ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES

Social Capital and Smallholder Farmers' Collective action: the Case of Primary Dairy Cooperatives in West Shoa Zone, Ethiopia

Daniel Belay Tesfaye

A Thesis Submitted to

School of Graduate Studies of Addis Ababa University in Fulfillment of the Requirements for the Degree of Doctor of Philosophy in Development Studies

Addis Ababa, Ethiopia

June 2018

Addis Ababa University

School of Graduate Studies

This is to certify that the thesis prepared by Daniel Belay, entitled: *Social Capital and Smallholder Farmers' Collective action: the Case of Primary Dairy Cooperatives in West Shoa Zone, Ethiopia* and submitted in fulfillment of the requirements for the Degree of Doctor of Philosophy in Development Studies complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

Signed by the examining committee:

_____ Signature _____ Date _____

Advisor

_____ Signature _____ Date _____

Advisor

_____ Signature _____ Date _____

Examiner

_____ Signature _____ Date _____

Examiner

_____

Chair of Department or Graduate Program Coordinator

DEDICATION

This doctoral thesis manuscript is dedicated to

- My supervisor, the late Prof Workneh (May God put his soul in peace), a dedicated mentor, an enthusiastic and friendly teacher, and above all a great and humble person.
- My mother, Shege Tulu and my father, the late Belay Tesfaye (May God put his soul in peace), who have never failed to give me moral support and commit their prayer, and from whom I learnt perseverance.

DECLARATION

I, Daniel Belay, hereby declare that the thesis entitled: *Social Capital and Smallholder Farmers' Collective action: the Case of Primary Dairy Cooperatives in West Shoa Zone, Ethiopia* submitted by me for the award of the Degree of Doctor of Philosophy (Development Studies) is my own original work, which has not been submitted for a degree or examination in any other university, and that all the sources I have used or quoted have been indicated and acknowledged by means of complete references.

Daniel Belay Signature _____

Addis Ababa University, Addis Ababa

Date _____

ACKNOWLEDGEMENTS

At the end of this long trip I would like to thank and praise the Almighty God for his compassionated help to complete this study.

I would like to sincerely express my continuing indebtedness to the late Prof Workneh Negatu who died three weeks after the dissertation submission and Dr Seife Ayele (at the Institute of Development Studies/UK), my supervisors, for their responsible and kind guidance, constructive feedbacks, and encouragement during the development and completion of this dissertation. I am immensely grateful to them for their friendly and warm welcoming approach. Thanks so much for your unreserved intellectual and supervisory support which have made this study a reality.

I owe a great deal to my beloved family. My parents (Belay and Shege), sisters (Yeshi and Zena), and brothers (Samuel and Yosef) have always been supportive and encouraging me. My greatest appreciation is to my mother, who always strives to see my success. Words fail to convey her sympathetic encouragement and emotional support in my life. Whatever I have achieved in life is all because of her prayers and love. I am also very thankful to my father (may Lord put his soul in peace). I can imagine he would have been a proud father today when I am completing this important milestone of my career.

I want to express my deepest gratitude to my wife, Asegedech Wondimu, for her support, countless sacrifices, and love which have helped me to finish my study. I am truly blessed to have her by my side. We were wed in the middle of my PhD study and have had an amazing son, Aaron, along the way. Aaron, your love has seen me enjoying and motivating my final year of writing the dissertation, not forgetting the challenges I faced as caring and thoughtful father.

I am grateful for the support of the farmers, cooperative chairpersons, and experts who participated in questionnaire surveys, interviews, and group discussions. I am also grateful to my research assistants for their support throughout the fieldwork. I thank all my friends and colleagues for their support and encouragement. Asechalew Feleke, Dereje Belay, Ashenafi Chaka, and Ermias Habte (PhD) deserve special thanks.

Finally, I am indebted to extend my heartfelt gratitude to all people and institutions which I cannot mention their names here but contributed to the completion of this study.

ABSTRACT

Dairy cooperatives promote collective actions to improve smallholder farmers' livelihoods by linking them to markets. They are social capital-based organizations aimed at increasing mutual benefit to members. Social capital enhances members' cooperation and participation in collective actions. Despite its significant importance, far fewer studies examined social capital as farmers' propensity to engage in collective marketing. The purpose of this study is, therefore, to construct indicators and measure the dimensions of social capital at an individual farmer level and investigate their contribution to milk market participation in dairy cooperatives. Quantitative data analysis was carried out on primary data collected in a survey of 154 dairy cooperative members. A two-stage sampling procedure was used to select the sample farmers for the study. At first stage, Extra Value Index was developed and used for selecting dairy cooperatives. The second stage involved systematic random sampling procedure for selecting every 'nth' farmer in each selected cooperative. Probability proportional to size was used to select sample farmers from the cooperatives. Qualitative tools were also employed to generate data that supplement the interpretation and clarification of results from the quantitative analysis. Principal component analyses were performed on data sets of dimensions of social capital in order to construct composite indicators for measuring farmers' dimensions of social capital: structural, relational, and cognitive. The method provided single, synthetic measures for each dimensions of social capital which are reliable, valid, and consistent. The measures were also robust and exhibit constructs validity. The Seemingly Unrelated Regression analysis revealed that various demographic, socioeconomic, and institutional factors influence farmers' dimensions of social capital. The result of the independent sample t- tests showed that women have less structural social capital than men. The result of the ANOVA test also showed that there is a relationship between gender difference in structural social capital & milk market participation. The Tobit regression revealed that there is a positive relationship between farmers' trust and quantity of milk marketed through the cooperatives. The results from Probit & Tobit regressions also revealed that various demographic, socioeconomic, and institutional factors influence farmers' milk market participation. Important implications of this study include (1) the study provided reliable, valid and consistent measures which can give a solid basis for a robust assessment of farmers' dimensions of social capital;(2) investment in education system, creating enabling environment for development of local associations, promotion of cooperative through mass media, and strengthening the existing training and capacity building measures are worthy of consideration for improving farmers' dimensions of social capital; (3) Paying attention to gender within social networks of the cooperative and to the broader context of gender differences within which social networks are forged, increasing farmers' interactions in the cooperatives, providing continuous gender training and capacity building, reducing gender inequality in access to productive resources and services need to be considered for improving gender differences in structural social capital and milk market participation; and (4) creating conditions which generate farmers' trust, improving the performance of the cooperative, and establishing additional milk collection centers should be aimed in order to enhance farmers' milk market participation in dairy cooperatives. In general, the study provides valuable insights on the role of social capital as a way to enhance farmers' market participation in dairy cooperatives & have implications for designing appropriate policies to improve farmers' livelihoods by linking them to market through cooperatives.

***Keywords**: social capital; collective action; dairy cooperative; market participation; Ethiopia.*

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACRONYMS AND ABBREVIATIONS

AADDP	Addis Ababa Dairy Development Project
AADI	Addis Ababa Dairy Industry
ADLI	Agricultural Development-led Industrialization
ANOVA	Analysis of Variance
CADU	Chilalo Agricultural Development Unit
CSA	Central Statistical Authority
DDA	Dairy Development Agency
DDE	Dairy Development Enterprise
EATA	Ethiopia Agricultural Transformation Agency
ENPC	Ethiopia National Planning Commission
EVI	Extra Value Index
FAO	Food and Agriculture Organization
FCA	Federal Cooperative Agency
FDRE	Federal Democratic Republic of Ethiopia
FINNIDA	Finnish International Development Agency
GDP	Gross Domestic Product
GoE	Government of Ethiopia
GTP	Growth and Transformation Plan
IFPRI	International Food Policy Research Institute
ILRI	International Livestock Research Institute
MoFED	Ministry of Finance and Economic Development
NGO	Non Governmental Organization
OBFED	Oromia Bureau of Finance and Economic Development
OECD	Organization for Economic Cooperation and Development
OLS	Ordinary Least Squares
PCA	Principal Component Analysis
PASDEP	Plan for Accelerated and Sustained Development to End Poverty
SDPRP	Sustainable Development and Poverty Reduction Program
SNNP	Southern Nations Nationalities and Peoples
SNV	Netherlands Development Organization

SUR	Seemingly Unrelated Regression
USAID	United States Agency for International Development
WSZCPO	West Shoa Zone Cooperative Promotion Office

CHAPTER 1: INTRODUCTION

1.1. Background

In Ethiopia, agriculture remains to be the most important economic activity, providing income, employment and foreign exchange. The sector contributes 38.5% of GDP, 75% of employment, (ENPC, 2016), and nearly 80% of export earnings (EATA, 2014). It provides most of the raw materials for Ethiopian industries. The agricultural sector is dominated by crop production, contributing 71.2% of the agricultural GDP. The livestock production contributes to 20.5% of the agricultural GDP. The residual (8.3%) is contributed by forestry and fishing (ENPC, 2016). Smallholder farmers are the overwhelming actors within the sector and contribute to the bulk of output. They contribute to 96% of crop production (MoFED, 2014) and 95% of milk production (Makoni et al., 2014).

Livestock production is an essential component of agricultural system in Ethiopia. It provides food, traction, manure, fiber, and performs other social and economic functions (ILRI, 2005). The livestock population is estimated to be 59.5 million cattle, 30.7 million sheep, and 30.2 million goats (CSA, 2017). Ethiopia has the potential for dairy development due to its favorable agro-ecology, huge livestock population, and increasing demand for dairy products in the urban centers (Mohammed et al., 2004; Staal et al., 2008; Zelalem et al., 2011). The authors asserted that investing in dairy development interventions can contribute to poverty reduction by increasing the income of the rural poor. They pointed that development interventions can transform the existing largely subsistent type of milk production to commercial level.

Improving smallholder farmers' market access has become a prominent element in strategies to promote rural development and poverty reduction in Ethiopia (MoFED, 2014; ENPC, 2016). For this to be realized, development interventions need to address the multiple market failures that the smallholder agriculture suffers from. Much of the literature documented that smallholder farmers face many constraints that limit their participation in the market (e.g. Bellemare and Barret, 2006; World Bank, 2008; Bekele et al., 2009; Markelova et al., 2009; Bernard et al., 2010). In the rural settings, the development of markets is limited by geographical isolation (remoteness or poor roads and poor communication systems) and lack of market infrastructure (World Bank, 2008). This holds true for the Ethiopian case where smallholder farmers face high

transaction costs that considerably reduce their incentives to take advantage from participation in markets (Holloway *et al*., 2000; Bellemare and Barret, 2006; Bernard et al., 2010).

Studies suggested that collective action mechanisms are avenues to reduce high transaction costs (Bekele et al., 2009; Markelova et al., 2009; Bernard et al., 2010). The authors stated that collective action enables smallholder farmers to pool their inputs and outputs, realize economies of scale in marketing, and bargain for better terms of trade in marketplace. In this regard, agricultural cooperatives are one of the instruments to promote collective actions. Cooperatives are supposed to address smallholder farmers' market constraints through collective action. They have been promoted as a means to reduce transaction costs by creating economies of scale for marketing input and outputs (Bekele et al., 2009; Bernard et al., 2010).

In Ethiopia, there is a renewed interest in collective action to promote greater market participation by smallholder farmers. Since 1994, the GoE has made efforts to promote a new generation of cooperatives that are voluntary, inclusive, and accountable, in contrast to the cooperatives formed under the previous regimes (Bernard et al., 2010). The perception that cooperatives can facilitate the market integration of smallholder farmers includes the dairy sector. The existence of high marketing costs, the prevalence of limited markets, and the riskiness attached to marketing this perishable commodity suggest that transactions costs play a significant role in dairy marketing (Holloway *et al*., 2000). Under such conditions, dairy cooperatives play an important role in reducing transaction costs and enhancing market participation (Holloway *et al*., 2000; Asfaw, 2009; Francesconi, 2009).

A growing body of literature has acknowledged social capital as an important factor in building and maintaining collective action (e.g. Meinzen-Dick et al., 2004; Ostrom and Ahn, 2007). Social capital defined as an "attribute of individuals and of their relationships that enhance their ability to solve collective action problems" (Ostrom and Ahn, 2007, p. 5). Ostrom and Ahn argued that social capital enhance trust among individuals and, thus, breed cooperation in collective action. Similarly, Meinzen-Dick et al. (2004) asserted that social capital (trust, reciprocity and networks) plays a key role in facilitating interactions among individuals that leads to collective outcomes. The authors contended that social capital is a resource developed and owned by individuals pursuing different livelihood strategies requiring coordination and collective action.

Literature indicated that cooperative is formed with the motivation of mutual benefit and the expectation of collective actions among members. As self-driven and autonomous organizations which are jointly owned and controlled, cooperatives depend on high involvement and interaction among members in decision making and distribution of benefits (Valentinov, 2003; 2004; Nilsson et al., 2012). The authors pointed that interpersonal relations are the foundation upon which cooperation, communication and coordination within a cooperative are based. Cooperatives are reliant on social capital as a resource for coordination of actions within the members, and the creation of links between the members. Social capital addresses and facilitates relationships, cooperation, and trust within the cooperatives (Valentinov, 2003; 2004). As Valentinov (2004, p. 1) pointed "cooperatives are a special, social capital-based, type of organization".

Various models have been advanced to capture the concept of social capital, but one of the most widely accepted frameworks is that of Nahapiet and Ghoshal (1998). Their framework draws important distinctions between the structural, relational, and cognitive dimensions of social capital. The framework overcomes the conceptual vacuity of this kind of immaterial resources and social capital research must consider each of these dimensions, which are more relevant in the context of organizations such as cooperatives. Nahapiet and Ghoshal (1998) and Nardone *et al*. (2010) suggested that when social capital outlined by these three dimensions, it becomes more robust and well-defined with greater applicability for developing meaningful and applicable insights for researchers.

The structural social capital refers to the formation of interpersonal linkages between members (Nahapiet and Ghoshal, 1998; Tsai and Ghoshal, 1998). The structural dimension of social capital relates to how members derive an advantage by using personal contacts within the social structure of interactions (Nardone *et al*., 2010; Gómez-Limón *et al*., 2014). Relational social capital refers to the properties of interpersonal relationships members developed as result of interactions. Literature indicated that this dimension of social capital facilitates social and resource exchange. It also enhances communication, and cooperation between the members (Nahapiet and Ghoshal, 1998; Tsai and Ghoshal, 1998). Cognitive social capital relates to the shared vision that facilitates the understanding of mutual goals and proper actions. This

dimension of social capital includes elements of social organization (beliefs, values, etc.) that enable members to reach a shared vision (Nardone *et al*., 2010).

The literature on social capital pointed that social capital can be analyzed at both the individual and collective level (Putnam, 2000; Yang, 2007). Studies take it for granted that social capital is collective property for a reason that social capital is embedded in social relations. However, Putnam and Yang argued that social capital should be analyzed at an individual level as collective level has its basis in individual behavior and attitudes. If social capital is to be analyzed at collective level, then the analysis should explicitly draw on a clear definition of individual social capital. While analyzing social capital at an individual level, researchers need to refer to the "features of social groups or networks that each individual member can access and use for obtaining further benefits" (Yang, 2007, p. 19).

Social capital measurement in cooperatives can provide a reliable indication of farmers' social connections and relationships, quality of relationships and interactions, and understanding of collective goals (Nahapiet and Ghoshal, 1998). A large body of literature showed that there is neither a universal method of measurement nor a commonly accepted single indicator which is believed to be adequate enough for robust assessment of facets of social capital. Social capital, which is multidimensional in nature, revolves around the different features of human behavior and relationships (Sabatini, 2009; Nardone *et al*., 2010; Gómez-Limón et al., 2014). The authors indicated that social capital measurement approaches need to focus on particular proxy variables (indicators) for human behavior and relationships with which the concept associated with. They pointed that using multiple indicators combined in an index is the preferred method to measure social capital.

Social capital is a productive asset that is built up through investment (Bourdieu, 1986). Bourdieu asserted that once built up, social capital generates a return, depreciates over time, and thus, it should be kept up to prevent from depreciating. Individuals' stock of social capital is considered as prerequisite for positive outcomes for individuals and the group as whole (Muñoz-Goy, 2013). Studies contended that investment in social capital depends on the individual factors and contextual or systemic factors at the level of community/nation (e.g. Alesina and Ferrara, 2000; Fidrmuc and Gërxhani, 2008; Kaasa and Parts, 2008). The authors argued that identifying determinants of individual social capital is important in improving the stock of social capital.

Gender-related social capital has become one of the emerging themes in the literature. Social capital builds and maintains collective action in gender differentiated social groups (Cleaver, 2005). Gender differentiated social capital is not inherently beneficial to collective action if social capital upholds exclusion (Sanginga *et al.*, 2010; Muñoz-Goy, 2013). However, studies contended that gender plays an important role in social capital formation and there is gender inequality in relation to the mobilization of social capital, or the potential use of the resources embedded in the social network (Westermann *et al.*, 2005; Sanginga *et al.*, 2010; Muñoz-Goy, 2013).

Studies particularly emphasized the role of trust in cooperatives. They identified trust as a key element in organizations such as cooperatives that have acknowledged the relevance of cooperation (Hansen et al., 2002; James and Sykuta, 2006; Österberg and Nilsson, 2009). The authors argued that trust is an important component of relational social capital that is associated with farmers' commitment, communication, and participation in cooperatives. For example, Hansen et al. (2002, p.1) showed that trust is an "important predictors of group cohesion, which is a measure of strength of the members' desires to remain in a cooperative and their commitment to it". Similarly, James and Sykuta (2006) revealed that trust is a key factor in farmers' choice to sell their output to a cooperative. Österberg and Nilsson (2009) also showed that trust is related to members' participative behavior in their cooperative's governance.

