% level.

Households with surplus grains production use grains as cash crops to cover expenses for household needs, and consume larger volume of dairy products, this partly explains income elasticity of dairy consumption. Marginal and food insecure farm households participate in dairy marketing because: dairying is the source of year round income, and has favorable terms of trade when exchanged with energy rich grains. Their opportunity cost of labor of those households in participating dairy market is also low because of reduced land and subsequent reduced farm activity.

5.2.5. Sensitivity analysis of sales volume decision of dairy products

Table 12 presents the effect of marginal changes in explanatory variables in volume of dairy sale among the participating and the whole sample of farm households.

Table 12 Marginal effect of independent variables among the participating and the whole sample

Variables	$\partial E\frac{(Y/Y^*>0)}{\partial X_1}$	$\partial EY_1/\partial X_1$
FAMSIZE	0.101	0.044
EDUCATIONH	-0.222	-0.097
EDUCATIONHS	0.060	0.027
EXPDAIRY	-0.026	-0.011

EXTENSIONV	0.202	0.089
RETRNTMMRT	0.133	0.058
RETRNTMDISCAP	-0.170	-0.074
FINANCE	0.0003	0.0001
LOAN	0.0004	0.0002
GRAINPRO	-0.014	-0.006
SEX (1)	-0.371	-0.163
#DAIRYCOWS (1)	-0.01	-0.004
BREED (1)	2.4776	1.0863

Source: Model output

The marginal effect of explanatory variables on the volume of dairy sale was computed from Tobit model. The explanatory variables, such as family size, educational level of spouse, extension visit, financial income from different sources, loan obtained and crossbred dairy cows had positive marginal effect on dairy sale. The remaining explanatory variables; education level of household head, return time from the district capital, number of dairy cows and grain production had negative marginal effect on dairy sale. The most important physical wealth having the greatest impact on dairy supply was crossbred dairy cows a unit increase of the number of crossbred dairy cows improves marginal supply by 2.4776 litres among the participating households and by 1.0863 litres among the whole sample. Similarly, the sex status of household head of being male would decrease volume supply of dairy by 0.3713 litres among the participating and by 0.1628 litres among the whole sample.

5.3. General Characteristics of Dairy Traders

5.3.1. Traders' social and intellectual capital

Table 13 Trader's experience, financial and social capital (N=30)

Variables	Statistics		Mean values (Standard error)
	Minimum	Maximum	
Years in dairy trade	0.50	40.00	8.17 (1.91)
Years of schooling of trader	0.00	14.00	4.43 (0.92)
Amount of capital currently used	30.00	15000.00	3193.50 (933.46)

Number of markets visited/week	1.00	7.00	3.8 (0.39)
Trade alone or in partnership	0.00	1.00	0.03 (0.31)
Number of languages spoken	1.00	4.00	1.93 (0.09)
From how many people buy on credit	0.00	65.00	3.57 (2.22)
To how many people sell on credit/week	0.00	20.00	4.27 (1.03)
Number of friends in dairy trade	0.00	6.00	1.27 (0.290
Number of relatives in dairy trade	0.00	5.00	0.90 (0.32)
Number of local trade contracts/week	0.00	7.00	3.43 (0.41)
Number of distance trade contracts/week	0.00	2.00	0.43 (0.10)
Number of partners through telephone order only/week	0.00	4.00	0.30 (0.15)
Parents in dairy trade	0.00	1.00	0.10 (0.06)

Source: Survey results

Thirty dairy traders including mobile butter traders (22) and bars and shops (8) were interviewed for primary information. Moreover, three processing plants and one dairy cooperative were sources of primary and secondary data used in the study.

Traders to be successful require a pool of friends, families and suppliers in a trade. The number and capacity of families and friends in the dairy trade who supported in the past and at present and the number of languages or dialects spoken by traders would enhance their social capital position. The social capital helps in terms of exchange of market information, on credit purchase and sale, and number of local and distant trade contracts.

Traders buy on credit on an average from 4 suppliers and sell about to 4 clients and have only 3 local and 0.4 distant trade contacts in a week. Most dairy traders are small and have more local trade contacts. Butter traders mostly establish distant trade contacts. More than 98% of traders started up their trading business themselves, which is small and personalized. Only 10% of traders indicated that their mothers were involved in dairy trade and none of them suggested that their father was in dairy trade thus insignificant social capital was derived from family dairy trade. Traders didn't appear to switch businesses very often; the total number of years the traders

surveyed had worked in dairy trading was only slightly higher than the number of years they had been in their current business, and the average number of years in dairy trade of those in the sample was 8.17 years. There appears to have been relatively little variation within the sample in terms of years of schooling or experience in dairy trade; traders received 4.43 years of schooling on average.

5.3.2. Transaction cost

Table 14 Transactions costs in Birr/trader (N=30)

Variables	Mean	Std. Error
Opportunity cost of processing labor of male	7.72	7.49
Opportunity cost of female processing labor	17.99	17.48
Hired labor cost in transporting milk	7.63	6.67
Hired labor cost in transporting butter	4.90	1.30
Cost of vehicle in transporting milk	22.38	17.21
Cost of vehicle in transporting cheese	0.33	0.27
Search cost of milk	21.97	10.74
Search cost of butter	10.57	1.89
Search cost of cheese	1.60	0.73
Opportunity cost of capital of butter tied	0.67	0.26
Qt. of milk spoiled	0.17	0.14

Source: Survey results

Transaction cost in dairy marketing can be captured by opportunity cost of labour involved in dairy purchase and sale and cost of holding inventory during the search. Dairy traders besides self-labour hire additional labour and involve family members in search effort. Second, each trader ties up his or her working capital in the form of dairy products for the time required in search. This cost is represented by opportunity cost of the working capital tied during search.

As indicated on the Table 14, much difference is observed between traders in terms of variables like years in dairy trade, years of schooling of trader, amount of working capital used, number of

markets visited/week, number of languages spoken, to number of clients sold on credit, number friends in dairy trade, number of local and distant trade contacts. Difference was observed between traders in number of relatives. Again difference is observed between traders in terms of parents in dairy trade, credit purchase and telephone order. Almost all traders do business alone and no difference was observed between traders who trade alone and those who trade in partnership.