The literature on social capital and collective action consists of large number of studies (e.g. Katungi et al., 2007; Ruben and Heras, 2012; Willy and Holm-Müller, 2013; Gómez-Limón et al., 2014). There is a great deal of research on the role of social capital in enhancing collective action. However, there are a few empirical studies examining the contribution of social capital to market participation. Thus, this study aims to provide empirical evidence on the linkage between farmers' social capital and market participation in dairy cooperatives. It assesses social capital at an individual farmer level and investigates its contribution to milk market participation. It provides valuable insights on the role of social capital as a way to increase farmers' market participation in dairy cooperatives. The study can have important policy implications for designing appropriate policies to improve smallholder farmers' livelihoods by linking them to markets.

1.2. Statement of the research problem

As part of the effort to transform the agricultural sector, the GoE has placed large emphasis on promoting cooperatives as one of a key institution for enhancing food security and reducing rural poverty. The GoE's various poverty-reduction strategy papers and growth transformation plans included cooperatives as one of the pertinent institutions for facilitating the market integration of smallholder farmers (Bernard et al., 2010). Ethiopia's SDPRP (MoFED, 2002) and the PASDEP (MoFED, 2006) emphasized the importance of cooperatives in strengthening the position of smallholder farmers in the market. The recent growth and transformation plans (GTP I, MoFED, 2010; and GTP II, ENPC, 2016) also view cooperative as a means of strengthening and empowering smallholder farmers' market participation. In line with this fact, the country has shown remarkable growth in the number of agricultural cooperatives established in recent years. However, the development of the cooperative sector is not without challenges (Bernard et al., 2013), including the fact that growth has not been accompanied by associated rural livelihood improvement.

Cooperatives are composed of autonomous members that are owners, users and social actors at the same time. This makes cooperatives to hold a particular set of organizational settings. From the organizational point of view, they are firms while from a sociological perspective they are a community of actors, whose interests and not always totally aligned (Nilsson and Hendrikse, 2010). Cooperatives depend on high involvement and interaction among members in decision making and distribution of benefits (Valentinov, 2003; 2004; Nilsson et al., 2012). Collective decision making helps cooperatives to coordinate actions among farmers as it is pointed by (Borgen, 2004). However, Borgen argued that such decision making structure also makes them susceptible to a wide range of problems, arising from conflicts between collective and individual goals. Therefore, cooperatives are reliant on social capital as a resource for coordination of actions within the members, and the creation of links between the members. Social capital addresses and facilitates relationships, cooperation, and trust within the cooperatives (Valentinov, 2003; 2004).

Ethiopian cooperatives face serious problems, including farmers' low market participation (Bernard et al., 2007; Francesconi, 2009; Ruben and Heras, 2012). Ruben and Heras (2012) outlined that the prevailing deficiencies in internal organization hinder autonomous collective

action and constrain farmers' market participation. Bernard et al. (2007) argued that most cooperative have a low level of coordination and cooperation among farmers, and face major constraints to become effective for improving market participation. Francesconi (2009) pointed that cooperation amongst farmers is low and this reduced farmers' interest in substantive efforts for enhancing market participation. Bernard et al. (2007) and Plaiser (2010) pointed that the members in the cooperatives have low trust in each other and the trust level on general basis is low, and this hampered the effectiveness of cooperatives in improving farmers' market participation.

Moreover, emerging evidence shows that women in Ethiopian agricultural cooperatives have low level of participation in collective marketing compared to their male counterpart (Jones et al., 2010; Thomas et al., 2013). The authors pointed that gender norms and practices constrained women's participation and deriving economic benefits in cooperatives. Literature attributed this to the fact that women constitute a social group with a disadvantaged socioeconomic status compared to men. The existing gender inequalities create difference in social capital between women and men in the cooperatives that result in difference in economic benefits derived between them (Molyneux, 2002; Muñoz-Goy, 2013). Studies asserted that this difference in social capital between men and women in social groups such as cooperatives constrain the effectiveness of collective action (Sanginga *et al.*, 2010; Muñoz-Goy, 2013).

The success of cooperatives depends on the degree of participation of its members, as is shown in Österberg and Nilsson's study (2009). As an organization formed with the motivation of mutual benefit and the expectation of collective actions among members, cooperative is reliant on social capital as a resource for coordination of actions within the members and creation of links between the members (Valentinov, 2003; 2004). Social capital, defined as "the sum of actual and potential resources embedded with, available through, and derived from the network of relationship possessed by an individual or social unit" (Nahapiet and Ghoshal, 1998, p. 243), significantly contributes to cooperatives' effectiveness by increasing motivation, solving coordination problems, facilitating information flow between individuals and cooperatives, and developing knowledge within the cooperatives. Moreover, social capital is essential for cooperatives because members who know, understand, and trust each other are more likely to work together to achieve shared goals and interests (Valentinov, 2003; 2004).

Therefore, by fostering social capital farmers in Ethiopian cooperatives can be prompted to participate in their cooperatives and to work together to improve their market access (Valentinov, 2003; 2004; Miller and Buys, 2008). However, the importance of social capital as smallholder farmers' propensity to engage in collective marketing has not received attention in Ethiopia. This may in part be due to difficulties in conceptualization, measurement, and determining the contribution of social capital to market participation in agricultural cooperatives. To address this knowledge gap, this dissertation develops theoretically based and empirically valid measures of dimensions of social capital at a farmer level in dairy cooperatives. It clarifies the factors that determine dimensions of social capital while providing the relationships between farmers' dimensions of social capital and milk market participation in dairy cooperatives.

1.3. Objectives of the study

The overall objective of the study is to construct composite indicators and measure the dimensions of social capital at a farmer level and investigate its contribution to milk market participation in dairy cooperatives.

The specific objectives are to:

1. Construct composite indicators for measuring dimensions of social capital at a farmer level;
2. Identify the determinants of dimensions of social capital at a farmer level;
3. Analyze the relationship between gender differences in the dimensions of social capital and market participation; and
4. Determine the effect of trust and non-trust factors on farmers' market participation.

1.4. Hypothesis

Arising from the study's objectives are the following general hypotheses:

1. The composite indicators constructed for measuring farmers' dimensions of social capital are reliable, valid, and consistent;
2. Demographic, socioeconomic, institutional, and cooperative factors have significant associations with farmers' dimensions of social capital.

3a. Women have low structural social capital than men;

3b. Women have high relational and cognitive social capital than men;

3c. Women have low milk market participation than men that is attributed to their low structural social capital;

3d. Women have high milk market participation than men that is attributed to their high relational and cognitive social capital;

4a. Trust is expected to have a positive relationship with farmers' milk market participation;

4b. Demographic, socioeconomic, institutional, and cooperative factors have significant associations with farmers' milk market participation.

1.5. Significance of the study

Studies showed the crucial role of collective actions in improving the market participation of smallholder farmers (Markelova et al., 2009; Bekele et al., 2009; Bernard et al., 2010). Inducing the formation of cooperatives in the agricultural community has been a popular strategy; often coupled with the role social relationships of the individuals play in such a collective action. It is the quality of social relationships between the individuals that influence their capacity to solve collective problems (Lin and Erickson, 2008). As one of the institutions of collective action, social capital is a vital component within a cooperative to ensure coordinated and cooperative actions (Putnam, 2000).

As noted earlier the GoE has promoted agricultural cooperatives as a vehicle to improve smallholder farmers' market participation. So far, however, hopes that policies would bring about positive and durable results remain unmet. The main policy bottlenecks include those that pertain to key underlying factors influencing success and failure of collective marketing in agricultural cooperatives. Hence, there is a need to gain more knowledge of factors that are critical in building and maintaining collective marketing. It is important to examine social capital, an attribute of individuals and of their relationships, which can enhance smallholder farmers' market participation in agricultural cooperatives.

This study empirically tests the model of individual social capital in dairy cooperatives and specifies the three major dimensions (structural, relational, and cognitive) of social capital at a farmer level—a topic rarely addressed in social capital literature. In addition, it is the first empirical study to examine the relationship between social capital and milk market participation in dairy cooperatives in Ethiopia. Therefore, this study can provide an important basis for future research in this area in Ethiopia—another significance of the study. Specifically, this study has four contributions:

First, it adds to the methodological literature of social capital research through development of a viable approach for measuring farmers' dimensions of social capital in dairy cooperatives. It provides single, synthetic measures for the dimensions of social capital which are reliable, valid, and consistent. This gives policymakers and practitioners a solid basis for a robust assessment of dimensions of social capital that enables them to make appropriate intervention in building social capital in dairy cooperatives.

Second, it contributes to understanding of individual level determinants of dimensions of social capital in dairy cooperatives. Knowledge concerning factors determining farmers' dimensions of social capital can help policy makers and practitioners in designing strategies to improve the stock of social capital in dairy cooperatives.

Third, it provides evidence of gender differences in the dimensions of social capital and their effect in milk market participation in dairy cooperatives. It contributes to the wider discussions on how to increase women's market participation in dairy cooperatives. This information should be useful for policymakers and practitioners when it comes to designing strategies to promote market participation in gender differentiated social groups such as dairy cooperatives.

Fourth, it contributes to the existing knowledge of the role of trust in dairy cooperatives. It provides evidence that trust is a significant factor explaining farmers' market participation. It also contributes to understanding of other determinants of farmers' market participation. Policy makers and practitioners can use this information to improve farmers' market participation in dairy cooperatives.

The results of this study are also important in demonstrating the significance of social relations among farmers for market participation in dairy cooperatives. In this vein, the study could have valuable practical implications for the cooperative management, cooperative promotion offices at different level and NGOs in designing appropriate interventions for integrating smallholder farmers with markets through the cooperatives. The farmers as part of the cooperative may also benefit from this study. They can be aware of social relations among farmers is a valuable and even necessary resource for the success of individuals and the members as a whole in the cooperatives. Social relationships are instrumental in facilitating farmers' participation in collective marketing.

1.6. Organization of the dissertation

This dissertation consists of seven chapters. Chapter 2 provides an overview of agriculture and cooperatives in Ethiopia. Chapter 3 reviews conceptual and empirical literature in order to inform and analytically locate the substantive and theoretical focus of this research on the social capital and collective marketing in cooperatives. In chapter 4, the methods and scientific reasoning behind the study are presented. The chapter provides the methodological approach used to collect and analyze the data. Chapter 5 displays the descriptive analysis of the sample farmers. Chapter 6 presents and discusses the results from PCAs, SUR, independent sample t-test, ANOVA, and Probit and Tobit regressions. Finally, chapter 7 provides summary with conclusion and implications of the study. It also presents the limitation of the study and suggestions for further research.

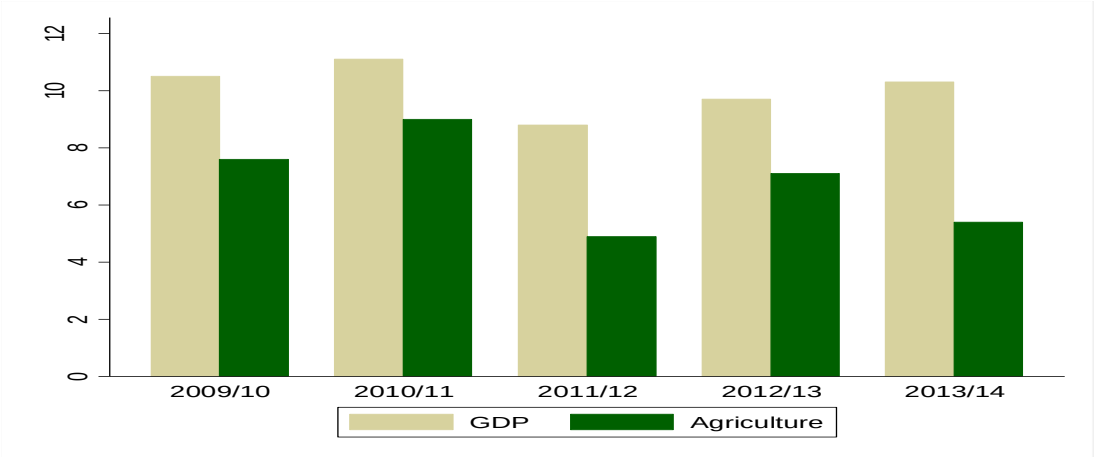
CHAPTER 2: AGRICULTURE AND COOPERATIVES IN ETHIOPIA

This chapter gives an overview of agriculture and cooperatives in Ethiopia. The chapter is sub-divided into four sections. The first section highlights the importance of agriculture to Ethiopian economy. The second section describes the dairy sub-sector and its development in Ethiopia. The third section presents the development and contribution of agricultural cooperatives in Ethiopia. The last section presents the summary of the chapter.

2.1. Introduction

According to the 2015 population estimation by CSA (2013), 80.6% of the Ethiopian population lives in rural areas and earns its livelihood from agriculture. Much literature has documented that agriculture continues to be a strategic sector in the development of Ethiopia. Agriculture accounts for large fractions of economic activity, 38.5% of GDP comes from agriculture. It employs 75% of the national labor force, thus providing food and incomes to individuals and households (ENPC, 2016). Exports are highly concentrated in agriculture, accounting for nearly 80% of export earnings (EATA, 2014). The agricultural sector has witnessed rapid growth in Ethiopia. For example, it showed an average growth rate of 6.6% per annum during GTP1 (2010-2015) period (ENPC, 2016). This growth rate is considered to be high by any measure and enabled the sector to remain a key driver of the economic growth of the country given the relative weight of agriculture in the overall economy.

Figure 1. Growth rate of GDP and agriculture



Source: MoFED (2014), ENPC (2016)

The GoE has recognized the importance of agriculture as a strong option for spurring growth, overcoming poverty, and enhancing food security. In 1994, the GoE adopted and used the ADLI as an overall development strategy for the country until recent years. ADLI bases on the development theories from the 1960s which suggest the development of smallholder agriculture first to facilitate demand for industrial commodities and inputs for industrialization. The ADLI focuses on increasing agricultural productivity of smallholder farmers to raise overall production, as well as invest in those labor intensive industries with most production linkages to rural areas (Diao et al., 2010).

Concomitant with the ADLI, a series of poverty reduction strategy papers (PRSP) were launched like the SDPRP (2001/02-2004/05) and the PASDEP (2004/05-2009/10). The SDPRP centered on the principal goal of poverty reduction. It focused on agriculture as the sector that is the source of livelihood for the bulk rural poor (MoFED, 2002). The PASDEP focused on accelerating growth through the commercialization of agriculture (MoFED, 2005). The GTP I (2009/2010-2014/2015) and current GTP II (2015/16-2020/21) are also very important steps in this regard. In GTP I, it was clearly indicated that the agricultural sector is given emphasis as the main source of economic growth. In turn, within agriculture, smallholder agriculture was given the top priority (MoFED, 2010). In GTP II, the development of smallholder agriculture is given emphasis as the main source of growth and rural transformation (ENPC, 2016).

In Ethiopia, agriculture is dominated by smallholder[1] farmers who occupy the majority of land and produce most of the crop and livestock products. Smallholder farmers are the overwhelming actors in the agriculture sector. They produced over 96% of the total crop production (MoFED, 2014) and 95% of milk production (Makoni et al., 2014). In 2015/16 meher[2] season, 15.23 million farmers covered 12.49 million ha of land with grain crops (cereals, pulses and oilseeds) from which a total volume of about 266.83 million quintal of grains was obtained (Table 1). Out of the total volume of this output, cereals, pulses and oilseeds accounted for 79.9%, 13.2% and 6.9% respectively (CSA, 2016). The 2016/17 livestock survey[3] also showed that the livestock

[1] According to Chamberlin (2008), smallholder implies limited land availability. Besides this, there are other aspects of smallness that characterize resource-poor farmers in the developing countries, such as limited capital (including animals), fragmented holdings, and limited access to inputs.
[2] Meher is the main crop season. Any temporary crop harvested between the months of September and February is considered as meher season crop (CSA, 2016).
[3] The survey excludes the livestock population in three zones of Afar and six zones of Somali regions.

population of smallholder farmers is estimated to be about a total ruminant (cattle, sheep, goats, and camels) of 121.6 million and equines (horse, donkey, and mule) of 11.0 million (CSA, 2017).

Table 1. Number of farmers, production area, and yield of crops for meher season of 2015/16

Crop	**No. of farmers**	**Area (ha)**	**Production (qt)**
Grain Crops	15,226,054	12,486,270.9	266,828,807.0
Cereals	14,366,063	9,974,316.3	231,287,970.8
Pulses	8,196,752	1,652,844.2	27,692,743.1
Oilseeds	3,136,603	859,110.4	7,848,093.1
Vegetables	6,847,531	201,332.1	7,444,468.4
Root Crops	5,991,644	213,766.7	39,985,663.0
Fruit Crops	4,437,307	92,362.4	6,797,428.3
Chat	3,068,297	251,381.2	2,026,966.4
Coffee	5,270,777	653,909.8	4,145,964.6

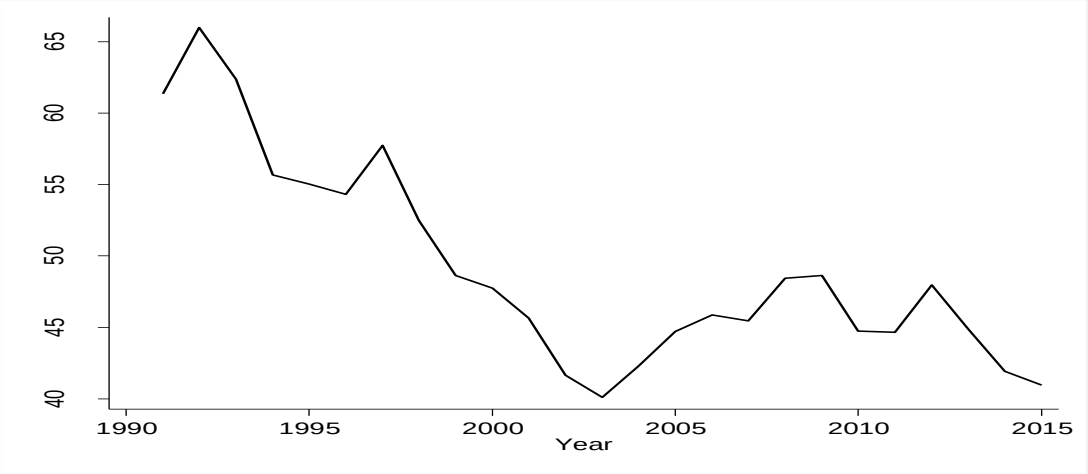
Source: CSA (2016)

The share of agriculture in the GDP has been declining over time in Ethiopia (Figure 2). The contribution of agriculture to GDP dropped from 61.4% in 1991 to 40.9% in 2015 (World Bank, 2017). Focusing on only the share of agriculture to GDP can cover the magnitude of the potential contribution of agriculture-led growth to poverty reduction. As economic development proceeds, it is obvious that the share of agriculture to GDP tends to decline. However, this doesn't mean faster economic growth and poverty reduction will be achieved by stimulating growth in the industrial and service sectors at the expense of agriculture. GDP growth generated by growth in agriculture has stronger poverty reduction impacts than the same growth in non-agricultural activities, particularly in lower-income countries like Ethiopia (FAO, 2012).

The performance of agriculture, especially smallholder agriculture, receives particular attention due to its role in sustaining the livelihoods of a majority of Ethiopia's poor. As the largest employer, agricultural growth has a large impact on poverty reduction by creating income opportunities for the poor (MoFED, 2010; ENPC, 2016). Smallholder agriculture in Ethiopia is characterized by subsistence and semi-subsistence orientation with low level equilibrium (low

input use, low productivity, low marketable surplus, and hence low returns) trap (Barrett, 2008). In the literature, poverty reduction can be realized through enhancing returns from smallholder production through improved market access. That is, improved market participation results in a higher level of commercialization with vast benefits to farmers including higher revenues, savings and hence investment in modern inputs (World Bank, 2008).

Figure 2. Share of agriculture in GDP of Ethiopia (1991-2015)



Source: World Bank (2017)

According to Jayne et al. (2011), agricultural commercialization increases farmers' productivity to produce greater surpluses which can be sold in the market. This, in turn, increases their market participation with a beneficial outcome of higher incomes and living standards. Studies suggested that commercialization of smallholder farmers is linked to increased household food security and, contributes to agricultural development (Pingali et al., 2005; World Bank, 2008; Jayne et al., 2011). The authors argued that commercial orientation of smallholder agriculture leads to real food prices to decrease, which increases smallholder farmers' purchasing power for food (as consumers) while enabling them to reallocate their scarce household incomes (as producers) to high-value non-food agribusiness sectors and non-farm enterprises.

Ethiopian government strategies have recognized and given attention to commercialization of smallholder agriculture. Policymakers view commercialization of smallholder agriculture as a cornerstone of the rural development and poverty reduction strategies. The adoption in the early 1990s of the ADLI development strategy shifted the focus of the government towards

commercial transformation of subsistence smallholder agriculture with a view of addressing the problem of poverty and food insecurity (Berhanu and Hoekstra, 2007). The recent Growth and Transformation Plans (GTP I and II) also recognized commercialization of smallholder agriculture as a key strategy for sustainably reducing poverty and for achieving equitable growth in the country (MoFED, 2010; ENPC, 2016).

However, commercialization of smallholder farmers remains one of the major challenges in Ethiopia. Much of the literature indicated that market access is one of the major constraints of commercializing smallholder agriculture (Bellemare and Barret, 2006; Berhanu and Hoekstra, 2007; Bernard et al., 2010). The majority of the farmers produces small marketable surpluses and faces thin markets which are characterized by low volumes, low activity, and non competitiveness. The farmers face constraints that impede them from taking advantage of market opportunities. They often live in remote areas with poor infrastructure and face high transaction costs that considerably reduce their incentives for market participation.

2.2. Overview of dairy development in Ethiopia

Ethiopia holds the largest livestock population in Africa with a national herd estimated at 54.0 million cattle, 25.5 million sheep, 24.1 million goats, 1.2 million camels, 11.0 million equines (horse, donkey, mule), 59.5 million poultry, and 6.2 million beehives (CSA, 2017). The livestock sector contributes about 7.9% of the total GDP, and 20.5% of agricultural GDP (ENPC, 2016). An extensive literature showed that livestock plays an important role in Ethiopia by contributing to rural livelihoods of the poor (ILRI, 2005; Staal et al., 2008; Azage et al., 2013). Livestock provides food, income, draft power, energy sources, transportation, social prestige and status. It also creates income opportunities for landless poor who provide fodder, collect water to feed, and engage in processing and marketing. .

Ethiopia has huge potential for dairy development. It manages large milking livestock population, estimated at 11.83 million cows and 0.23 million camel (CSA, 2017). These numbers tended to increase during the last 10 years (Table 2). For example, the number of milk cows increased from 8.5 million in 2005 (CSA, 2005) to 11.83 million in 2016 (CSA, 2017). Milk production also increased steadily from about 2.62 billion liters to 3.13 billion liters for the same periods. In addition, the country enjoys diverse topographic and climatic conditions. The favorable climate throughout the country supports use of improved and high-yielding breeds.

The climate offers a relatively disease-free environment for animal feeding. There is also potentially large market for dairy products, which is expected to grow with growing population, urbanization and per capita income (Mohamed et al., 2004; Staal et al., 2008).

In Ethiopia, dairy production is practiced almost all over the country. The production depends mainly on indigenous livestock: cattle, goats, camels and sheep. Cattle has the largest contribution (81.2%) of the national annual milk output, followed by goats (7.9%), camels (6.3%) and sheep (4.6%) (CSA, 2009). According to CSA (2009), the productivity of theses indigenous livestock is generally low. For example, in 2009 the average cow milk production was estimated at 1.54 liters/cow per day. A recent report by CSA (2017) showed that the average cow milk production was 1.37 liters/cow per day in 2016.

Table 2. Number of milk cows and milk production by region

Geographic area	**No. of milking cows (million)**		**Total milk production (million lt)**	
	2005	**2016**	**2005**	**2016**
Ethiopia	8.53	11.83	2,623.1	3,134.2
Tigray	0.28	0.83	130.3	193.3
Afar	0.18	0.39	63.5	132.7
Amhara	1.02	2.73	466.7	597.2
Oromia	3.99	4.83	1,145.3	1,383.6
Somale	0.12	0.14	49.9	40.0
Benshangul-Gumuz	0.07	0.15	20.1	6 32.6
SNNP	2.82	2.68	723.8	725.9
Gambela	0.05	0.06	15.9	19.7
Harari	0.008	0.02	3.1	6.2
Dire Dawa	0.02	0.01	4.5	3.1

Source: CSA (2005; 2017)

Dairy production systems

In Ethiopia, the dairy system categorized based on socioeconomic structures of the population and holdings, agro-ecology characterization of the area or climate, type of breed and species used for milk production, and the integration with crop production as criterion (Dereje et al., 2005). Based on these criterions, three dairy production systems are recognized in Ethiopia; namely the rural dairy system which is part of the subsistence farming system and includes pastoralists, agro-pastoralists, and mixed crop–livestock producers; the peri-urban; and urban dairy systems (Dereje et al., 2005; SNV, 2008).

The rural dairy system contributes 95% of total national milk production. It is non-market oriented and most of the milk produced is consumed at home (Makoni et al., 2014). The mixed crop–livestock producers in the highlands produce 63.3% of the total national milk production. The mixed crop-livestock system largely depends on local animals that have generally low performance. The quantity of surplus milk is determined by the household demand for milk consumption, the potential to produce milk in terms of herd size and production season, and access to a nearby market (Azage et al., 2013). In the lowland areas, pastoralism is the major milk production system and contributes 22.4% of the total national milk production. Milk production is characterized by low yield and seasonal availability (Staal et al., 2008).

The literature indicated that the peri-urban milk production system includes smallholder and commercial dairy farmers in the proximity of Addis Ababa and other regional towns. The system possesses crossbred animal in small to medium-sized farms. The primary objective of the farms is to get additional cash income from milk sale. The source of feed for the animals is both home produced and purchased hay. The urban dairy milk production system includes highly specialized, state or businessmen dairy farms, which mostly found in major cities of the country. Cattle are maintained under confined systems where purchased feed is provided directly to cattle due to the scarcity of land. The primary objective of the farms is to get cash income from sale of milk and milk products (Sintayehu et al., 2008; SNV, 2008).

Dairy marketing systems

In Ethiopia, dairy products are channeled to consumers through both informal and formal marketing systems[4]. In the informal marketing system, milk and milk products are channeled from producers to consumers directly or through one or more market agents. Dairy producers sell the surplus milk produced to their neighbors and/or in the local markets, either as liquid milk or in the form of butter and/or *Ayib*. This marketing system is characterized by no license requirement, low cost of operations, no regulation of operations, and high producer price compared to formal market (SNV, 2008; Zelalem et al., 2011).

[4]The term informal reflects marketing systems in which governments do not intervene substantially in marketing. In the contrary, the term formal reflects marketing system that falls within the regulation of the local business including business registration, tax payment, etc (Land O'Lakes, 2010).

Staal et al. (2008) mentioned that the informal marketing system has been playing a key role in providing important market outlets for smallholder producers. The system has provided low-cost milk and dairy products for poor consumers. According to Staal et al. (2008), the system has clearly created an effective, functional link between farmers and consumers which responds to consumer demand. About 95% of the national milk is marketed through informal channels and is unprocessed (Makoni et al., 2014). The dairy sector is dominated by the traditional processing and marketing of dairy products, especially butter. Because of underdevelopment of infrastructures in rural areas, only 5% of the milk produced is marketed as liquid milk (SNV, 2008). This indicates that the informal marketing system remains dominant in Ethiopia.

In the formal marketing system, milk is collected at private milk collection centers or cooperative milk collection centers and transported to processing plants. In this system, milk quality tests are conducted on delivery, thereby assuring the milk quality. This has encouraged the producers to improve the hygiene conditions of the milk in order to avoid rejection at the collection centre (Zelalem et al., 2011). This marketing system particularly limited to peri-urban areas and Addis Ababa. However, it has shown expansion with the private sector leading the dairy processing industry in Addis Ababa and other major regional towns. Many private milk processing plants have started milk marketing and processing, increasing the amount of milk marketed through the formal markets. However, the share of dairy products marketed through the formal market remains only 5% (Makoni et al., 2014).

Dairy consumption

Milk and milk products are part of diet of many Ethiopians. The people consume dairy products such as raw milk, curd (defatted sour milk), sour milk, ghee (heated butter) and various kinds of butter, cheese and yogurts (SNV, 2008). It is estimated that only 4.5% of the milk produced is sold in the market in 2011 while the household consumption accounts for about 46.61% of milk produced. The remaining, 48.36% of the milk produced, converted into butter and *ayib* (cottage cheese) (USAID, 2013). However, milk consumption in Ethiopia is estimated at 18.87 liters per person/annum which is far below the FAO recommended 200 liters (Makoni et al., 2014).

The demand for milk varies between rural and urban population. In rural areas, the consumption of milk is determined by livestock ownership and season. The demand for milk is mainly for fresh milk and partially met by producing at home and/or purchased from neighboring producers

(SNV, 2008). Of the total annual milk production in 2009/10, CSA (2010) estimated that 85% was used for household consumption. In urban areas, the principal determinant of dairy consumption is income. Expenditure on dairy products rises as individual's income rises. The majority of the milk consumed in urban centers is supplied through the informal sector: smallholder producers and traders. The urban centers like Addis Ababa and other regional cities are the primary outlet for processed milk in Ethiopia (Land O'Lakes, 2010). In general, literature indicated that per capita milk consumption in Ethiopia declined from 26 liters in mid-1980s to 16 liters in 2001 and rose to 20 liters in 2010 (Makoni et al., 2014).

Price of dairy commodities

Literature documented that prices of dairy commodities fluctuate and are influenced by different factors such as season, access to market/distance from towns, fasting periods, festivals and holiday, level of supply vs. purchasing ability of the urban consumers, and quality of dairy products (Sintayehu et al., 2008; Azage et al., 2013). The authors indicated that during the rainy season, the monthly collections are relatively higher and it is more difficult to sell the milk with attractive margins (Appendix F). Milk is perishable product and can't be kept for long hours before consumption or processing. Distance from market is a major factor that prohibits farmers from selling fresh milk to urban consumers.

The price for dairy products is highly affected by the long fasting period. Because of low demand during these days, the price of dairy products decreases. In the contrary, the price for dairy products highly inflates during religious and cultural festivals as the demand for these products is high. In urban areas, there is relatively low supply of dairy products and thus, there is high demand for these products. This results in higher price. Dairy commodities that are produced in milk processing plants are relatively more expensive (Sintayehu et al., 2008). In general, the price of fresh milk is increasing over the years in Ethiopia. Based on the data from CSA, the price of fresh milk showed an increment of 93.87% between the year 2011 and 2016. The trend on average price of fresh milk in the past five years is indicated in Appendix G.

Dairy development policies and their impacts

Literature showed that dairy development has passed through three distinct periods in Ethiopia: imperial regime (1960-1974), socialist (*Derg)* regime (1974-1991), and the current period (1991 to present) (Mohammed et al., 2004; Staal et al., 2008; Makoni et al., 2014). Though Ethiopia's

agriculture is dominated by smallholder farmers, the successive regimes devised various similar policies to improve commercial dairy production, especially around Addis Ababa. For this to be realized, they introduced cross-bred and exotic cattle and related feed and management technologies, and develop milk processing industry. The policy instruments and operational procedures carried out to attain these goals varied over time, reflecting the politico economic philosophy of the respective regimes (Staal et al., 2008).

The imperial regime (1960-1974)

The imperial regime characterized by a free market economic system and the emergence of modern dairying. In 1947, Ethiopia received 300 Friesian and Brown Swiss dairy cattle from the United Nations Relief and Rehabilitation Administration (UNRRA). This was the first step in introducing modern dairy production. The cattle were used to establish Holeta dairy farms in 1955. The regime established milk processing with a small milk boiler and packing facility in Addis Ababa which is considered as an important milestone in the development of dairy sector. It also introduced high-yielding dairy cattle on the highlands in and around major urban areas. To complement these input oriented production efforts, the regime established a modern milk processing and marketing facilities (Staal, 1995).

To facilitate the growth of dairy sector in Ethiopia, UNICEF established processing plant at Shola on the outskirt of Addis Ababa in 1960. The plant collected milk from both smallholder producers and the large farms. In the second half of the 1960s, dairy production rapidly developed and facilitated by the establishment of the milk collection centers. In 1966, AADI (Addis Ababa Dairy Industry) was established to control and organize the collection, processing and distribution of locally produced milk. In 1971, DDA (Dairy Development Agency) was established to take over the responsibilities of AADI and carried out more tasks including provision of services for increasing milk production and creating formal milk markets in urban areas of the country (Mohammed et al., 2004).

With the encouragement of the DDA, dairy cooperatives established to undertake commercial dairy production. The members of the cooperatives were those with larger landholdings for dairy production purposes (Alemayehu 1992 cited in Staal et al., 2008). The establishment of the CADU (Chilalo Agricultural Development Unit) with the help of Swedish government played an important role in distributing crossbred heifers in between 1970 and 1980. CADU also provided

health services, artificial insemination, in addition to forage production and marketing (Staal, 1995). Further, World Bank launched AADDP (Addis Ababa Dairy Development Project) in 1971 with the aim of developing commercial dairy production and providing support for smallholder producers (Mohamed et al., 2004).

Between 1961 and 1974, milk production increased by 16.6% from 637,400 to 743,100 metric tons with an average annual growth rate of 1.6% (Staal et al., 2008). This growth was attributed to the economies of scale in production as well as marketing, transport subsidies to the formal market, land tenure security, and the free market for inputs including feed. However, on a per capita basis, the authors pointed that milk production declined at an average rate of 0.87% per annum during the same period.