5.3.3. Working capital

The opportunity cost of working capital indicates how costly it would be for a dairy trader to tie up working capital in dairy products for the period of time required for the transaction. Liquid milk is highly perishable and requires immediate sale as it is or should be processed into different dairy derivatives to improve its shelf life. Therefore, the opportunity cost of working capital tied in the dairy trade especially liquid milk is insignificant. Relatively butter has better shelf life and opportunity cost of working capital is also high. Therefore, much time can be spent during butter marketing or in deliberately speculating higher price while the butter is in storage and the capital is tied.

The majority of traders are very small in terms of resources used for the business. Sixteen (53%) sample traders operate with working capital of less than 1000 Birr, and 9(30%) traders operate with financial resources between 1000 and 5000 Birr, and the remaining 5(17%) operate with working capital between 6000 and 15000 Birr. Almost all traders don't involve brokers in buying and selling processes and operate by owners themselves. Sometimes traders take dairy products from suppliers on credit basis and repayment is made right after the sale. Such traders have high opportunity cost because of inability to look for quality dairy products and negotiate or haggle over the prices.

5.3.4. Opportunity cost of labour

It is the result of search time and search labour allocated during search for market information and trading partner. Butter and cheese traders are small and don't involve brokers in search. Mostly they use self-search and in some cases family labour during search. They search for buyers and sellers, and also are responsible for purchasing and selling activities. Therefore,

opportunity cost of their labour is very high. They are mobile and visit several markets in a week.

Milk traders are relatively bigger in terms of resources used such as capital and labour. Most have a premise and utensils for milk sale. They involve hired labour for search in permanent locations.

Males and females process dairy products in the household in the district, when the family has abundant female labour then processing predominantly becomes the task of females. On the other hand, when a family faces shortage of female labour, males get involved in dairy processing activities. Female members of a household process more than double of male members as indicated on the Table 14.

5.4. Methods of Detecting Quality of Dairy Products

Butter purchasers, consumers and traders use a variety of ways in ascertaining the quality of butter and improve their confidence during exchange. Among these procedures are:

1. Before affecting the purchase, traders and consumers take the sample of butter and rub anywhere on the top of their hands. Butter has lowest melting point than many solid foodstuffs and under the normal temperature it starts to melt and spread over the surface of their hand. Butter mixed with foreign matters takes extended time to melt or sometimes not at all. All traders and some experienced consumers in the district use this method in checking the quality of butter. It enables them to be sure whether the butter is mixed with commonly used foreign materials like banana, potato, etc.

2. Use senses of smelling. It is assumed that good quality butter has a characteristic smell, which is very distinct.

3. Butter colour, is also used in the detection of quality. Preferred quality of butter is light yellow. Through time butter also exhibits a tendency to yellow colour. Invariant of time butter mixed with foreign matter, depending upon the colour of the material and proportion, remains to have original colour.

4. After boiling butter, foreign materials will settle and take the lower part of the container while butter particles will come to the surface and take the upper part of the container because butter or fat particles have lower density. Through boiling it is possible to tell the extent of the quality of butter. Making use of this chemical characteristic even un-experienced consumer can easily identify quality butter, which is free from or has the acceptable level of foreign materials. This method is usually used after exchange or transaction is completed and has little or no effect in purchase decision and risk reduction.

5. Price is used as a sign of quality. Implicitly expensive butter is assumed to be of better quality, while cheaper ones are inferior. Sometimes quality is compromised and tradeoffs are commonly observed between quality and price, and for obvious reasons good quality butter fetches higher price.

6. Traders use social capital or networks to develop confidence in exchange. Some traders try to establish better social capital, which is useful for exchange, especially traders who purchase and sell in large quantities and more frequently often have better network of social capital. Traders with better social capital have less concern for quality supervision during exchange, which is replaced by trust and mutual understanding.

The above mentioned methods were used both by experienced traders and consumers in identifying quality butter in the district.

Unlike butter, milk has no easily measurable quality. No distinct traditional methods were observed in local markets in detecting the quality of milk- transactions were based on trust. Both consumers and traders prefer to buy from known source and avoid buying milk from elsewhere. Adulteration with water was a major problem in liquid milk transaction, and because of its physical characteristics, it was difficult to tell the quality from the outset. Thus, often poor quality milk was sold and bought unnoticed. When traders or consumers have doubt over the quality of milk, they let liquid milk to stand for some time till the formation of yoghurt and see

the proportion of fat and solid not fat to water. This helps them in future purchase and sale decisions.

5.5. Marketing Channels

The purpose of this section is to review the structures adopted by marketers to deliver dairy products, mainly milk and butter, from producers to consumers.

Roads, communication facilities and market institutions are often poorly developed in the rural areas and this limit the range of marketing functions and services and confine sales to the nearby consumers. Poor infrastructure coupled with perhisability of dairy products form a major obstacle to the marketing functions and limits the involvement of market intermediaries, which resulted into poor development of marketing channel for dairy products.

Dairy products reach the consumer in a variety of ways: by means of direct sales to rural and urban consumers, direct sales to rural traders or retailers, through farmer trader, direct sales to kiosks and shops, direct sales to the cooperative and dairy processing industries. More often, smallholder farmers transport dairy products to the rural and urban markets themselves, either carrying or using donkeys, and sometimes sell directly to farmer trader (retailers) at the farm gate or in the market, or directly to wholesalers. Urban and peri urban producers sell dairy products to consumers, dairy cooperative and shops / kiosks

Through the network of marketing channel as the dairy product moves from producer to consumer either sold as liquid milk or transformed to butter, ayib (cottage cheese) and yoghurt. The bulk of dairy products in rural areas is sold in the form of butter and cheese, and milk is more transacted around urban and peri urban areas.

Urban consumers have high quality considerations of dairy products such as hygiene and standards. Few and poorly developed dairy market institutions are not able to satisfy these growing needs. This indicates unsophisticated dairy market structure.

Marketing in the form of liquid milk is restricted to major urban centres while transaction in the form of butter and cheese is dominating and undertaken all in rural and urban areas in the district. However, because of limited production of dairy especially butter, the district is not able to satisfy the increasing demand both in urban and rural areas. Therefore, the district is deficit in butter product and there is wide supply-demand gap.

Reduced transaction of liquid milk in the rural areas is mainly because of small dispersed production, problem of collecting and transporting milk to market, bulky and high perishability nature of milk and lack of cooling facilities and reduced demand because of income and inhibiting traditional and cultural taboos in the rural areas. Farm households were using farm gate and milk collection centres owned by the cooperative and milk processing industries as an outlet for liquid milk. No sale of liquid milk was observed in physical market place, which was the case for butter and cheese.

5.5.1. Marketing channels for milk

As depicted on the Figure 5 about 51% the product, passes from the producer to the consumer. Milk is bulky and highly perishable and its spatial transaction is very much limited as compared to butter and cheese. This characteristic of milk and increasing demand for milk in major urban centres has resulted in institutional arrangement to establish reliable outlet. Before the economic reform policies introduced in 1990, milk marketing channel was short due to low level of commercial processing and poor development of market institutions. Milk marketing channel in milk market is changing rapidly with the increasing milk marketing outlets in urban and peri urban areas. This is because of the coming into scene of some new actors to the marketing channel, which were unknown until very recently in the district i.e., dairy producers cooperative and who stood between producers and consumers. This is the second most important channel through which the product reaches the consumer.

Fresh milk for consumption without change of form must flow in the marketing channel very quickly from producers to consumers. The flow of milk through the channel starts with the fresh product produced early in the morning, being sold either to consumers or processors before noon.

Vertical integration by forming producers' dairy cooperative is extremely important in marketing of high quality and highly perishable dairy product such as milk, which ensures greater efficiency and effectiveness in the milk market.