The socialist regime (1974–91)

Following the 1974 revolution, the socialist (Derg) regime followed a centralized economic system. The government nationalized private farms and industries. The DDA merged with other nationalized dairy farms to establish the DDE. The aim of establishing DDE (Dairy Development Enterprise) was to operate state farms, establish a milk collection centers and to provide others services. The regime focused on state farms, farmers' producer cooperatives, service cooperatives, and the peasant associations. Large dairy farms including CADU were annexed by the PAs. Some new state farms were established and some large farms were also converted into state farms (Mohamed et al., 2004).

Literature indicated that the nature of agricultural extension service and provision of dairy inputs were changed. Extensions services and other supporting inputs were provided to producer cooperatives than individuals. In the mid 1980s, donor-funded dairy projects restarted with the aim of supporting producers' cooperatives (Staal, 1995). DDE retained the right to determine the prices paid to raw milk suppliers. Prices paid per liter to producers by DDE increased by 43% from 1972 to 1992 (Staal et al., 2008). The authors pointed that this led to the expansion of the informal sector where the rate of price increase was much higher. Moreover, the regime fixed, overvalued foreign exchange rate policy made exports more expensive and imports cheaper.

According to Staal et al. (2008), the growth of the dairy sector was adversely affected by the policies followed by the Derg regime. Smallholder dairy producers, which produced the largest

share of milk in the country, were largely neglected. The development of market-oriented dairying in rural PAs was hampered by low producer prices and a narrow focus on producer cooperatives. Despite their importance in the supply of milk to urban centers, the urban producers were also completely neglected of supports. In spite of huge public expenditure, Staal et al. (2008) mentioned that state farms' dairy production declined from 6 million liters in 1983/84 to less than 5 million liters in 1989/90.

Since 1978, dairy imports significantly increased to bridge the gap between supply and demand. This was partly due to a level of dairy production that lagged far behind the demand and increased food aid milk powder imports by World Food Program. In 1986, dairy imports reached a peak of 314,700 metric tons due to the drought prevailed in the country (Reda, 2001). Felleke and Geda (2001) revealed that dairy imports as a percent of total consumption increased from 4.1% to 12.8% between 1977 and 1989. Dairy imports for commercial purpose also grew at 24.2% per year during the same period.

During Derg regime, the informal market in urban milk supply and demand significantly increased. For example, consumer in Addis Ababa purchases 71% of liquid milk directly from urban producers. On the other hand, the rural farmers sold their milk to DDE milk collection centers at an average lower price than the local market. However, the collection centers lowered transaction cost of the farmers and guaranteed access to market. The urban producers were playing a significant role than peri-urban though they had not received supports (Staal et al., 2008). Thus, milk production shifted away from the rural areas to near urban consumers, ignoring the vast majority of the rural areas (Staal, 1995).

The current regime – market led economy (1991–present)

In the history of dairy sector in Ethiopia, the third phase starts from the year 1991, when the Ethiopian People Revolutionary Democratic Front (EPRDF) came to power and implemented several macroeconomic policy changes. The fixed exchange rate system was changed to flexible (market-determined) exchange rate system. In 1992, the local currency (birr) was devalued considerably, followed by a series of smaller devaluations. The devaluations discouraged dairy imports (Staal et al., 2008).

In 1993, the DDE came under government control with more management autonomy. Large dairy state farms were sold or returned to their previous owners that help them to expand their activities. The policy change allowed private sector participation in dairy production, processing and marketing of milk. Several dairy processing companies have been established around Addis Ababa and other urban areas (Mohammed et al., 2004; SNV, 2008; Staal et al., 2008). The milk intake at the Shola plant increased since 1993 and prices paid to producers were gradually raised. In late 1991, Sebeta Agro-Industry joined the dairy sector and stimulated competition and helped expand the formal market (Mohammed et al., 2004).

To benefit from the newly created market opportunities, dairy producers within a 100km radius of Addis Ababa established the Addis Ababa Dairy Producers Association (AADPA). The aim of the association was procurement of cattle feed. A new generation of cooperatives emerged in rural areas. The cooperative proclamation in 1998 further helped the emergence of cooperatives that abide by the principles of cooperatives. Smallholder Dairy Development Pilot Project was implemented by FINNIDA with aim of identifying smallholder dairy producers' market constraints. Dairy extension services were enhanced in the country. Improvements were also made in veterinary services, breeding services including artificial insemination and promotion of forage and feed production (Mohammed et al., 2004; Staal et al., 2008).

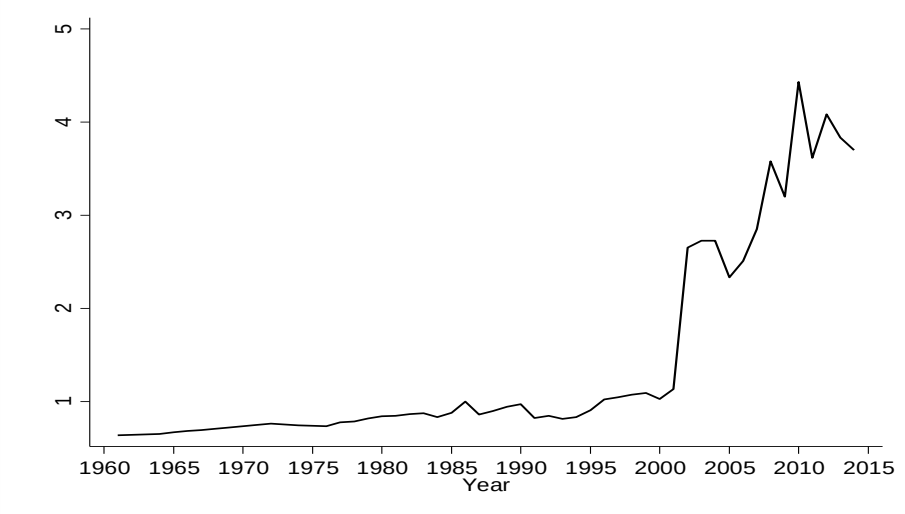
According to Mohammed et al. (2004), post 1991 milk production grew faster at an annual growth rate of 3%. Per capita milk production also grew slightly but at insignificant rate due to the high population growth. The authors indicated that the increments show the termination of the negative trend in per capita production growth in the previous periods. Felleke and Geda (2001) showed that the share of government-owned enterprises in total milk production decreased significantly. In the contrary, Felleke and Geda revealed that the share of smallholder production in total consumption increased by more than 30% from 71% to 97%. The contribution of large private farms also increased from 21,750 tons in 1985 to 33,182 tons in 2000.

An extensive literature pointed that most of the post reform growth is concentrated in the rural production and peri-urban systems (SNV, 2008; Staal et al., 2008; Zelalem et al., 2011). It is indicated that the flourishing of private processing industries and dairy cooperatives has stimulated producers in rural production and peri-urban systems as it offered them a new market

for their milk production. The use of improved inputs (improved breeds) and increased coverage of extension services have also contributed to faster growth of the dairy sector.

Overall, milk production in Ethiopia increased during the 1961-2015 (Figure 3). Milk production increased at an average annual rate of 1.55% during the 1961-2000. However, per capita milk production declined as a result of the high population growth rate. Since 1991, milk production grew at higher rate of 3% (SNV, 2008). The performance of the dairy sector since 1991 is better compared to the previous regime. However, the general historical performance of the dairy sector in Ethiopia has been disappointing given its potential (Staal et al., 2008).

Figure 3. Trend in total milk production in Ethiopia (1960-2014)



Source: FAO Agricultural Statistical Database

In general, the Ethiopian dairy sub-sector is predominantly smallholder and subsistent-oriented. Given the considerable potential for smallholder farmers income and employment opportunities from high-value dairy products, a growing body of literature argued that development of the dairy sector can significantly contribute to poverty reduction and nutrition in Ethiopia (Staal et al., 2008; Sintayehu et al., 2008; Zelalem et al., 2011; Azage et al., 2013). Market-oriented development of smallholder dairying has a potential to enhance rural incomes, improve food and nutrition security, and to achieve sustainable rural poverty reduction with a positive impact on women and landless rural households. It can also generate on-farm as well as off-farm employment opportunities along the dairy value chain (Staal et al., 2008).

However, literature recognized that smallholder farmers face high milk marketing costs and limited remunerative milk market outlets in Ethiopia (Holloway *et al*., 2000; Mohammed et al., 2004; Asfaw, 2009; Berhanu, 2012; Azage et al., 2013). The small volumes traded coupled with seasonal variability of dairy production, as well as low prices hampered market gains for most of the farmers in the rural areas. The bargaining power of the farmers is also limited by perishable nature of the product, leaving the farmers in a vulnerable position. Smallholder farmers have limited access to input markets and finance, and can thus individually hardly overcome binding technical and commercial constraints.

2.3. Agricultural cooperatives in Ethiopia

The current body of literature pointed that cooperation is a long tradition in rural Ethiopian society (Francesconi, 2009; Bernard et al., 2010). For centuries, the rural communities are used to traditional collective action organizations. They have indigenous knowledge that has been known to generate collective action. Indigenous institutions such as *Iddir*[5], *Iqqub*[6], *Mahiber*[7], are traditional collective action organizations that provide economic, social, and religious services. These institutions are playing an important role in bringing the rural community together. They are significantly contributing to social cohesion and support among the people (Bernard et al., 2010).

Kodama (2007) mentioned that modern cooperatives in Ethiopia were started during the imperial regime (1960s-1974). He pointed that the first formal proclamation on cooperatives (44/1961) gave rise to the institution in its modern sense. Cooperatives were setup in the form of producer cooperatives to jointly produce commercial and cash crops (i.e., tea, coffee, and spices). And farmers with large landholdings were members of these cooperatives and smallholder farmers were excluded. Literature indicated that by the end of the imperial era, there were 149 cooperatives in the country, including 94 multipurpose, 19 consumer, 19 savings and credit, and 17 handicraft cooperatives (Lelisa 2000, cited in Tesfaye, 2008).

[5] *Iddir* is a self-help association that is established voluntarily by members of a neighborhood community and serves as social and economic insurance at times of death and other crises.
[6] *Iqqub is* informal institution established voluntarily by relatives, neighbors or friends to collect a specific amount of money on a specific date and paid on round and lottery basis to each member.
[7] *Mahber* is socio-religious voluntary associations peculiar to Orthodox religion followers which hold gatherings, with spiritual and social functions.

According to Kodama (2007), the Derg regime (1974-1991) introduced cooperatives based on Marxist principles aimed at ending capitalist exploitation of the peasantry. The cooperatives were established as a strategy to control the economical transformation towards a socialist agriculture and a state controlled marketing system. Bernard et al. (2010) also pointed that cooperatives were established to organize peasants, manage production and purchasing, and sell inputs and consumer goods to members. The authors indicated that there were more than 7,700 primary cooperatives with 4.8 million members during the Derg regime.

Kodama (2007) indicated that there were two main types of cooperative during the Derg regime: producer cooperatives and service cooperatives. The producer cooperatives were collective production units. The service cooperatives were charged with purchasing output, managing input supply, credit, milling services, and the sale of consumer goods for farmers. Ruben and Heras (2012) mentioned that cooperatives were relatively autonomous and the leaders were freely elected in early years of the regime. However, the government gradually controlled the cooperatives and converted them in extensions of state power. In support of this argument, Bernard et al. (2010) pointed that cooperatives were playing a central role in levying and collecting taxes from farmers, extending state control to the local level, and promoting a socialist ideology.

Following the downfall of the centralized Derg regime in 1991, the socialist cooperatives collapsed in many parts of the country symbolizing the liberalization of farmers from over centralized governance. The largely negative experiences of farmers with cooperatives led to their dissolution. Nonetheless, cooperatives began to re-emerge after the coming to power of the present government. Since 1994, the government has promoted a new generation of cooperatives that differ from their predecessors and consider them as a pillar of the national strategy named ADLI (Bernard et al., 2010).

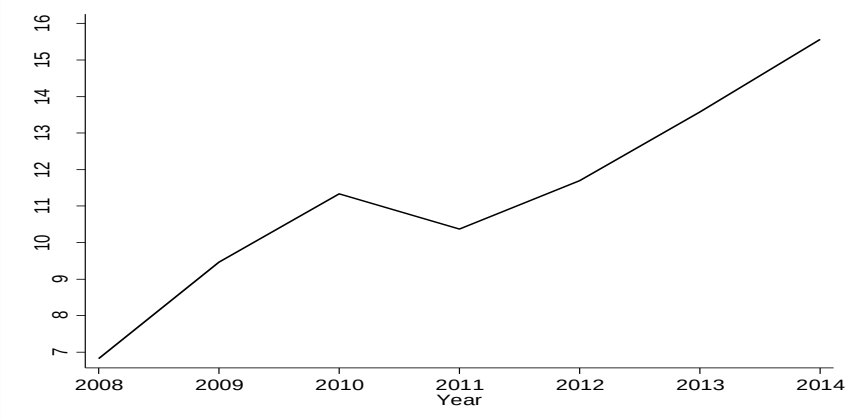
Literature documented that Ethiopian policy makers have renewed their interest in agricultural cooperative for facilitating the integration of smallholder farmers to markets. There has been a nationwide plan to promote cooperatives for coordinating actions both horizontally (among members) and vertically (with other value chain agents). Cooperatives have been promoted as a means to reduce transaction costs of farmers by creating economies of scale for marketing input and outputs. They are supposed to increase farmers' bargaining power vis-à-vis other value chain

actors through joint marketing system or indirectly by means of increasing local prices (Francesconi, 2009; Bernard et al., 2010).

Taking into account the lesson learned from the undesirable role of the government in cooperative affairs in the past, agricultural cooperatives were reestablished following the proclamation in 1998 (No. 147/1998). This proclamation has enabled the promotion of new cooperatives and gave rise to government's role in providing a supportive legal environment. The proclamation recognized the cooperative values and argues that autonomous, viable, and self-reliant cooperatives can play a key role in the social and economic development of the country. The proclamation has helped the cooperative to register and acquire a legal status. It has also facilitated the provision of support for emerging cooperatives (FDRE, 1998).

As part of the support for cooperative promotion, the GoE established the Federal Cooperative Agency (FCA) in 2002. The FCA was established with a broad mandate: to supervise the implementation of cooperative legislation, to design policies and legal procedures, and to ensure the coherence of cooperative policy with other sectors (labor and employment, land, customs and taxation, and financial regulations). The FCA guides and supports cooperative promotion efforts throughout the country, working through regional state Bureaus of Cooperative Promotion, whose mandate extends down to the *woreda*[8] and *kebele*[9] levels (FDRE, 2002).

Figure 4. Growth in number of primary agricultural cooperatives in Ethiopia (2008–2014)



Source: FCA, 2015

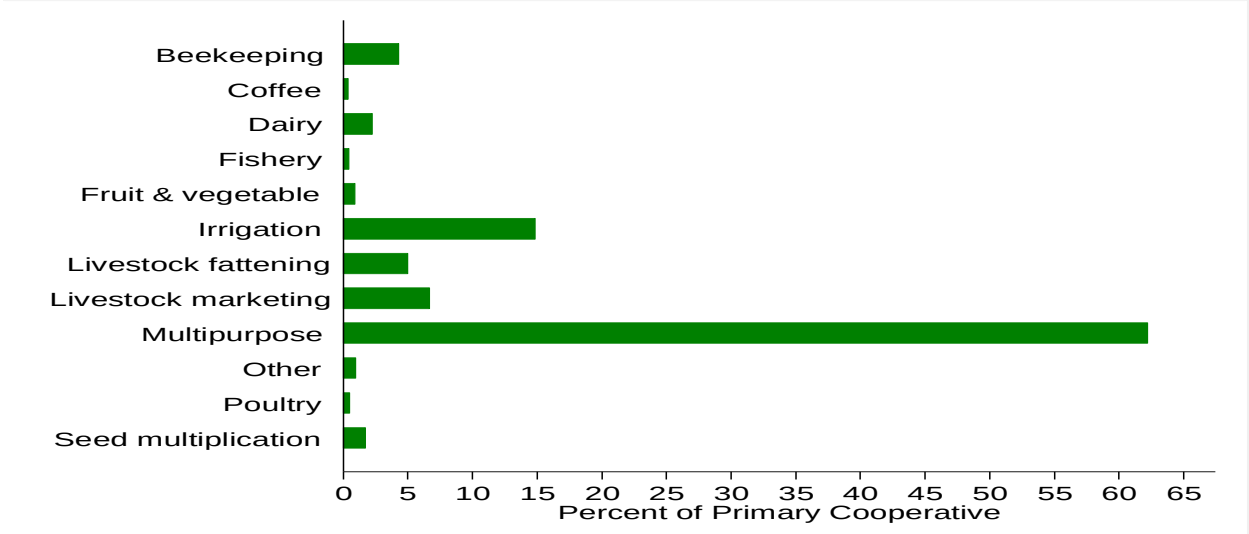
[8] In Ethiopia woreda is an administrative unit in the government structure equivalent to a district.

[9] *Kebele* is the smallest administrative unit below the woreda (district) level.

According to FCA (2015), most of the agricultural cooperatives in Ethiopia are engaged in supplying inputs and marketing farm products. The cooperatives are playing a prominent role in the provision of agricultural inputs to farmers, distributing 95% of all fertilizers used. However, their involvement in marketing farm output is still low. FCA (2015) showed that the number of primary cooperatives in agriculture increased from 6825 in 2008 to 15568 in 2014 (Figure 4). Most of the cooperatives focus on a single agricultural commodity (e.g. dairy, coffee, livestock etc.) or irrigation and the majority of the multipurpose cooperatives concentrate on agriculture (Figure 5).

The recent literature indicated that about 36% of farmers are members of agricultural cooperatives in Ethiopia (Bernard et al., 2013). It is a significant increase when it is compared with 9.1% in 2005 (Bernard et al., 2010). However, the involvement of female in primary agricultural cooperatives is low. The proportion of female members in all primary agricultural cooperatives is 18.9% (FCA, 2016). Literature recognized that women face constraints that limit their participation in cooperatives in Ethiopia. Women's role in society and the misconception of their domestic and reproductive responsibilities are among the constraints (Thomas et al., 2013).

Figure 5. Percent of primary agricultural cooperatives by type in Ethiopia in 2016



Source: FCA, 2016

An extensive literature indicated that dairy cooperatives have been established with the intention of facilitating market access, and delivering inputs and services in Ethiopia. Dairy cooperatives have provided regular income and reliable milk marketing outlet to their members. They have

also been playing a prominent role in the adoption of market-oriented dairying, by encouraging farmers in marketing their surplus milk through them (Holloway et al., 2000; Asfaw, 2009; Azage et al., 2013). There are 504 dairy cooperatives engaged in milk marketing operation in different parts of the country (FCA, 2016). In 2010, there were 114 dairy cooperatives (Land O'Lakes, 2010). This shows that there is a significant increase in the number of dairy cooperatives over the last seven years.

Although dairy cooperatives have played an important role in improving the livelihood of their members, evidence shows that their development is weak and mostly limited to milk collection and marketing (Azage et al., 2013). The authors indicated that most of the cooperatives are inefficient and ineffective, lack clear vision and goal, have limited skill and knowledge in dairy business, lack accountability and transparency, and heavily depend on support from the government and NGOs. Thus, they need supports to meet their objective of commercializing smallholder farmers.

2.4. Summary

This chapter has provided an overview of agriculture and cooperatives in Ethiopia. The literature clearly showed the crucial importance of agriculture in the development of Ethiopia. Taking this into account, the GoE strategies have recognized it as a strong option for spurring growth, overcoming poverty, and enhancing food security. The performance of agriculture, especially smallholder agriculture, has received particular attention due to its role in sustaining the livelihoods of a majority of Ethiopia's poor. As the largest employer, agricultural growth has a large impact on poverty reduction by creating income opportunities for the poor. However, this can be realized through enhancing returns from smallholder production through improved market access.

The chapter presented the dairy sub-sector and its development in Ethiopia. The country has huge potential for dairy development due to its large milking livestock population, diverse topographic and climatic conditions, and large market for dairy products. Three dairy production systems are recognized in the country: rural dairy system, the peri-urban, and urban dairy systems. The rural dairy system has the largest share (95%) in the total national milk production. With regard to dairy development, there were three successive regimes that devised various policies to improve commercial dairy production in Ethiopia. In general, evidences shows that

the dairy sector is non-market oriented which is attributed to farmers' high milk marketing costs and lack of remunerative milk market outlets.

Finally, the chapter presented the development and contribution of agricultural cooperatives in Ethiopia. Cooperatives have been promoted as a means to reduce farmers' transaction costs by creating economies of scale for marketing input and outputs. In line with this fact, dairy cooperatives have been established to address smallholder dairy producers' market constraints through collective action. The next chapter will review the pertinent literature on collective action, social capital, agricultural cooperatives, and market participation, identify gaps and present the conceptual framework of the study.

CHAPTER 3: REVIEW OF THE RELATED LITERATURE

This chapter reviews theoretical and empirical literature in order to inform and analytically locate the substantive focus of this research on the social capital and collective marketing in dairy cooperatives. The first section discussed the conceptual and theoretical perspectives are discussed. The second section presents the review of the empirical literature. The third section provides the conceptual framework guiding this study into examining social capital as smallholder farmers' propensity to engage in collective marketing in dairy cooperatives. The last section presents the summary of the chapter.

3.1. Conceptual and theoretical perspectives

3.1.1 Smallholder farmers' collective action for market access

World Bank (2008) suggested that enhancement of smallholder farmers' market access lead to increased income, food security, opportunities for rural employment, and sustained agricultural development and national economy growth. A growing body of literature showed that increasing smallholder farmers' participation in the market enables them to benefit from opportunities emerging and is relevant to achieve food security and poverty reduction (Pingali et al., 2005; World Bank, 2008; Jayne et al., 2011). However, the vast majority of smallholder farmers still find it difficult to participate in markets. Lack of access to market infrastructure, geographical isolation (poor roads or remoteness and poor communication) hindered the farmers' participation in markets (World Bank, 2008; Bekele et al., 2009; 2011).

Literature suggested that lack of market access is the major constraint of the commercialization of smallholder agriculture (Holloway et al., 2000; Bellemare and Barret, 2006; Bernard et al., 2010; Bekele et al., 2009; 2011). Smallholder farmers face difficulty in participating in markets because of the numerous constraints and barriers mostly reflected in the transaction costs. This holds true for both input and output markets. Barret (2008) pointed that the challenges of imperfect markets and high transaction costs make a high proportion of smallholders to have low market participation. Even those that participate in the markets often do so only at the margins because of these challenges.

The available literature has paid attention to collective action as a mechanism to overcome smallholder farmers' marketing constraints. Collective action has been promoted as a strategy to

improve the incomes of smallholder farmers, primarily by reducing transaction costs and improving their bargaining power (Markelova et al., 2009; Bernard et al., 2010; Bekele et al., 2009; 2011; Fischer and Qaim, 2012). Collective action is defined as voluntary action taken by a group of individuals to achieve shared objectives (Markelova et al., 2009) or it can be described as what happens when individuals voluntarily contribute to an effort to advance their mutual interests and expect to achieve common benefits (Poteete and Ostrom, 2004).

Though various definitions are suggested in the literature, collective action requires "the involvement of a group of people, a shared interest within the group, and some kind of voluntary common action that works in pursuit of that shared interest" (Meinzen-Dick et al., 2004, p. 200). For the purpose of this dissertation, the definition of Marshall will be guiding. Marshall (1998) defined collective action as the action taken by a group of individuals (either directly or on its behalf through an organization) to achieve common benefits. This definition reflects that the focus of the discussion is on established groups such as cooperative where individuals are working collectively to achieve a shared goal or interest (access to market).

Collective action mechanisms are avenues to reduce high transaction costs. Studies pointed that collective action enables smallholder farmers to pool their surplus output into a single tradable lot and they can use this large quantity as a basis for negotiation with potential buyers. This can enhance their bargaining power in the market and reduce their per-unit of transaction costs. Acting collectively, smallholder farmers can reduce transaction costs and secure access to high value markets and services (Markelova et al., 2009; Bekele et al., 2009; 2011). Collective marketing also promotes contractual arrangements between smallholder farmers and potential buyers which can be "very costly for buyers to negotiate, monitor and enforce when they are dealing with spatially-dispersed individual farmers" (Bekele et al., 2011, p. 483).

Sandler (1992) pointed that collective action requires the coordination of efforts by individuals to further their shared interests. He contended that in collective action, members' actions are interdependent, that an individual's outcome is dependent on the action of others. Bekele et al. (2011) described agricultural cooperatives as a more formal expression of collective action. Similarly, Hong and Sporleder (2007) mentioned that collective action in the form of cooperative signifies a form of integration for members' businesses, especially crucial where market fails and high transaction cost occurs. Agricultural cooperatives are one of the instruments to promote

smallholder farmers' market participation through collective action (Bekele et al., 2009; Bernard et al., 2010). Cooperatives promote interaction that enables members to use their knowledge of each other and of the cooperative to engage in collective action (Majee and Hoyt, 2009).

The literature on cooperative shows that cooperative represents simultaneously a voluntary association (social group), and a joint business enterprise owned and controlled by members of the same group. That is, the ownership right in cooperative is allocated to members, who have two roles: as patrons of the cooperative and claimants of the residual rights over the cooperative (Valentinov, 2003; 2004; Nilsson et al., 2012). As it is indicated by Nilsson et al. (2012), collective ownership and usage of the cooperative require the interaction of the members. This shows that from both individual member and business perspectives, cooperative promote interaction. Quibria (2003) pointed that this interaction is crucial in the sense that they create social networks, have the potential to build trust and values, maintain norms, and influence social and economic outcomes. This indicates that social capital is essential in cooperatives.

3.1.2. The concept of social capital

The concept of social capital has gained wide attention among researchers in the field of development. The recent interest in the application of social capital originates from the limitations of an utterly economic approach towards achieving economic growth (Portes and Landolt, 2000). The classical and neoclassical economists tended to pursue "independent individual", operating under the assumption that action is determined through calculated, rational self interest of benefits versus consequences. This approach is criticized due to the lack of acknowledgement of the effect social structure and social relations may have on the actor (Granovetter, 1985). As it is pointed by Parts (2008), a growing number of researchers have used social capital in line with the idea that social phenomena can influence economic activities. Extensive literature on social capital clearly indicated that social capital has gained wider acceptability; however, it remains a complex and sometimes elusive concept (e.g. Nardone *et al*., 2010; Gómez- Limón et al., 2014). There is still debate on as to what exactly social capital is and how best to define it.

Bourdieu, Coleman, and Putnam laid the foundation for contemporary research on social capital. They significantly contributed towards the conceptualization of social capital. Though they approach the notion of social capital from different perspectives, they show the concept of social

capital as a metaphor for advantage (Burt, 2007). In the mid 1980s, Bourdieu conceptualized social capital as the network that consists of social relationships and the extent to which the resources are possessed by the individuals in the network. He defined social capital as "the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance or recognition" (Bourdieu, 1986, p. 248). This definition emphasized social capital as resource created by the relationships among individuals. It showed that individuals as well as groups can derive benefits from personal networks and relationships.

Bourdieu proposed three forms of capital: economic, cultural and social. He argued that one form of capital is convertible, on certain conditions, to another. According to his argument, social capital and cultural capital (which he relates to human capital) were convertible, in certain conditions, into economic capital and vice versa. For example, the giving of a gift indicates the conversion of economic capital into social capital and diluted the monetary significance as well as infused meaning into the exchange. Similarly, the acquisition of cultural capital over a period of time required economic capital to make it possible. Bourdieu contended that cultural capital and social capital are disguised forms of economic capital. They only produce effects to the extent that they conceal the fact that economic capital is at the root of their effects (Bourdieu, 1986).

In the late 1980s, a second broad explanation of social capital was forwarded by Coleman based on dense social networks and their impacts on educational and community institutions. Coleman (1988) approach to social capital has considerably contributed to social capital research. He recognized the importance of the structure of social relations. He emphasized the functional aspects as well as the benefits of social capital and defined social capital as "a variety of different entities, with two elements in common: they all consist of some aspect of social structure, and they facilitate certain actions of actors-whether personal or corporate actors-within the structure" (Coleman, 1988, p. 98).

Coleman (1988) characterized social structure within a network by the density of the network and the strength of the ties among individuals. He argued that the social structure within a network creates the functionality and the benefits of social capital. According to Coleman, norms

that are derived from a dense, strong social network facilitate certain actions of the network members. They are beneficial to collective actions. In general, Coleman (1988) viewed social capital as a manifestation of social structures or resources that facilitate certain actions of the individuals within that structure.

Coleman (1990) used the concept of social capital to understand the relationship between educational achievement and social inequality. He explained social capital as "the set of resources that inhere in family relations and in community social organization and that are useful for the cognitive and social development of a young person" (Coleman 1990, p. 300). According to Coleman (1990), social capital includes: 1) trustworthiness of social environment, which makes possible reciprocity exchanges, 2) channels of information, 3) effective sanctions, and 4) social organizations, or associations.

In the early 1990s, Putnam viewed social capital from functional point by considering efficiency. He defined social capital as "the features of social organization, such as trust, norms and networks that can improve efficiency of society by facilitating coordinated actions" (Putnam, 1993, p. 167). He argued that social networks facilitate social interactions that enhance productivity of an individual and group. He considered social capital as a public good which is difficult to be transformed into a private good because of its collective nature. Putnam expressed stock of social capital in terms of trust, networks and norms that increases through use and diminishes if not used.

Putnam's book *Bowling Alone* (2000) reflected his great contribution to social capital. In his book, Putnam associated the decline of civic engagement and connectedness in the American society to the lack of social capital in communities. He showed that the decline of social capital in communities negatively associated to public participation in the democratic process. He defined social capital in terms of relations or interdependence as "connections among individuals - social networks and the norms of reciprocity and trustworthiness that arise from them" (Putnam, 2000, p. 19). In this definition, Putnam showed that social capital is the store value that individuals have accumulated in their networks. He emphasized that social capital is maintained if people continue to participate in their networks. He also acknowledged social capital as both private good and public good.

Building on the seminal works by Bourdieu, Coleman, and Putnam, a growing literature has employed the concept of social capital to account for successful collective action (e.g. Nahapiet and Ghoshal, 1998; Portes, 1998; Valentinov, 2004; Ostrom and Ahn, 2007). The literature highlights the value of social relationships between individuals as the capacity to collective action.

Emphasizing the concept of intellectual capital, Nahapiet and Ghoshal (1998) proposed a comprehensive model of social capital that could be used in an organizational context. The authors defined social capital as "the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit" (Nahapiet and Ghoshal, 1998, p. 243). In their theoretical work, the authors included various concepts such as intellectual capital, the three dimensions of social capital, and the development of organizational social capital. They defined intellectual capital as the "knowledge and knowing capacity of social collectivity" (Nahapiet and Ghoshal, 1998, p. 245). More specifically, intellectual capital is a resource and capability that organizations possess which enables it to act on the basis of knowledge and knowing. This indicates that intellectual capital refers to collective knowledge and collective knowing created through and embedded in social networks rather than individual knowledge.

Nahapiet and Ghoshal (1998) contended that individuals contribute to collective knowledge and collective knowledge is more beneficial than individual knowledge. Nahapiet and Ghoshal (1998) asserted that social capital, as defined by its dimensions, facilitates the creation and dissemination of collective knowledge within an organization. Further, the authors pointed that social capital in an organization should be studied from a multidimensional perspective. This multidimensional model needs to include the structural, relational, and cognitive dimensions.

Portes (1998) offered a comprehensive conceptualization of the origins and nature of social capital. He defined social capital as "the ability of actors to secure benefits by virtue of membership in social networks or other social structures" (Portes, 1998, p. 6). This definition indicates that social capital is an interaction-based concept existing within social relationships and connections. Portes's definition also shows that social network or social structure is the foundation of the creation of social capital. Portes emphasized that social capital is leveraged

through memberships in different social structures. In order to leverage the social capital available in social structures "an individual must be related to others, and it is those others, not himself, who are the actual source of his or her advantage" (Portes, 1998, p. 7). He argued that "involvement and participation in groups can have positive consequences for the individual and the community" (Portes, 1998, p. 2).

Valentinov (2004, p. 7) defined social capital as "norms, values, and trust embodied in the specific structural forms (e.g. cooperatives, networks, associations, groups etc.)". Cooperatives have a characteristic of collective ownership and features of collective decision making. From this perspective, Valentinov (2004) argued that interpersonal relations between members have a vital influence on the coordination and decision-making costs of a cooperative. He contended that social capital enhances the possibilities to cooperate and smoothes the communication and coordination within a cooperative, which therefore reduces transaction costs and generates economic benefits.

Social capital enhances the ability of individuals to cooperate hence formation of collective action. Social capital determines the success and failure of collective action (Ostrom and Ahn, 2007). Ostrom and Ahn defined social capital as "an attribute of individuals and of their relationships that enhance their ability to solve collective action problems" (Ostrom and Ahn, 2007, p. 5). According to Ostrom and Ahn (2007), social networks, reciprocity and trustworthiness enhance the ability of individuals to cooperate and solve collective action problems. In line with this, the authors acknowledged the multidimensional nature of social capital: social networks, reciprocity and trustworthiness.

Table 3 shows social capital has different definitions with different focus. What is apparent from the definitions is that social capital is created by the social relationships and networks. The definitions reflect that social capital inheres in the structure of social networks and relations. Social capital is possessed by an individual that is related to others. In other words, there should be social interactions for social capital to exist. They show that social capital is a resource created by the social relationships and interactions among individuals. The definitions of social capital have commonality in that they point to social relations that have productive benefits. Though it is not explicitly stated in all definitions, social capital describes having access to social

resources and/or as using these resources. According to the definitions, social capital is a productive resource to achieve certain goals. That is, social capital creates values for the individuals that participate in the interactions.

Table 3. Some selected definitions of social capital

Author/s	**Social capital is …**
Bourdieu	"… the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance or recognition" (Bourdieu 1986, p. 248).
Coleman	"… not a single entity but a variety of different entities, with two elements in common: They all consist of some aspects of social structures, and they facilitate certain actions of actors—whether persons or corporate actors—within the structure" (Coleman, 1988, p. 98). "…the set of resources that inhere in family relations and in community social organization and that are useful for the cognitive and social development of a child or young person" (Coleman 1990, p. 300).
Putnam	"… features of social organization such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit" (Putnam 1995, p. 67). "… connections among individuals –social networks and the norms of reciprocity and trustworthiness that arise from them" (Putnam, 2000, p. 19).
Nahapiet and Ghoshal	"…the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit" (1998, p. 243)
Portes	"… the ability of actors to secure benefits by virtue of membership in social networks or other social structures" (1998, p. 6).
Valentinov	"…norms, values, and trust embodied in the specific structural forms (e.g. cooperatives, networks, associations, groups etc.)" (Valentinov, 2004, p. 7).
Ostrom and Ahn	"…attribute of individuals and of their relationships that enhance their ability to solve collective action problems" (Ostrom and Ahn, 2007, p. 5).
Yang	"….features of social groups or networks that each individual member can access and use for obtaining further benefits" (Yang, 2007, p. 19).