Figure 3 Marketing channels for liquid milk

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                          ┌──────────────────┐
              ┌───────────│  Milk Producers  │───────────────┐
              │           └──────────────────┘               │
              │                     │                         │
              ▼                     ▼                         │
    ┌──────────────────┐  ┌──────────────────┐               │
    │ Dairy cooperative│  │   Bars & shops   │               │
    └──────────────────┘  └──────────────────┘               │
              │                     │                         │
              ▼                     ▼                         │
    ┌──────────────────┬──────────────────────────┐          │
    │ Consumers in the │ Consumers outside the     │◄─────────┘
    │     district     │        district           │
    └──────────────────┴──────────────────────────┘
```
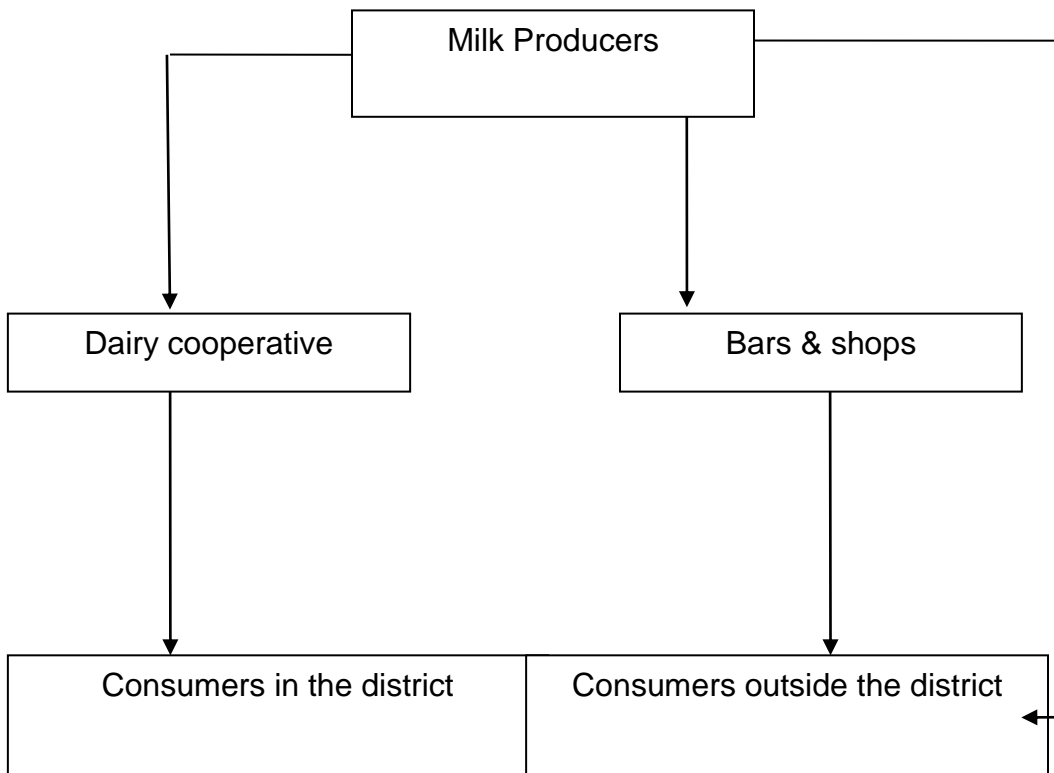
Source: Survey results

5.5.2. Marketing channels for cooking butter

The district is deficit in cooking butter. This demand gap is met through import from Addis Ababa and the neighbouring regions. Fresh butter produced by the smallholder farmer in the district and neighbouring regions is expensive and has dual functions; used for cooking as well

as cosmetics. Usually urban consumers who are concerned with quality and food safety prefer such a product for household consumption. It is more homogenous and fetch similar price to producers as compared to butter imported from Addis Ababa.

Most farmers sell butter in markets within their vicinity. This can be attributed to the small amount of butter produced and offered for sale, long distances, and to the high demand urban and peri urban markets is rare because of reduced output levels and consequently the increasing transactions cost. However, most of the product, around 82%, passes from producer to consumer. Small quantities of butter produced and offered for sale restrict most farmers to take advantage of spatial arbitrage. This is mainly because of the transaction costs and opportunity cost of time for farmers to mediate exchange is high since output levels are low. Therefore, mobile butter traders are involved in accumulating supplies for resale to consumers in rural and urban markets.

Mobile butter traders purchase butter from wholesalers in Addis Ababa, purchase fresh butter and cheese from producers in the district and neighbouring regions for resale in urban and rural market. They buy dairy products of better shelf life from producers at farm gate or at market place after transported to the market. About 5.5% of butter reaches the final consumer through this line of network.

5.6. Marketing Efficiency
5.6.1. Marketing margins
Table 15 Costs and margins of dairy products (milk/liter, butter/kg and cheese/kg) for the Year 2006 in Birr

No	Costs/margins	Mobile Traders (N= 22)		Bars & Shops (N= 8)	Dairy coop. (N= 1)
		Butter	Cheese	Milk	Milk
1. Marketing cost					
1.1	Purchase cost	27.0	4.60	11.00	10.90
1.2	Processing cost	-	0.75	0.047	-
1.3	Transport cost	1.16	0.13	0.057	0.0578
1.4	Spoilage	-	-	0.12	0.0389
1.5	Other costs	0.16	0.30	0.12	0.0032
2. Transactions cost					

2.1	Opportunity cost of capital	0.037	0.18	0.01	0.012
2.2	Opportunity cost of labour	0.70	0.58	0.836	0.077
3.	Total cost	28.943	5.49	3.19	2.0889
4.	Sales	31.40	6.80	3.00	2.1111
5.	Margins				
5.1	Total Gross Marketing argin	14.12%	32.35%	33.3%	10%
5.2	Net Marketing Margin	7.8%	19.3%	-6.3%	1.05%

Source: Survey results

Concentration analysis may be limited in value, and so it is better to include other criteria for measuring efficiency. A measure of market evaluation, which can complement the concentration analysis, is a classic approach called margin analysis.

A common means of measuring market efficiency is to examine marketing margin. This is an attempt to evaluate economic or price efficiency. The overall marketing margin is simply the difference between the farm gate price and the price received at retail sale. It is important to sort out the producers' share in the consumers Birr and also to know the shares of different actors. Market prices reflect two elements; marketing and transaction cost on one hand and normal profit on the other. Normally, at each successive stage, the price per unit is higher because of adding value by all or some of the marketing functions of transport, storage and processing. In marketing margin analysis the purchase price and selling price of dairy products of different marketing middlemen was considered.

 In an efficiently operating market, the competitive environment should keep the marketing margin to the minimum. Efficiency in performance of marketing is not in all cases equated with small marketing margins. Small marketing margin, however, is not always equated with efficient performance in marketing functions. Similarly, large margins are not necessarily a firm indication of inefficiency or excess profit. Marketing margin and costs can be meaningfully discussed in relation to the services and functions provided. Sometimes widening margin overtime may reflect an increasing demand by consumers for additional services. Small-scale

dairy processing and marketing in the district received further boost following policy changes that liberalized dairy marketing, and improved the price they received for dairy products. Since the policy shift, the dairy industry has seen some changes to the emergence of small-scale dairy producing urban and peri urban households, few small scale milk processing and marketing enterprises and dairy cooperative which participate both in formal and informal markets.

Small-scale dairy traders comprise those who trade in butter and milk as a main business, farmer trader, milk bars, processors and those who trade in dairy as part of other retail activity mainly involving sale of other household consumer items like shops and kiosks. Here the dairy trade comprises of less than one fourth of the total turnover.

Mobile butter traders: Those are characterized by lack of fixed premises and the proprietors predominantly run the business personally. Their mode of transport is mainly public transport and sometimes on foot. They involve casual workers in transporting, loading and unloading activities. The majority of them sell butter more often and also cheese less frequently. The butter is purchased from Addis Ababa, and delivered to customers to urban and rural markets. Cheese is assembled from producers at the market on the market day or purchased at the farm gate. It is more perishable as compared with butter and less mobile and they prefer to sell on the day of purchase.

As indicated in Table 15 they get net marketing margin of around 7.8% for butter and 19.3% for cheese. The return per kg of butter was minimal. They also run less risky business because of the reduced perishability of butter and cheese. Especially this characteristic of butter enabled them to visit four to five rural and urban markets per week with the same product at hand. The outlay for marketing and transactions is the highest because of the continuous movement in search of market information, potential buyer and better price. The major marketing cost is the expenditure for transport. Transaction cost is expressed in terms of the opportunity cost of capital tied to butter and opportunity cost of labour involved. The major constraint of mobile butter and cheese traders is lack of enough capital, 46% percent of them indicated shortage of capital inhibited them to improve the business.

Bars and Shops: Traders with dairy bars and shops have fixed premises and mainly sell both pasteurized and un pasteurized liquid milk and in few cases sell yoghurt, fermented liquid milk locally called irgo. They vary from those with the sitting arrangement for customers to those that act only as retail or wholesale. Besides family labour, wage employment is actively involved in running the milk bars. Milk collection from producers is mainly on foot or by public transport. Own vehicle are used in some cases. The net marketing margin is negative and -6.3%, this is because of higher transaction cost mainly opportunity cost of labour involved which can be self labour or owners, family or hired labour working for long hours every day in permanent locations. The transactions cost accounts more than 10% of the total cost. Many of them work in rental houses and allocate some amount of money to settle house rent bill. The purchase price is continuously increasing because of the coming in to the scene of many actors to the sector. The business is risky because of perishability of milk and a portion of milk is wasted due to spoilage.

It operates mainly as bargaining association with a role of securing the most profitable and reliable outlet for the dairy products mainly milk. Further processing and sales of dairy products are left to other handlers. Business risk for bargaining is minimal as they are buyers of milk at the district capital for resale in Addis Ababa. Their strength is in numbers and has limited opportunity to capture more of the consumer dollar since no effort is made for value adding activities such as pasteurization, standardization and packing for which consumers are willing to pay relatively higher price.

Recently, it has a plan for vertical integration and involvement in value addition activities besides bargaining. It started to manufacture the surplus milk into storable hard products like butter and cheese. It is believed that, the capacity to dispose of the surplus milk substantially strengthens its bargaining position but not profitable business as compared to selling liquid milk. Besides, it has also a plan to establish milk and feed processing plants, provide services such as Most of the members of the dairy cooperative keep crossbred dairy cows, the processed dairy derivatives such as butter and cheese from the milk of these cows is surprisingly little in quantity. Therefore, in comparison with the sale of liquid milk dairy processing into butter and cheese is unprofitable or, more commonly, a losing proposition.

The performance of the dairy cooperative and its members over the last few years were dramatic and impressive results were observed. Members of the dairy cooperative and the volume of milk collected for sale increased many fold since its establishment in late 1998. Number of members has increased between the years 1998 and 2005 from 34 to 798, and milk collected and sold has increased from 25703 litres to more than 2.2 million litres for respective years. Eight milk collection centres presently serve the cooperative. With the aim of increasing the volume of milk supply and providing market access to peri urban and rural dairy producers the cooperative has a plan to add extra three milk collection centres, which are all outside the periphery of the town.

As shown in Table 15, the net marketing margin is one of the lowest and is only 1.05% as compared with other traders. However, member dairy producers contribute 100gms/kg of milk sold with the aim of strengthening the financial position of the cooperative and yet many dairy producing households in urban and peri urban areas prefer to sell the produce to the cooperative. This is mainly because they feel the sense of ownership and consider the cooperative as their own and it is also a reliable year round outlet for their produce. The provision of inputs and veterinary services keep members loyalty and maintain milk yield and giving the cooperative economies of scale. Also, lump-sum bimonthly payment allows farmers to budget and thus farmers are prepared to accept lower milk prices from the coop than elsewhere.

5.6.3. Spatial and temporal price behavior of dairy products

Table 16 Price of a liter of milk in Birr when purchased at Alidege

Months	Y e a r s					
	2001	2002	2003	2004	2005	2006
January		9.70	9.80	9.70	9.60	9.70
February		9.50	9.35	9.35	9.30	9.30
March		9.30	9.35	9.35	9.30	9.30
April		9.70	9.60	9.70	9.60	9.80
May		9.70	9.70	9.70	9.70	9.80
June		9.70	9.70	9.70	9.70	9.80
July		9.70	9.30	9.60	9.70	9.70
August		9.70	9.30	9.60	9.70	9.80
Sept.		9.75	9.60	9.70	9.70	9.90
October		9.80	9.60	9.70	9.70	9.90
November		9.80	9.70	9.70	.9.70	9.90
December	9.70	9.80	9.70	9.70	9.70	9.90

Source: Alidege Dairy Cooperative

Table 17 Price of a liter of milk in Birr when sold in Awash

Months	Years					
	2001	20012	2003	2004	2005	2006
January		10.90	11.0	10.90	10.80	10.90
February		10.70	10.55	10.55	10.50	10.50
March		10.50	10.55	10.55	10.50	10.50
April		10.90	10.80	10.90	10.80	11.00
May		10.90	10.90	10.90	10.90	11.00
June		10.90	10.90	10.90	10.90	11.00
July		10.90	10.50	10.80	10.90	10.90
August		10.90	10.80	10.80	10.90	11.00
Sept.		10.95	10.80	10.90	10.90	11.10
October		11.00	10.80	10.90	10.90	11.00
November		11.00	10.90	10.90	10.90	11.00
December	10.90	11.00	10.90	10.90	10.90	11.00

Source: Alidege Dairy Cooperative

The spatial and seasonal price analysis requires reliable and enough time series data. Many marketing middlemen dealing with dairy products were small in terms of resources and human labour involved in the business. They were not able and had no the culture of keeping records. The effort of concerned authorities in collecting and organizing socioeconomic data and making available for concerned individuals and institutions for development work was minimal. In such a situation price analysis has serious limitations.

Secondary price data of dairy products were found at the cooperative and processing industries where prices were set administratively with little impact of demand and supply. Distortions introduced by dairy marketing institutions weaken the link between the local and central markets. Apart from the decision of these institutions poor infrastructure, transport and communication services give rise to large marketing margin in delivering the locally produced dairy products to the central market.

In Table 16 and 17 local and central market prices of a litre of milk was presented, respectively. Throughout the period spatial price difference between local and central markets remained the same irrespective of market forces. A uniform margin of twenty cents for five years indicated price manipulation and quick price transmission which was not proportional to the temporal varying marketing and transactions costs.