Source: Constructed by the author

As it is mentioned earlier, the aim of this study is to provide empirical evidence on the importance of social capital as smallholder farmers' propensity to engage in collective marketing in dairy cooperatives, the conceptualization of social capital in this study follows Nahapiet and Ghoshal (1998). Nahapiet and Ghoshal's three dimensions of social capital (structural, relational, and cognitive) have been employed as an analytical framework because (1) the model has been

developed from an organizational (cooperative) perspective and (2) as noted by Nahapiet and Ghoshal (1998), Tsai and Ghoshal (1998), and Nardone et al. (2010), it offers comprehensive conceptualization of social capital that accommodates the major concerns of the existing literature as it enables multidimensional assessment of the concept. In the following section, each dimension will be examined in the organizational setting of cooperatives.

While a growing number of policy-relevant researches on social capital are proliferating, there still exists controversy on how to objectively measure social capital. Literature argued that the conceptual ambiguity surrounding social capital has resulted in inherent difficulties in measuring it (Sabatini, 2009; Nardone *et al*., 2010; Gómez-Limón et al., 2014). The authors pointed that much of the ambiguity around social capital is derived from its imprecise definition and the application of different units of analysis. More specifically, Sabatini (2009) argued that the controversy revolves around the forms of social capital, dimensions in which social capital is accrued and, the various determinants of social capital.

Literature indicated that the quantification of benefits from social capital directly or by use of proxy variables is not an easy task. The fact that social capital is multidimensional, and uses various proxy variables that are difficult to quantify in different settings, limits its measurability and the benefits derived from the various social relationships. This indicates that much work is still needed to objectively assess and determine benefits from social capital on the basis of theoretical insights (Sabatini, 2009). Social capital as a resource is elusive and cannot be seen or touched and its measurement is difficult. It can only be measured by focusing on features of human behavior and relationships that the concept associated with, in other words the process that results in the accumulation of social capital. That is, social capital includes key features such as social networks, trust, norms, reciprocity, etc (Nardone *et al*., 2010; Gómez-Limón et al., 2014).

The other ambiguity around social capital is whether it should be considered at an individual or aggregate level. The notion that individuals can invest in relationships and get beneficial returns in future makes measurement of social capital at the individual level. In this view social capital is considered as a personal belonging that benefits its owners directly through personal networks. However, social capital is also measured at an aggregate level. In this view social capital is considered as a community resource that can benefit everyone in the community (Putnam, 2000).

However, Putnam's argument supports that the concept of social capital has its bases in individual behavior and attitudes. Similarly, Yang (2007) suggested that social capital should be considered as an individual attribute as individual is the natural unit of observation and measurement. Taking this into account, Yang defined social capital as "the features of social groups or networks that each individual member can access and use for obtaining further benefits" (Yang, 2007, p. 19). Therefore, social capital should be analyzed at the individual level as collective level has its basis in individual behavior and attitudes.

Further complicating matter, social capital is highly context specific. Social, cultural, and economic differences indicate that general measures of social capital are insufficient for identifying the mechanisms behind social capital across studies (Woolcock and Narayan, 2000). The authors pointed that the complex nature of social capital is clear in instances where measures and conclusions drawn from studies in developed countries are applied to studies in developing countries. Woolcock and Narayan asserted that the generalization of social capital measures across studies fails to account for the social and historical contexts of different populations. Thus, statistical evidence drawn from surveys using indices of social capital loses out on the "subtlety, richness, and enormous variation gleaned from case studies of individual countries and communities (Woolcock and Narayan, 2000 p. 235).

While the issues discussed above may affect the measurement of social capital, it is feasible to achieve some form of balance between theoretical relevance and construct validity and reliability (Sabatini, 2009; Gómez-Limón et al., 2014). In view of the foregoing, this study conceptualizes and measures social capital as being comprised of three dimensions: structural, relational, and cognitive. This conceptualization and measurement offers multidimensional assessment of the concept. A theoretically informed measurement framework is developed which guides the construction of composite indicators for measuring each dimensions of social capital. The measurement method summarizes the indicators of dimensions of social capital in meaningful ways, while still creating a single measure for each dimension which shows strong statistical validity.

3.1. 3. Dimensions of social capital and cooperatives

Social capital consists of three dimensions: structural, relational, and cognitive (Nahapiet and Ghoshal, 1998). The dimensions are highly inclusive and ensure the representation of the

different features identified in social capital. Although the characteristics used to describe the dimensions are interrelated, each dimension is a separate construct and has a set of unique qualities (Nahapiet and Ghoshal, 1998; Tsai and Ghoshal, 1998; Nardone et al., 2010).

Structural social capital

The literature on social capital refers structural social capital to structural characteristics and patterns of relationships among individuals in an organization. The structural dimension is related to the formation of interpersonal linkages between individuals. It shows how the structure of relationships enhances accessibility and linkages of members to each other. It indicates the extent to which an individual has access to other members. It is associated with whom, and how, an individual reaches out them; and, how frequently an individual shares information and resources with them (Nahapiet and Ghoshal, 1998; Tsai and Ghoshal, 1998). According to Borgatti and Foster (2003), the structural dimension is characterized by network components and features such as network configuration (such as the hierarchy within an organization), the presence or absence of network ties between individuals, and the density and connectivity of a network. Structural social capital facilitates cooperation by lowering transaction costs and accumulating social learning. It accounts how individuals derive an advantage by using personal contacts within the social structure of interactions (Nardone et al., 2010; Gómez-Limón et al., 2014).

Structural social capital has often been examined in terms of the structural characteristics of the ties within the social network: bonding and bridging (Lin, 2001). Bonding social capital exists in socially close relationships such as with family, close friends[10], and neighbors (Part, 2008). This social capital shows the horizontal relationships occurring in homogenous groups (like a family or neighborhood). It is inward looking and reinforces exclusive identities (Woolcock, 2001). It sustains solidarity within the group, which is important in providing support for the members of the group (Jochun et al., 2005). Bridging social capital, on the other hand, exists in social relationships such as with distant friends, associates and colleagues (Part, 2008). It is, therefore,

[10] Close friend refers to person one feel at ease with, can talk to about private matters, or call on for help (World Bank, 2004).

more outward looking (Woolcock, 2001). It brings people together from different social groupings, promoting cross-cultural understanding and tolerance (Jochun et al., 2005).

By design the cooperative is an organization with plenty of social ties among its members. Cooperative is formed by a group of voluntary farmers to achieve their collective goals. The collective ownership and usage of the cooperative entail that the members are likely to know each other and have social relationships (Nilsson et al., 2012). Thus, there exists a dense interpersonal social network. The structural social capital can be measured by the strength of social ties, by the density of social network, and by the frequency of social interactions among the members. A high level of structural social capital, therefore, is beneficial for both members and management because a social network structure creates a platform for information sharing and exchange which facilitate the interactions and knowledge transfer among the membership. For the individual members, strong ties with other members lead to exploitative learning that results in an increase in efficiency and productivity (Levinthal and March, 1993).

Relational social capital

The relational social capital refers to the kind of personal relations people have built up between them through interactions in an organization. It shows the nature and quality of the relationships and interactions among individuals. It describes the properties of interpersonal relationships people developed as result of interactions within the organization (Nahapiet and Ghoshal, 1998). Trust, trustworthiness, norms, sanctions, reciprocity, confidence, and solidarity are the key attributes of this dimension (Gómez-Limón et al., 2014). Literature indicated that trust has an indispensable role in promoting cooperation among individuals. It facilitates social interaction, reducing the costs of interaction and contributing to more effective operation of businesses. Trust among individuals is a mechanism that allows actors to discover their common interests and to organize collective actions for their realization (Hansen et al., 2002; James and Sykuta, 2006; Six, 2007; Österberg and Nilsson, 2009).

Trust is defined as "the extent to which one believes others will not act to exploit one's vulnerabilities for their own gains" (Hansen et al., 2002, p. 42). Trust is based on expectation that individuals or organizations will act in ways that are expected and will consider the interest of others. Trustworthiness refers to the individual's or organization's accountability, fair dealing, and sense of honesty and to how deserving an individual or organization is of the trust afforded

them by others (Australian Bureau of Statistics, 2004). Trust facilitates resource exchange as it stimulates individuals' willingness to cooperate, building a reputation of trustworthiness and attracting other members into the network. When two actors trust each other, they become more willing to share their resources without fearing that one's exchange partner will act opportunistically. Thus, when trust exists, the exchange or combination of resources i.e. cooperative behavior emerges (Tsai and Ghoshal, 1998). An extensive literature emphasized the association between trust and cooperatives. Trust has increasingly gained attention for the role it plays in cooperatives (Hansen et al., 2002; Dakhli and de Clerq, 2004; James and Sykuta, 2006; Six, 2007; Österberg and Nilsson, 2009). The next section will review pertinent literature on the importance of trust in cooperatives.

Social norms refer to "informal rules, shared understandings, and conventions that proscribe, prescribe and modulate certain behaviors in various circumstances" (Aldridge et al., 2002, p. 11). According to Coleman (1990), social norms give individuals the confidence to invest in collective activities with the knowledge that others will do so as well as a result of interaction. He mentioned that breaching a social norm may lead to loss of reputation and sanctions in a group that causes feelings of shame and distress in its deviants. The foundation of many social norms is the concept of reciprocity, which refers to the act of providing a service to others at a personal cost with expectation of this kindness will be returned at some undefined time in the future in case of need (Gómez-Limón et al., 2014).

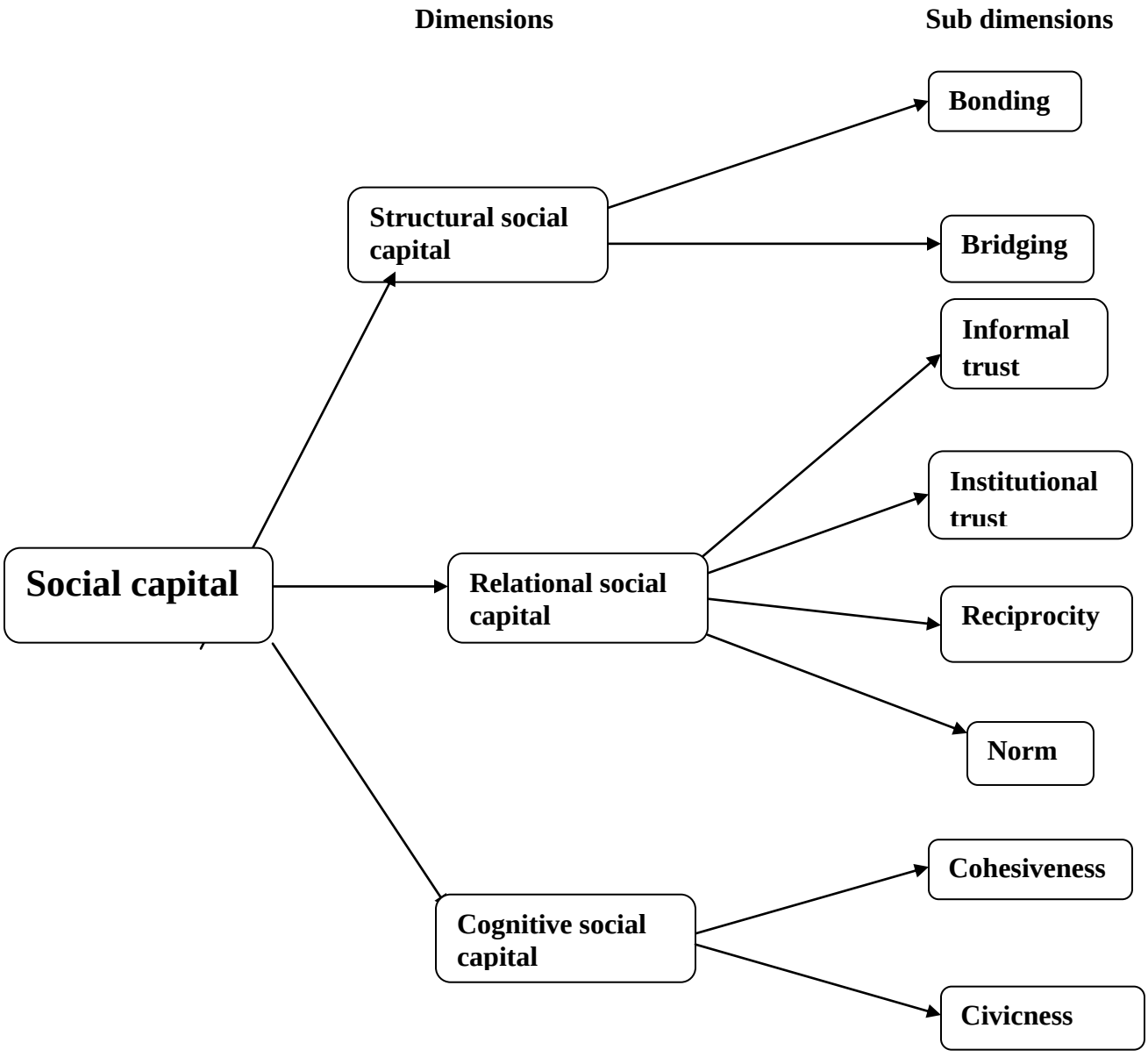
As a society with a dense social network, a cooperative develop social norms emphasizing loyalty, reciprocity, and cooperation. It is believed that members within a cooperative are supposed to accept social control through norms (Nilsson et al., 2012). Social control can mitigate the problem of free-riding by making opportunistic behaviors costly due to the threat of social sanctions and reputational effects (Gulati et al., 2000).

Cognitive social capital

Cognitive social capital refers to the shared vision that facilitates the understanding of mutual goals and ways of acting in an organization. This dimension is associated with the fact that "individuals who share the same frame of mind and goals find it easier to understand and learn from one another" (Lindstrand et al., 2011, p. 197). One of the key features of this dimension is the level of *civicness* among individuals in a community. Civicness relates to individuals'

propensity to keep them informed about community affairs. It is supposed that well-informed individuals have a better knowledge of community affairs and a greater confidence in their ability to influence choices in a community (Putnam 2000). According to Gómez-Limón et al. (2014), civic engagement rationalizes cooperative behavior and makes it respectable. Community cohesiveness is other feature of cognitive dimension. Community cohesiveness refers to individuals' perceptions regarding the similarity among them i.e. how much they share similar belief and characteristics (Sahin, 2007).

Figure 6. The structural, relational, and cognitive dimensions of social capital



Nilsson et al. (2012) argued that cooperative vision and purpose provide a starting point for the members to develop mutual understanding. Members are supposed to agree on what their cooperative should do, and how to do it. They also accept the proper way of acting in a cooperative. The cooperative principles apparently contain element of ideology describing these issues. Hogeland (2004) mentioned that cooperative values and norms reflect service to members over profit, to subordinate individual goals to the good of the whole, and to value equality, etc. A cooperative supposed to develop a set of common language among the members. The frequent social interactions among members and the repeated transactions between the members develop shared vision in the cooperative. The shared vision among members can enhance cooperation (Tsai and Ghoshal, 1998) and reduce the problem of free-riding (Leana and Pil, 2006). It also enables members to communicate more effectively and avoid possible misunderstandings (Tsai and Ghoshal, 1998).

3.1.4. Trust and cooperative

The concept of trust has increasingly gained attention for the role it plays in economic activities (Sapienza et al., 2013). The authors argued that trust relates to many economic phenomena such as economic growth, international trade, and investment. Trust has emerged as a key construct in a wide variety of organizational studies that have acknowledged the relevance of cooperation in organization. Literature emphasized trust as a key factor behind positive organizational outcomes (Hansen et al., 2002; Barraud-Didier et al., 2012; Paliszkiewicz, 2013). Members' trust in their leaders is related to range of outcomes such as quality of communication and commitment within an organization. Trust is the foundation of interpersonal communication which is important for cooperation and effectiveness in an organization.

According to Barr (2003), the definition of trust needs to contain two components. The first is vulnerability: the act of trust reflects keeping oneself in a vulnerable position in the hope of obtaining a benefit as a result. The second is expectation: the potential trustor bases his decision on an expectation- that potential trustee will not – through words, actions or decisions – act opportunistically. Thus, trust is defined as "the willingness of a party to be vulnerable to the actions of another party, based on the expectation, that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party" (Mayer et al., 1995, p. 712). Similarly Six (2007, p. 290) defined trust as "as a psychological state

comprising the intention to accept vulnerability to the actions of another party based upon the expectation that the other will perform a particular action important to you".

As it is pointed by Mayer et al. (1995), the above definitions reflect the willingness put oneself at risk to someone's actions due to a positive belief of his trustworthiness. Trust is what one need to maintain interaction if he/she does not have confidence in the other party. Confidence is supposed to exist when one knows what to expect in a situation. Based on this, trust is required when there is no basis for confidence, in the sense that trust is necessary when the other party is unknown, or his/her behavior cannot be predicted or imputed. Seligman (1998) supported the above argument in that trust is necessary when the other party is unknown, or his/her behavior cannot be predicted or imputed. He argued that trust is required because there is no system within which penalty or sanctions can be imposed or there is no underlying sense of sameness or familiarity that would allow such prediction.

Six (2007) contended that trust is essential in the context of collective action. He pointed that when people are placed in a relational context where trust is involved, trust and action need to mutually reinforce each other. Six argued that trust is relevant when the trustor depends upon the trustee's future action/s to achieve his/her own goals and objectives. His argument indicates that the trustor, when acting on trust, presumes a position that is vulnerable to trustee's opportunistic behavior. As it is suggested by Ostrom (2003), trust develops when the trustee does not involve in opportunistic behavior, so that the trustor can't place himself/herself in a vulnerable position with regard to the trustee's action(s). Ostrom argued that trust strengthens the bond between individuals, facilitates exchange of information, enables risk taking. Trust is a key factor that shape networks and structural behavior of economic agents. It is the crucial link between networks and collective action and it is an important factor in sustaining voluntary cooperative action.

Dakhli and de Clerq (2004) defined institutional trust as trust that people have in institutions or organizations that exist in the society. Similarly, James and Sykuta (2005, p. 549) defined institutional trust as "trust among an organization's members existing within or impacted by the organizational setting". As it is pointed by Paliszkiewicz (2013), institutional trust relates to employees faith in leaders and attainment of organizational goal, and to the belief that the action of the organization will prove beneficial for employees. Cooperatives are a form of business

organization and thus, institutional trust relates to trust in members and management, and the cooperative (Hansen et al., 2002; Dakhli and de Clerq, 2004). Institutional trust helps members to actively participate in the governance of cooperative (Barraud-Didier et al., 2012) and be loyal to the cooperative (James and Sykuta, 2006).

Dakhli and de Clerq (2004) and James and Sykuta (2005) argued that institutional trust has an economic significance in cooperatives. They contended that institutional trust relatively lowers bureaucratic and market transecting costs, and thus smoothes cooperation and coordination within cooperatives. Institutional trust can reduce monitoring cost; increase the willingness of individuals to interact with their organization and to share information, resources, and knowledge (Dakhli and de Clerq, 2004). When there is a higher level of trust among members, the cooperative operate more efficiently than cooperatives manifesting lower levels of trust, other things being equal (James and Sykuta, 2005). Thus, Dakhli and de Clerq (2004) and James and Sykuta (2005) argument indicates that trust gives economic advantages to cooperatives and it is important to development of cooperative behavior.

Studies suggested that trust has a significant role in agricultural marketing cooperatives. Hansen et al. (2002) showed that trust among members and trust between members and management are positively associated with group cohesion, which shows the strength of the members' desires to remain in a marketing cooperative and their commitment to it. James and Sykuta (2006) argued that trust and farmer perceptions of trustworthiness are higher in cooperatives than in investor owned firms. The authors argued that trust is an important factor explaining the choice of farmers to market through the cooperatives rather than to investor-owned firms.

3.1.5. Gender differences in social capital

Gender is defined as "a structure of social relations that builds on the perceptions of differences between males and females that are reflected in everyday social practices" (Karhina et al., 2016, p. 3). The definition shows that gender relates to the social roles and identities associated with what it means to be a woman or a man. In connection with this, gender equality relates to the relationship between women and men and the differences in power between them. It is determined by the social and cultural attributes, norms, and expectations associated with what it means to be a woman or a man. Gender equality can enhance productivity, improve development outcomes, and make institution more representatives (World Bank, 2011). However, Addis and

Joxhe (2016) stated that there exists an asymmetry, where the male sex is given a higher value than the female sex. This has led the male sex to assume a dominant position, in terms of access to productive resources and power and the female sex is expected to defer to the other sex in decision making in most areas.

There is a growing literature that indicates gender differences in social capital endowments (Molyneux, 2002; Muñoz-Goy, 2013). According to Molyneux (2002), women more often depend on social capital which is located more so at home rather than in the workplace. Women undertake voluntary work and childcare that involve greater altruism and mobilize feelings associated with motherhood. The author pointed that women's social capital focuses more on solving domestic issues and less on economic opportunities. In the contrary, men's social capital is usually associated with public environment of the workplace that usually associated with economic opportunities. Pandolfelli et al. (2007) pointed that men have better outside social networks and thus they are in a better position to get advantage from collective action.

Social networks are the manifestation of power relations within societies (Molyneux, 2002). The author stated that there are substantial differences between women's and men's networks. Women are disadvantaged in two ways. First, women's social networks don't bring economic advantages. Business, political favors, and valuable contacts operate through men in-groups which exclude women. Second, women's social networks usually associated with fewer economic resources and depend more on time and non-monetized labor exchanges that can be included in the domestic division of labor. Similarly, Molyneux (2002) and Muñoz-Goy (2013) pointed that that there is gender inequality in relation to mobilization of social capital. The authors argued that women are less able to mobilize social capital to get advantage in their organization.

Women value altruism, collaboration, and conflict resolution more highly than men and thus, they usually build more informal social relations and networks (Molinas, 1998). Women build stronger kinship and friendship relations than men. In the contrary, men build more on formal relations that improve access to economic resources and decision-making (Molyneux, 2002). Women's social networks are wider than men's in South Africa. However, they are more localized in their area and mobilize fewer economic resources. This in turn, negatively influences women's stocks of social capital that enables them to participate in collective action (Maluccio et

al., 2003). Similarly, Katungi et al. (2006) stated that men have better access to social capital that enables them to participate in social institutions more than women.

Literature indicated that women build more relational social capital than men. Lowndes (2004) pointed that women have more trust on their neighbors. Similarly, Kormelinck (2010) revealed that women are more trustworthy and altruistic than men in social groups such as cooperatives. Westermann et al. (2005) also stated that norms of reciprocity are more likely operate in groups where women are present. According to Putnam (1995), women have more associational life than men and they are better in civic engagement. Women are a source of social cohesion in a group (Padmaja et al., 2006), as they have more homogeneous interest, greater interdependency, and an everyday experience of collaboration (Agarwal, 2000).

The review of the literature pointed out that there is considerable gender difference in social capital. The studies indicated that gender has an important role in social capital formation. Women build their structural social capital through localized social networks whereas men's structural social capital extended beyond their local area. The studies also showed that women build more relational social capital than men based on norms of reciprocity and trust. With regard to cognitive aspect, women are better in civic engagement and more actively involved in social organizations. The studies indicated that as a result of differing dimensions of social capital, women and men experience different level of access to valuable information and resources that can improve their livelihood.

3.1.6. Gender, agricultural cooperatives, and market participation

In developing countries, there is growing interest in establishing agricultural cooperative as a platform for empowering people to achieve goals that they would not be able to achieve on their own. Cooperatives help vulnerable female and male farmers to secure sustainable livelihoods (Borzaga and Galera, 2014). The authors argued that cooperatives have much potential to empower these limited resource farmers by enhancing their access to input and output markets. According to World Bank et al. (2009), cooperatives enable farmers to have enhanced market opportunities and reduce the risk they face in the market. They also help farmers to build individual capacities. In general, cooperatives improve farmers' incomes, socio-economic status, and leadership skills.

There is evidence that suggest many women work in the informal sector, operating at a low level of activity and obtaining low income. Cooperatives can provide them with the social, economic, and political leverage they need. For the farmers, cooperatives provide the setting for solving collective problem and the articulation of strategic and basic needs. The mutual encouragement and support that farmers give each other can also be essential in boosting their self-confidence. Cooperatives are governed by a certain number of values: social responsibility, equality, solidarity, and caring for others (Borzaga and Galera, 2014). However, women are not able to fully utilize the potential benefits that the cooperative provide (Meier zu Selhausen, 2016).

It is obvious that cooperatives reflect the broader society in which gender inequality exists. According to Thomas et al. (2013), the most important gender issues in Ethiopian agricultural cooperatives are women's low level of participation and under-representation in leadership and decision-making. The participation of women in agricultural cooperatives is generally very low. The authors showed that women account 20% of cooperative membership and 18% of the cooperatives have women in leadership positions. There is also a very small increase (3%) in women's participation over time.

Literature argued that women face constraints that hinder their participation in cooperatives. One of the constraints is the role of women in society and the misconception of women's domestic and reproductive responsibilities. This restricts women's economic opportunities and is the cause of their work burden and time constraint. Women often engage in income earning activities together with their nonpaid work as mothers and caretakers of the household. Thus, they have little time and fewer opportunities to participate and attend meetings in cooperatives (World Bank et al., 2009; FAO, 2011). In Ethiopia, the cause of women's low participation in cooperatives is social and cultural norms and practices which place women in a lower position relative to men. Gender norms and practices influence social and economic capabilities and opportunities of women engagement in cooperative activities (Jones et al., 2010).

Meier zu Selhausen (2016) stated that women's lack of access to productive resources is the other constraint that limits their participation in cooperatives. Women lack access to land, production inputs and services; their level of education is lower and their cooperative knowledge and business experience is very limited. Because of these problems women are unable to participate in cooperatives and excluded from the benefits that cooperatives provide. Similarly,

Jones et al. (2010) pointed that women in Ethiopia face unequal access to and control over key productive resources land, credit, and extension services. The authors pointed that the gender specific constraints limit women's access to productive resources and services and thereby hinder them reaching their economic potential.

Women's participation in the cooperatives is affected by customary laws. Despite land certification policy in Ethiopia that state both men and women as equal owners, customary practices assume male headship and ownership of land (Kumar and Quisumbing, 2012). In most place land ownership is the most important requirement for cooperative membership (Bernard and Spielman, 2009) and this excludes women from being member of a cooperative. There are also cases where cooperative by-laws, certain rules and regulations discriminating against women's participation in the cooperatives. For example, most cooperatives in Amhara region of Ethiopia have a rule of 'only one member per household'. This has led to married women to be excluded from membership in cooperatives, only female household heads being more likely to be a member (Oxfam International, 2013).

In many developing countries, agricultural commercialization is playing a key role in creating new market opportunities. However, for women in particular, equal access to participate in these markets is still limited by several factors. Women play a key role in supplying traditional and high-value produce, but compared to men, women farmers face a number of disadvantages, including lower mobility, less access to productive resources, and cultural norms. Women tend to lose income and control as a product moves from the farm to the market. In general, women farmers are often excluded from participation in lucrative markets (World Bank et al., 2009; FAO, 2011).

In sub-Saharan Africa, infrastructure is an obstacle for women's market engagement than men. Infrastructure is severely constrained; transport infrastructure is limited mainly to main roads and the majority of the farmers are far from these roads. Women farmers also face additional concerns, cultural norms and safety, which are taken into account in their travel and transportation of produces. Women often do not reach markets because roads or transportation are inefficient or unsafe for them to use. This decreases their access to markets and thus their opportunities for participation in the market (World Bank et al., 2009; FAO, 2011).

World Bank et al. (2009) stated that women play an important role in agriculture and rural livelihoods. However, women's access to productive resources and services, such as education, land, credit, information is often constrained. They are usually at a disadvantaged because of persistent gender disparities in access to productive resources. Fischer and Qaim (2012) mentioned that when new marketing or technological opportunities emerge, agricultural production is often centralized under men's control. This limits women's ability to adequately participate in markets and generate income.

Women face difficulties in participating in markets due to gender norms and relations. In some South Asian countries, cultural norms restrict women's movement in public, so women has to go to socially acceptable and gender segregated places to sell their produces or has to rely on men to serve as their link to markets (Women Thrive Worldwide, Undated). Compared to male counterparts, women have a lower socio-economic status, which hampers their opportunities to access and participate in collective marketing groups. Women's freedom is restricted by men's control over their mobility and they are primarily supposed to be responsible for all domestic work. This has hindered them from better participation in collective marketing (Fischer and Qaim, 2012; Thomas et al., 2013).

Women are relatively more involved in production of traditional food crops for subsistence and sale, whereas men more produced cash crops. Even men take over production and marketing of traditional crops when they become financially lucrative (World Bank et al., 2009). For example, in Ethiopia, women mostly involved in production and marketing of dairy which is a semi-subsistence agricultural commodity. They carry out almost all dairy activities in the household. They also control the income generated from the sale of dairy products. With the availability of dairy cooperatives and dairy processing companies, milk becomes financially lucrative in some areas and men have taken over the sale of milk and control the income (Lenjiso, 2013).

Gender was investigated in various empirical studies as a factor in market participation. Chirwa and Matita (2012) revealed that gender in terms of sex of household head is an important factor in determining market participation Malawi. The findings showed that the probability of men participating is 17% higher than that of females participating in commercialization. The authors asserted that gender disparity in market orientation between male and female heads of

households, which could be as a result of biases in access to productive resources against female-headed households.

Zamasiya et al. (2012) revealed that female-headed households are more likely than male headed households to participate in soybean markets. The authors suggested that legumes are culturally viewed as women's crops in Zimbabwe. Similarly, Jagwe (2011) showed that there is a positive significant relationship between traders being male and sale of banana. The finding showed that banana marketing is gender sensitive and male traders are more likely to have an advantage. In the contrary, Gizachew (2005) revealed that there is a negative relation between sale volume of milk and male headed household. Similarly, Asfaw (2009) showed the same result. Female headed households sell more quantities of milk than male-headed households.

3.2. Empirical Literature

3.2.1. Measuring social capital

Brehm and Rahn (1997) used data from the General Social Survey and showed the existence of an endogenous (and dynamic) property of social capital. They estimated their structural model of social capital in a pooled cross-sectional analysis combining latent variables (interpersonal trust, civic engagement, and confidence in government) for the key concepts and exogenous variables, all measured at an individual level. The findings showed that interpersonal trust and civic engagement are in a tight reciprocal relationship, where the connection is stronger from participation to interpersonal trust, rather than the reverse.

Knack and Keefer (1997) have used indicators of trust and civic norms from the World Values Survey (WVS) to estimate the impact of trust, civic norms and associational activity on a nation's economic growth rate. Narayan and Pritchett (1997) constructed a measure of social capital in rural Tanzania, using data from a large-scale household survey (of 1376 households in 87 clusters). They asked questions about the households' memberships in groups, the characteristics of these groups, and individuals' values and attitudes (particularly their definition of and expressed level of trust). They used the two most commonly used indicators, namely trust and membership of voluntary organizations, in a combined quantitative measure of social capital.

Grootaert (1999) undertook a multivariate analysis of the role of voluntary organizations at the meso level in affecting household welfare and poverty outcomes and in determining access to

services. Using data from 1200 households, Grootaert investigated six dimensions of social capital in local associations namely the internal heterogeneity, density of associations, frequency of meeting attendance, members' effective participation in decision making, payment of dues, and the community orientation of associations. He constructed social capital index from the values of these six variables. Grootaert and van Bastelaer (2002) differentiated micro versus macro approaches to measuring social capital. In their micro approach, they encompassed networks, organizational membership, trust, norms, and values. They also pointed that assessing the institutions of the country, the rule of law, and governance in measuring social capital at a macro level.

Using data from450 farmers and 195 traders from seven municipalities of Benguet, Milagrosa and Slangen (2006) asked questions on 22 social capital statements and membership on seven community associations. They used quantitative-additive method to calculate cognitive and structural social capital scores and create social capital index. They extracted six components were underlying social capital using principal component analysis. The components were core trust, institutional trust, informal networks, poverty perception, common goals and life satisfaction. Independent factor analyses for farmers and traders showed that informal networks and outer core trust, respectively, loaded heavily in terms of social capital motivations in Benguet, Philippines. The findings showed that farmers had significantly better community relations than traders i.e. they have higher social capital scores than traders. Traders scored higher memberships in formal organizations and for this reason; they had higher overall social capital index.

Using survey data from 12 city law enforcement departments in Turkey, Sahin (2007) examined three social capital dimensions: structural, relational, and cognitive. He used confirmatory Factor Analysis (CFA) to develop and validate the measurement models for the latent variables in his study. The CFA analysis results indicated that relational dimension of social capital is measured by five indicators in the model, having factor loadings higher than .46. The indicators of this construct related to intraorganizational trust. The results showed that Integrity produced the highest factor loading (.78) among all the indicator variables of this construct. Other indicators, including *trust*, showed moderate factor loadings (ranging from .46 to .62). The cognitive social capital was measured by five indicator variables in the measurement model. The result from

CFA showed that all the factor loadings range from .64 to .78. The indicator, communicate produced the highest factor loading score (.78) and all other indicators also provided high factor loadings. The structural social capital was also measured by five indicators in the measurement model. The result CFA showed that all the factor loadings are statistically significant; however, one of the indicator variables, exchange, was eliminated from the measurement model in the three-factor model because it produced a low factor loading (.25). The other four indicators (with factor loadings ranging from .32 to .71) were retained.

Willy and Holm-Müller (2013) subjected the social capital indicators to explorative factor analysis using PCA. This generated indices on the five components of social capital considered in their study: social participation, social networks, social support, reciprocity and trustworthiness. They conducted PCA in three steps. First, they asked the respondents specific questions that were used as indicators of each of the five components of social capital. Second, they carried out PCA with orthogonal rotation on these items. They verified the sampling adequacy using Kaiser–Meyer–Oklin (KMO). They also tested whether correlations between items were large enough for PCA using Bartlett's test of sphericity. Third, they selected components from step 2 with eigenvalues greater than 1. Finally, they summed up the actor scores in each PCA component for each social capital component to obtain a single score and normalized on a 0–1 scale.