The most important seasonal elements resulted in dairy price difference in the district were religion and precipitation. During long Christians fasting periods in the months of February, March and early April prices of dairy products especially milk was depressed. Reduced demand for milk resulted in reduced price of milk. Right after the fasting period price of milk start to soar until the onset of long rainy season in summer. Increased supply during summer makes prices to fall. Increased supply of dairy products in summer was partly the result of improved productivity due to improved animal feed such as natural pasture. The district was deficit in butter and the gap was met through imported butter from Addis Ababa and neighboring locale. Therefore, spatially butter had different price pattern in the district. Butter is relatively less bulky, hard and storable as compared to milk and seasonal or temporal price variation is not automatic as deficit could somehow be adjusted from storage.

CHAPTER SIX

SUMMARY, CONCLUSIONS AND POLICY IMPLICATIONS

This chapter consists of summary and conclusions, and policy implications sections. The summary and conclusion section describes the objectives of the study and gives brief account of methods used and results obtained in the study. Policy implication section elucidates areas for policy intervention.

6.1. Summary and Conclusions

The study was initiated with the objectives of analyzing dairy marketing patterns and efficiency. Market participation and sales volume decisions are found to be important elements in the study of marketing patterns. Participation in dairy sale is a dichotomous dependent variable the Maximum Likelihood Estimation procedure of logit model was thus used in the study. Participation decision of the smallholder was affected by education of household head, experience in dairy production, and return time from the district capital and financial income from different sources. The sales volume decision of dairy was analyzed using Tobit model. Education of the household head, extension visit, and return time from the district capital, financial income from different sources, credit, grain production and crossbred dairy cows were important determinants affecting volume of dairy sales.

Marketing structure was analyzed with the help of concentration ratio. Marketing costs and margin were also analyzed in this study. Milk and butter marketing channels are established in the study. Milk marketing is changing rapidly with increasing market oriented small scale dairy producers and milk marketing outlets, such as milk processing industries and dairy producers cooperative which stood between producers and consumers.

Dairy market in the study area is characterized by the prevalence of un concentrated supplies. Products are supplied by a very large number of producers from different areas. At buyers' level market is also un concentrated for butter and cheese. On the other hand, milk market at buyers' level is weakly olygopsonistic applying criterion of the four firms' concentration ratio (CR4),

which is 41.2%. Concentration analysis is limited in value and complemented by analysis of marketing margins. A product method of marketing margin analysis is used for different actors. Dairy processing industries enjoy the highest return per unit of milk processed, and net marketing margin of 19.9%. In the other extreme, dairy bars and shops get minimum net marketing margin of – 6.3% because of higher transactions cost mainly opportunity cost of labor involved.

6.2. Policy Implications

Strategies that are of significant importance which are also policy relevant are provision of quality animals both local and crossbred, which improve total production and subsequently marketable surplus. Dairy production especially in rural area is small to support an elaborated marketing system. The low marketable output generates limitations to explore distant but rewarding markets due to high transaction costs arising from transportation and high opportunity cost of labor involved.

Remoteness from district capital and demand areas is one of the constraints to dairy marketing in the district, which resulted into inadequate marketing link between the rural producer and the urban consumer. This missing link can be forged through institutional arrangement such as cooperative structures. Cooperatives can be very successful in dealing with both information asymmetries and easily attain competitive edge. They do this through collective action, pooling resources and lowering the unit cost of transactions. Members should widely understand the cooperative and its objectives and established voluntarily without any form of external imposition. Once decision to adopt cooperative structure as a means of dairy development is taken, government policies may be used to support dairy cooperatives.

In the district collecting and transporting milk and its dairy derivatives from its production site to the consumption to the transformation unit or consumption zone is a challenge to the dairy marketing and development. Improved collection and reduction in milk wastage requires improved infrastructure and transportation means.

From results of the study provision of extension service improve dairy sales volume. Market extension services rendered to smallholder should be relevant and enough. However, with major

thrust of extension agencies on production techniques, marketing extension so far has not received the attention it deserves. Moreover, farmers have increasingly begun to perceive marketing rather than production as major constraint to enhancing farm incomes. Marketing extension was a peripheral issue in the extension scenario so will need to be brought to centre stage and production needs to be significantly dictated by market requirements. Another need is enlightening the producer seller on consumer preferences and to advise him on the proper methods of processing for marketing, storing, packaging, handling and transporting and to improve the quality of the produce to secure a better return.

Dairy marketing and processing activities are predominantly the concern and tasks of ladies in the household in the district. Trained and educated ladies are found to participate in dairy market. Extension and training programmes in dairy market should be designed primarily in such a way to target and enlighten these sectors of the society.

Marketing is a multistage process. For the improvement and development of marketing structure, a coordinate approach aiming at removing all the weak links of the marketing channel is essential. A package of improved marketing services in the form of regulated markets, grading, weighing, storing, transporting and handling services need to be made available to ensure the producer a fair return from his production efforts and a better share in the price paid by the consumer. On the other hand ensure the consumer to get quality product in relation to the money outlay.

Financial capital, such as financial income from different sources and credit (loan) found to stimulate dairy market participation and volume decision. However, extension of bank credit is conditioned by the availability of collateral. Land ownership issues, traditional farming practices and lack of market access often prevent smallholder farmer from obtaining loan from banks. Therefore, increasing the dimension of access to credit and forming well functioning formal rural and urban financial systems are critical in influencing entry to the dairy market.

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SUMMARY OF SURVEY QUESTIONARIE

Dairy Producers Survey

I. General Conditions;

    1. Date of the interview; Date _____ Month_____ Year _____

    2. Name of the interviewer _____ _____

    3. Name of the service cooperative: _____

    4. Name of the kebele (PA): - 1. 2. _____

    5. Name of the village _____

    6. Name of the interviewee (household head):_____

    7. Sex of the household head 1=Male 2=Female

    8. Age in year's _____

II. Membership in Dairy Cooperatives;

    1. Are you a member of dairy cooperative? Yes 2. No

    2. If yes, what is the name of cooperative? _____

    3. Why you joined the cooperative?

    1. The cooperative provide better price

    2. The cooperative try to hold the cost down

    3. The milk hauling and other services rated to be excellent

    4. Provide guaranteed outlet (market)

    5. Give field service or technical assistance __ 6. The scaling is fair ____

    7. It makes timely payment _____8. Others (specify)_____

III. Unfavorable Events in the Household for the Last Twelve Months;

    1. None 2. Death of the household member   3, Illness and accidents   4. Major crop and
    livestock loss   5. Others (specify)

IV. Pastoralism Experience in Number of Years; _____

V. Experience in Dairy Production in Number of Years; _____

VI. Size, Sex and Age Composition Household Members;

Sex	Age in Years				
	<5yrs	6-10 yrs	11-15yrs	16-65yrs	>65years
Male					
Female					

    Available family labor aged between 15 and 65 years old; _____

VII. Educational Level;

1. Years of schooling of the household head; _____

2. Years of schooling of the spouse; _____

3. The schooling of other household members;

No	Household members	Age in years	Relation to the hh head	Years of schooling
1				
2				

VIII. Distance to Market, Roads and Urban Center;

1. Distance to the nearest milk and other dairy product market/collection centre in km; _km

2. Distance to roads and Awash town;

1. Distance to the werer ; __ km, walking time _____ hrs

IX. Extension Services;

1. Do you have access to livestock extension services? 1. Yes 2. No

2. If yes, mention the source and how often you were visited in the last twelve months?

Livestock extensions	Number of visits made by extension agent	Purpose of the visit
Governmental		
Private		
Cooperative		

3. Which main aspects of dairying were you advised by livestock extensions?

4. Did you find the advice from extension agent adequate 1. Yes 2. No

5. If no, what else you needed to be advised?

X. Financial Obligation;

1. Number of students in school (proxy to financial obligation); _____

2. Rank how income from dairy is spent;

Type of Expenses	Rank
Expenditure incurred for students	
To buy grain for home consumption	
To buy other food	
To buy soap and clothes	
For loan repayment	
Expense incurred for replacement stock and other farm inputs	
Others (specify 1.	

2.	

XI. Credit;
1. Total amount of loan received in the last year;
       1. No loan _____ 2. From formal institutions_____ 3. From informal sources _____ 4. Amount repaid_____
2. What is the purpose of taking loan?
       1. For dairy production 2. For production other than dairy 3. Others (specify) _____
3. Did you get credit when you needed it? 1. Yes 2. No
4. Have you applied for credit this year? 1. Yes 2. No
5. If no, why?
       1. Lack of collateral   3. Unfavorable burocracy
       2. Don't need/want to take credit   4. Others (specify) _____
6. On what basis do you think creditworthiness is judged?
       1. Collateral   4. Relationship with these institutions
       2. History of repayment   5. Others (specify)
       3. Personal characteristics like hard work, health, age and knowledge of the work
7. What criteria do you use whenever you choose the lending institutions?
       1. Interest rate 4.Restrictions on their use
       2. Type of loan provided 5. Physical proximity
       3. Non financial services provided like training 6. Others (specify)____
XII. Dairy Herd, Production, Consumption and Sales Last Week;
    1. Dairy herd

Cows	Breed type	Number of dairy cows	Number of milking cows	Yield/day (Liters)
Crossbred cows				
Local cows				
Total				

2. Production, consumption, processing and sale of milk in the last week;
       1. Total liters of milk produced __ 2. Total liters of milk consumed___
       3. Frequency of consumption ___4. Total liters of milk sold_____
       5. Total liters of milk processed into;
         2.5.1.Butter____ 2.5.2. Cheese _____2.5.3. Yoghurt_____
       6. Total liters of milk required to process;
       1. A kg of butter _____2. A kg of cheese_____
       3. A liter of yoghurt/ergo_____
3. Production, consumption, processing and sale of butter in the last week;
       1. Total kg of butter processed _____
       2. Total kg of butter consumed _____
       3. Frequency of consumption _____4. Total kg of butter sold _____
4. Production, consumption, processing and sale of cheese in the last week;
       1. Total kg of cheese processed__2. Total kg of cheese consumed___

       3. Frequency of consumption_____ 4. Total kg cheese sold_____

5. Production, consumption, processing and sale of yoghurt/irgo in the last week:
       1. Total kg/Lt of yoghurt/irgo processed _____
       2. Total kg/liter of yoghurt/irgo consumed _____
       3. Frequency of consumption _____
       4. Total kg yoghurt/ergo sold _____

6. Main reasons for selling dairy product in the above form in order of importance;

Dairy products	Reasons			
Milk				
Butter				
Cheese				
Yoghhurt/irgo				

7. Where do you get market information (information on prices and trading partners)?

8. What do you do if you can't sell dairy products on a market day at a market?
       1. Take back and consume _____ 2. Move to another market
       3. Take to residential areas and look for buyers
       4. Keep until next market day

XIII. Market Outlet and Buyer Type of Different Dairy Products Last Week;
    1. Quantity of sales of dairy products and buyer type;

Dairy products	Unit (Qt)	Buyer type					
Milk		1	2	3	4	5	6
Butter							
Cheese							
Yoghhurt/irgo							

       Buyer type 1=consumer 2=Retailer 3=Wholesaler 4=Catering shop 5=Organizations (hospitals/schools/hotels) 6= Dairy and Dairy Products Marketing Association

2. In deciding to whom to sell, what factors do you consider?
       1. Price
       2. Closeness in distance 3. Transport availability
       4. Others (specify)_____

3. Reasons and Nature of change in the market outlets during the last one year;

Change from _____ to _____	Reasons

Outlets 1. Farm gate 2. Collection center 3. Delivery to the market
4. Others (specify)

XIV. Marketing and Transactions Costs Last Week;

Quantity and cost items	Dairy Products				
	Milk	Butter	Cheese	Yoghurt /irgo	Total
1. Qt for sale/week					
2.Processing labor hour (hr) 2.1. Male labor 2.2. Female labor					

3. Transportation
 3.1. Labor hour (hr)
     -Self
     -Spouse
     -Children
     -Hired labor
 3.2. Hired labor cost (Br)
 3.3. Cost of donkey or equivalent (Br)					

4.Search 4.1. Search labor (hr) 4.2. Total capital tied during search (Br) 4.3.Opportunity cost of capital tied during search (Br)					

5. Loss due to spoilage
  -Qty
  - Br					

6 Selling/negotiating 6.1. Labor hr					
7. Sales outlet 7.1. Prices/unit by sales outlet					
8. Buyer type 8.1. Prices/unit by buyer type					

9. Total sales
  - Qty
  - Br					

10. Mode of payment					
11. Tax paid (Br)					

Outlets: 1=Market place 2=Collection center 3= Delivery to the market 3= others (specify)
Buyer type: 1=consumer 2=Retailer 3=Wholesaler 4=Catering shop
5=Organizations (hospitals/schools/hotels)
6= Dairy and Dairy Products Marketing Association
7. Others (specify)

Mode of payment: 1. Cash 2. Cash in advance 3.Credit 4. Barter 5. Others (specify)_____

   2. Do you sale products other than dairy at the market or at other outlets?

      1.Yes 2. No

      3. If yes, what is the percentage of this sale of the total?

Marketed products	Percentage (%)
1. Dairy products	
2. Products other than dairy	
Total	

XV. Major Problems (the most important problem) in Sale of Dairy Products

Dairy products	Problems		
	Product related	Buyer related	Price related
Raw milk			
Butter			
Cheese			
Yoghurt/irgo			

XVI. Wealth

1. Size of land holding with exclusive right (ha); _____

2. Area of land allocated to different enterprises with exclusive use (ha);

   1. Cropped _____2. Fallow_____ 3.Pasture _____

   4. Unproductive land _____ 5. Others (specify) _____

3. What activities/jobs you do during the off-farm period?_____

4. Income from off farm activates?

   1. Per day _____2.Per week _____ 3.Per month _____

   4. Others (specify) _____

5. Do you have any other income source?

   1. None 2. Salary 3. Pensioner 4. Remittance from abroad

5. Remittance from domestic 6. Others (specify_____

6. How much you get per (day/week/month/year)? _____

7. Income of other family member per (day/week/month)_____

8. Present livestock possession and sale by households;

Type of livestock	Number of animals owned	Number of animals sold	Income from the sale of livestock in the last 12 months (Br)
Lactating cows			
Dry cows			
Calves			

Heifer			
Bulls			
Oxen			
Sheep			
Goat			
Donkey			

XVII. Grain Production;
>   1. Total grain produced/year, _____
>   2. Adequacy of grain for family need or consumption;
>   2.1. Adequate   2.2. Deficit   2.3. Surplus for sale

Dairy Marketing Middlemen Survey

I. General
>   1. Date of the interview; Date _____ Month_____ Year _____
>   2. Name of the interviewer _____ _____
>   3. Name of interviewee _____
>   4. Residence; Town _____ Higher _____ Kebele _____
>   5. Type of trader 1.Wholesaler 2. Retailer 3.Catering shop 4.Farmer
>   5. Broker 6.Others (specify)
>   6. When do you trade?
>   1. Year round ____ 2. During holidays only _____
>   3. When purchase price becomes low _____ 4. Others (specify) _____
>   7. How long have you been in dairy trade? Years _____
>   8. Educational level; _____
>   9. Religion 1. Christian_____ 2. Muslim __3. Others (specify) _____
>   10. Amount of capital currently used? _____Birr
>   11. How many markets do you visit per week to sale dairy products?_____
>   12. Name of the market(s)?_____ _____ _____
>   13. Do you trade alone or in partnership? 1. Alone 2. Partnership
>   14. If in partnership, how many of them are in business?

II. Assets;
1. Asset ownership of trader;

>   1. None   5. Access to telephone
>   2. Vehicle for transport   6. Electricity
>   3. House   7. Radio
>   4. Storage equipment   8. Others (specify) _____

2. What is the critical asset enables to become a trader?

Name of Asset	Rank	
Cash		1= 1st
Trust		2= 2nd
Buyer credit		3= 3rd
Sales advance		4= 4th
Social capital like		5=5th

parents/friends in trade		

3. Number of languages spoken; _____

4. Social capital;

       1. From how many people do you buy on credit _____

       2. To how many people do you sell on credit _____

       3. Number of friends in dairy trade_____

       4. Number of family members in dairy trade_____

       5. Number of local trade contracts in the last week_____

       6. Number of distance trade contracts in the last week_____

       7. Number of partners through telephone order only_____

       8. Was your father/mother in dairy trade?

III. Choice of Source of Dairy Products;

1. What factors and levels do you consider when you buy dairy products?

Factors and levels	Dairy products			
	Milk	Butter	Cheese	Yoghurt/irgo

2. How do you detect or measure these criteria or standards of quality?

       1. _____

       2. _____

       3. _____

       4. _____

IV. Marketing and Transactions Cost Last Week;

Quantity and cost items	Dairy products			
	Milk	Butter	Cheese	Yoghurt/irgo
1.Qt purchased (kg/Lt)				
2. Cost of buying				
3. Sources 3.1. Prices/unit by source				
4. Mode of payment				
5.Processing labor hour (hr) 5.1. Male labor 5.2. Female labor				
6. Transportation 6.1. Labor hour (hr) -Self -Spouse -Children -Hired labor 6.2. Hired Labor cost (Br) 6.3. Cost of donkey or equivalent (Br)				

6.4. Cost of vehicle (Br)				
7.Search 7.1. Search labor (hr) 7.2. Total capital tied during search (Br) 7.3.Opportunity cost of capital tied during search (Br)				
8. Loss due to spoilage - Qty - Br				
9. Selling/negotiating 9.1. Labor hr				
10. Sales outlets 10.1. Prices/unit by outlets				
11. Buyer type 11.1. Prices/unit by buyer type				
12. Total sales - Qty - Br				
13. Mode of payment				
14. Tax paid (Br)				

Sources: 1= Farm gate 2= Processing plant 3= Wholesale 4= Delivered at home or shop 5= Cooperative 6= other groups (specify) _____
Mode of payment: 1= Cash 2= Cash in advance 3= Credit 4= Others (specify_____

Outlets: 1= Own 2= Delivery to the market place 2=Collection center 3= Delivery to the buyer 3= Others (specify) _____

Buyer type: 1=consumer 2=Retailer 3=Wholesaler 4=Catering shop 5= Organizations (hospitals/schools/hotels) 6= Dairy and Dairy Products Marketing Association 7= Others (specify) _____

V. Nature of Transaction such as Purchase and Sale of Dairy Products;
1. Is there a change of market source of dairy products during the last one year? 1. Yes 2. No
2. If yes, what is the reason for the change of source? 1. Good price 2. Short distance 3. Product quality 4. Reliable supplier 5. Mode of payment 6. Others (specify)
3. Is there a change in the market outlet during the last one year? 1. Yes 2. No
4. If yes, what is the reason for the change of market outlet? 1. Good price 2. Short distance 3. Take any quantity 4. Reliable buyer 5. Mode of payment 6. Others (specify)
5. Is there a change in the mode of payment in the last one year? 1. Yes 2. No
6. If yes, what is the reason for the change of mode of payment?
7. Who does purchasing/collecting dairy products for you?
1. Myself 2. Brokers 3. Agents 4. Relatives 5.Others
8. What is the basis of payment to purchasers?

kg/liter of butter/milk bought 6. Others (specify) _____

9. How much did you pay to purchasers on the above basis (Br)? _____

10. How much kg/liter of dairy products did you buy/offer once?
    1. Milk 2. Butter 3. Cheese 4.Yoghurt

11. How   1. I don't pay   4. On monthly basis

           2. on daily wage basis   5. As percentage of selling price

           3. On many days will it take you to sell dairy products offered once?

               1. Milk 2. Butter 3. Cheese 4. Yoghurt

12. Do the markets from where you buy dairy products vary from season to season? 1. Yes 2. No

13. If yes, what is the reason? 1. Price difference 3. Better seasonal supply
                       2. Transportation problem 4. Others (specify)

14. What do you do if you can't sell all the dairy products on a market day at a market?
    1. Take back and consume _____ 2. Move to another market _____
    3. Take to residential areas and look for buyer's _____
    4. Keep until next market day_____

15. Where do you get market information (information on price and trading partners)?

16. How do you discover/determine price at the market?

VI. Main Problems with Sale and Purchase of Dairy Products (Prioritize);

Dairy products	Problems related to purchase	Problems related to sale
Milk		
Butter		
Cheese		
Yoghurt/irgo		