Using a survey data of 998 farmers in Andalusian, Spain, Gómez-Limón *et al*. (2014) developed a comprehensive index for social capital. They identified three dimensions of the social capital, structural, relational, and cognitive social capital, each one also comprising several subdimensions. After applying PCA to the farmers' dataset, they retained 14 principal components, explaining 59.6 percent of the total variance. Furthermore, their Kaiser-Meyer-Olkin test measure of sampling adequacy was 0.843 and Bartlett's test of sphericity was significant, indicating the data is large enough for PCA. To understand the meaning of these components, they analyzed the rotated factor loadings of the individual indicators. The result showed that the base indicators selected for each subdimension considered are adequate. Each subdimension was explained by one single principal component i.e. the indicators selected for each topic are highly correlated with the latent variable or subdimension analyzed.

Bisung (2015) employed PCA with varimax rotation to drive independent dimensions of social capital from all social capital indicators. He chose this rotation because its solution to data reduction discriminates between theoretical constructs and gives higher loads to fewer indicators. He extracted components with Eigen value greater than 1. After interpretation of components based on indicators with high loads on a common factor, he created three additive indices of social capital: informal support networks index, formal support networks index and trust index.

As demonstrated above, there is no single measure which academics have deemed adequate enough to provide a robust assessment of the many facets of social capital. Rather, variations can be seen throughout the literature, which attempt to measure social capital in a variety of ways. The study generally draws on a number of sources of information to construct social capital indexes.

3.2.2. Determinants of social capital

Most studies have focused on the potential contribution of social capital to individual welfare. So far, there are only few studies about the determinants of social capital, and no comprehensive and consistent framework has been developed for investigating determinants of individual social capital. Basically, some authors emphasized the role of individual factors in determining the incentive of individuals to invest in social capital, such as age, education, income, (e.g. Christoforou, 2005; Fidrmuc and Gėrxhani, 2008; Kaasa and Parts, 2008); while others offer weight to the effect of contextual or systemic factors at the level of community/nation, such as town size, income inequality; ethnic divisions (e.g. Fidrmuc and Gėrxhani, 2008; Alesina and Ferrara, 2000).

Katungi et al. (2007) pointed that an individual's social capital is accumulated as result of investing in social networks and/or participating in organizations. Similarly, Glaeser (2001) stated that an individual's social capital results from the individual's efforts and as a consequence of the social environment. According to Katungi et al. (2007), an individual effort is considered to be an endogenous process that involves comparing the costs and benefits of investing in social networks and/or participating in organizations. The authors argued that an individual will compare the expenditure in terms of time, effort, and financial outlay to expected returns. Studies suggested that individual social capital is determined by individual and aggregate level factors (Fidrmuc and Gėrxhani, 2008; Kaasa and Parts, 2008). Table 4 shows an

array of individual and community factors that determine different dimensions of individual social capital.

There are varying empirical results with regard to the impact of age on social capital. For example, Kaasa and Parts (2008) found that social networks decrease with age in northern Europe. The authors showed that old people live rather alone than with the family due to high welfare and well-developed social security system and hence they have limited access to social networks. The relation between social networks and age was also found to be concave – with ageing the social networks first increase and later decrease (Fidrmuc and Gėrxhani, 2008). Similarly, age has a positive relationship with trust and norm (Kaasa and Parts, 2008). With regard to civic participation, people tend to have higher civic participation between 50–60 years of age, whereupon their participation starts to decline (Fidrmuc and Gėrxhani, 2008).

Concerning education, studies (e.g. Christoforou 2005; Kaasa and Parts, 2008) showed that education encourages the formation of social networks. Rupasingha et al. (2006) stated that education enhances investment in social capital by improving one's communication skills and increasing social interaction and networking. In the contrary, Gómez-Limón *et al*. (2014) found that there is a negative relationship between education and social capital. The authors argued that educated individuals have a higher opportunity cost of time that constrains their investment in social capital. Studies showed that education strengthen trust by reducing uncertainty about the behavior of others (Haddad and Maluccio, 2003; Kaasa and Parts, 2008). Education has a positive relation with the norms of reciprocity that enables individuals to act collectively for mutual benefit and social purposes (Jicha, 2011).

Marital status is one of the variables that create differences in stock of social capital. Putnam (1995) revealed that married people have higher social capital, and that single people are less trusting and less engaged in civic activities than married people. Putnam suggested that married people are more socially involved than other people. In the contrary, Bolin et al. (2003) showed that married people have less social capital, as family life takes time and decreases the need for outside social relations. In general, religiosity positively influences social capital, increasing social networks, trust, and norms (van Oorschot and Arts, 2005; Kaasa and Parts, 2008).

Table 4. Summary of selected empirical studies on determinants of social capital

Variable	Dimensions of social capital			Findings	Author/s (year)
	Structural	**Relational**	**Cognitive**		
Age	Informal networks	Institutional trust, Norms		Age has a negative effect on informal networks. Age has positive effect on institutional trust and norms.	Kaasa & Parts (2008)
	Social networks			With ageing the social networks first increase and later decrease	Fidrmuc & Gėrxhani (2008)
			Civic participation	People have higher civic participation between 50–60 years of age, whereupon their participation starts to decline.	Fidrmuc & Gėrxhani (2008)
Gender	Social networks			Women have more informal networks which enable them to access social support.	Fidrmuc & Gėrxhani (2008)
	Social networks			Women are likely to have less formal networks.	Christoforou (2005)
Marital status		Trust	Civic participation	Married people are more trusting and more engaged in civic activities than single individuals.	Putnam (1995)
Religiosity	Social networks	Trust, Norms		Religiosity positive effect on social networks, trust, and norms.	van Oorschot & Arts (2005)
Income	Formal networks	Institutional trust, Norms		Income is positively associated with formal networks, institutional trust & social norms.	Parts (2013)
			Civic participation	Income positively influences the participation of individuals in a group.	Rupasingha et al. (2006)
	Networks (formal, informal)	Trust (general, Institutional)		Income is positively associated with informal networks, formal networks, general trust, & institutional trust.	Kaasa & Parts (2008)
Education	Formal networks	Trust (general, Institutional)		Education has a positive association with formal networks, general trust, and institutional trust.	Kaasa & Parts (2008)
		Trust	Civic participation	Education enhances trust and willingness to participate in organizations that generate benefit to the society.	Haddad & Maluccio (2003)

Continued …

Town size			Civic participation	Living in small or medium-sized town decreases civic participation	Fidrmuc & Gėrxhani (2008)
	Informal networks			People have less informal networks in larger-sized towns.	Alesina & Ferrara (2000)
Ethnic divisions			Civic participation	Ethnic divisions have negative effect on civic participation.	Alesina & Ferrara (2000)
Income inequality			Civic participation	Income inequality reduces civic participation.	Alesina & Ferrara (2000)

Source: Constructed by the author

Evidence shows that higher levels of income have a positive effect on formal networks and trust (Kaasa and Parts, 2008). The findings of Knack and Keefer (1997) also showed income is positively related with group membership and interpersonal trust. The authors suggested that all individuals may not enjoy access to the stock of social capital available in a society, as low income lead to social exclusion and hinder incentive to cooperate. Studies (e.g. Rupasingha et al., 2006; Gómez-Limón *et al*., 2014) revealed that regional variables create differences in stock of social capital. The authors showed that rural dwellers have higher levels of civic engagement than their urban counterparts.

Alesina and Ferrara (2000) showed that income inequality significantly lower participation in associational activities, contributing to erosion of social capital. The authors argued that when income unevenly distributed, people may feel exploited by others, thus diminishing their faith in their fellow citizens. Putnam (1995) argued that racial differences significantly reduce the level of social capital in USA. Similarly, Alesina and Ferrara (2000) revealed that participation in associational activities is significantly lower in ethnically fragmented localities. Studies also investigated the impact of town size on the dimensions of social capital. Fidrmuc and Gėrxhani (2008) showed that living in a small-sized towns decreases both informal and formal participation, while Alesina and Ferrara (2000) revealed that people have less informal social contacts in larger-sized towns.

In this section, I reviewed the literature on determinants of different dimensions of social capital at an individual level. The findings provided strong support for the argument that both individual- and aggregate-level factors determine the individual's social capital. The findings

also showed that while analyzing the determinants of social capital, different dimensions of social capital have to be analyzed separately. This is indicative of the fact that different factors have different influence on different dimensions of social capital- a particular determinant may have a positive effect on one dimension of social capital while its effect on another dimension of social capital may be negative or non-existing. This study tests many of the relationships supported in the literature and introduces additional variables that are relevant to the context of dairy cooperatives. It sheds light on factors influencing smallholder farmers' dimensions of social capital in dairy cooperative, while contributing to the designing of strategies to improve the stock of social capital.

3.2.3. Determinants of dairy market participation

Various empirical studies have investigated factors influencing smallholder farmers' participation in dairy markets in developing countries. The findings of the studies suggested that various demographic, socioeconomic, institutional, and infrastructural factors determine smallholder farmers' participation in dairy markets. Holloway et al. (2000) analyzed the effect of transaction costs at household level and the choice of production technique on the decision of Ethiopian smallholder farmers to sell their milk to dairy cooperatives. The findings showed that cow numbers, time to the milk group, and visits by extension agent have impact on milk market participation.

Berhanu (2012) studied factors affecting milk market participation and volume supply in Ethiopia. He used a Probit model of households' discrete decision to participate in the market followed by a Heckman selection model. The Probit model results revealed that age of household head, milk yield per day, dairy farming experience, milking cow ownership and landholding size affected probability of milk market participation. The result of Heckman selection estimation indicated that milk yield per day, dairy farming experience and household size determine volume of milk supply. Kiwanuka and Machethe (2016) used a double-hurdle model to study determinants of smallholder farmers' participation in Zambian dairy sector's interlocked contractual arrangements. The findings revealed that the determinants of smallholder farmers' participation are milk price at the collection center, ownership of improved breed animals, income from other sources, access to dairy marketing information, and landholding size.

Nga et al. (2012) used Heckman two-step procedure to estimate factors affecting the decision of market participation and volume of milk marketed by dairy households in Vietnam. Age and education level of household head, experience in dairy production, distance from milk market, and number of milking cows affected the probability of farmers' milk market participation while education level, number of milking cows, and non dairy source of incomes affected the volume of milk marketed. Benyam et al. (2016) also employed Heckman two stages procedures to analyze factors affecting milk market participation and level of participation in Southwest Ethiopia. The result of the first stage of Heckman procedures revealed that family size, access to credit, distance from milk market center, and number of milking cows owned affect household milk market entry decision. In the second stage estimation, family size, number of milking cows, and monthly non-dairy income source influenced the volume of milk marketed.

3.2.4. Empirical studies on social capital

A growing body of empirical literature argued that social capital plays an important role in enhancing collective action (e.g. Willy and Holm-Müller, 2013; Gómez-Limón et al., 2014). Grootaert and van Bastelaer (2001) pointed that social capital can help in transforming agriculture and more generally help alleviate poverty for individuals and for countries as a whole. Empirical evidence revealed that social capital contributes to rural livelihood improvement, in general, and cooperative development in particular.

Wolz et al. (2008) investigated the impact of social capital on farm income among household plot farmers in Ukraine. The authors underlined the multidimensional side of social capital. They found that social capital of its bridging structural type is a significant factor determining the level of agricultural income. However, both bonding and cognitive social capital had no impact on agricultural income. The authors contended that social capital can be identified as a significant production factor. They pointed that social capital contributes to farm income by helping farmers in accessing farm technology and information, credit, inputs, and market.

Gorton et al. (2010) investigated the importance of social capital for local economic development using water communities (WCs) in Macedonia. The authors revealed that the performance of individual WCs, measured in terms of both farmer satisfaction and payment records, has been highly uneven. They found that the importance of structural, relational and cognitive dimensions of social capital. The results showed that membership is linked to trust in senior managers

(relational social capital) and presence of perceived shared interests (cognitive social capital). Furthermore, the findings pointed that satisfaction with WCs depends on structural factors and this related to how resources are used, transparency and accountability. Payment behavior is linked to farmers' satisfaction, relational social capital and the cognitive dimension.

Munasib and Jordan (2011) revealed that a positive effect of associational membership on decisions about adopting sustainable agriculture practices and the extent of their use among Georgian farmers. The results showed that social networks are crucial in channeling and diffusion of information and that associational activities lead to more effective communication. According to the authors, individuals' involvement in community affairs through any formal channel affects their preferences and makes them more socially responsible to the environment. They suggested that associational memberships help to maximize profits at the individual level by providing information about, and hands-on techniques of, sustainable practices.

Willy and Holm-Müller (2013) analyzed the effects of social influence and participation in collective action initiatives on soil conservation effort among smallholder farmers in Kenya. They indicated that four components of social capital: social support, social participation, reciprocity and trustworthiness has positive influences on the likelihood of participating in collective action. In the contrary, social networks were found to have a negative influence. The authors revealed that location of households closer to sources of rivers and involvement with external organizations is found to also enhance participation in collective action. They also found out that participation in collective action enhances soil conservation efforts. The findings also showed that neighborhood social influence and subjective norms are significant determinants of soil conservation effort.

Gómez- Limón et al. (2014) highlighted the importance of associations in rural development endeavors. The authors asserted that rural associations enhance social capital building in communities. The building of social capital, in turn, influences the dynamics of development in rural areas with ultimate impact on the capability of communities and social cohesion. Gómez- Limón et al. (2014) emphasized the roles that the social relationships among farmers play in rural development. They argued that social relationships and networks benefit farmers by influencing farming practices and their propensity to adopt modern technologies via the supply

of information through networks. They contended that associations emerge as a result of trust between individuals and are the basis for greater trust and new collective efforts.

Liang et al. (2015) investigated the impact of social capital on member participation in collective activities and on the economic performance of farmer cooperatives in China. The authors indicated social capital by three dimensions, i.e., the external, relational, and cognitive dimensions. The results showed that members' participation in technical training and general meetings is more active in cooperatives with a higher level of relational and cognitive social capitals. Moreover, all three dimensions of social capital positively influence the economic performance of cooperatives.

When we look at the focus and contents of the previous social capital studies in Ethiopia, less emphasis was given in assessing the role of social capital in smallholder farmers' market participation in cooperatives. However, there is recognition of importance of social capital for the rural poor. There are few studies on social capital and the results of these studies showed that the importance of social connections and relationships in improving productivity, accessing market, and building livelihood.

Dodd (2012) examined the association between social capital and subjective well-being in rural Ethiopia. The findings revealed that generalized trust, membership in *Iqqub*, and perceptions of the trustworthiness of government were found to be associated with subjective well-being in rural Ethiopia. More specifically, the result showed that the association between cognitive social capital and subjective well-being is stronger than the association between structural social capital and subjective well-being. Fredu et al. (2009) investigated the interactions between gender, social capital and empowerment in the rural areas of northern Ethiopia. The findings showed that social capital, the number of local associations a household is a member, plays an important role in empowerment. However, there is significant gender difference i.e. social capital doesn't significantly empower female headed households but it significantly empowered male headed households.

Kormelinck (2010) examined the relationship between women's bargaining position and trust in coffee marketing cooperatives in Ethiopia. The study showed that female members have more trust, are more trustworthy or reciprocal, more altruistic and more cooperative than male

members. The finding revealed that various factors influence trust in the cooperatives. Age education, disloyalty in selling to other parties and diversification of income negatively influence trust while coffee harvest, years of membership, and performance of cooperatives influence positively. Furthermore, participation, commitment and voting have a positive effect on trust. The finding also showed that women's bargaining position restricted their trust in the cooperative. Women's limited membership was caused by their weaker bargaining position, such as lack of ownership of land and limited access to information and training on cooperative which, in turn, lowers their trust in the cooperatives.

Plaisier (2010) investigated farmers' willingness to invest, engagement, and trust in coffee marketing cooperatives in Ethiopia. The findings showed that the performance of the cooperative influence trust. It appeared that a better performing cooperative exhibits more trust. Trust, in turn, showed a strong and positive relation with the engagement of members with their cooperative and with members' loyalty. It appeared that the relation between trust and engagement is even of greater significance than the relation between performance and engagement. The finding also showed that engagement is also positively related to willingness to invest collectively. The other important finding is a risk-taking attitude of the farmer has a positive relation with engagement, loyalty and willingness to invest in the cooperatives.

Ruben and Heras (2012) explored coffee marketing cooperatives' performance in Ethiopia. The authors investigated the relationship between social capital and cooperative performance. The result of the study revealed that there is significant difference in social capital that is attributed to individual member characteristics and aggregate cooperative performance indicators. Ruben and Heras (2012) suggested that cooperatives with high social capital are better able to build communitarian response to external constraints, create stronger resistance against adversities, and are capable of accessing resources. However, this response depended on availability of the type of social capital: if bonding social capital is stronger than bridging social capital, there is the likely of collective action, but when bridging social capital becomes stronger, people tend to rely more on individual solutions using outside networks and alternative solutions.

3.3. Conceptual framework

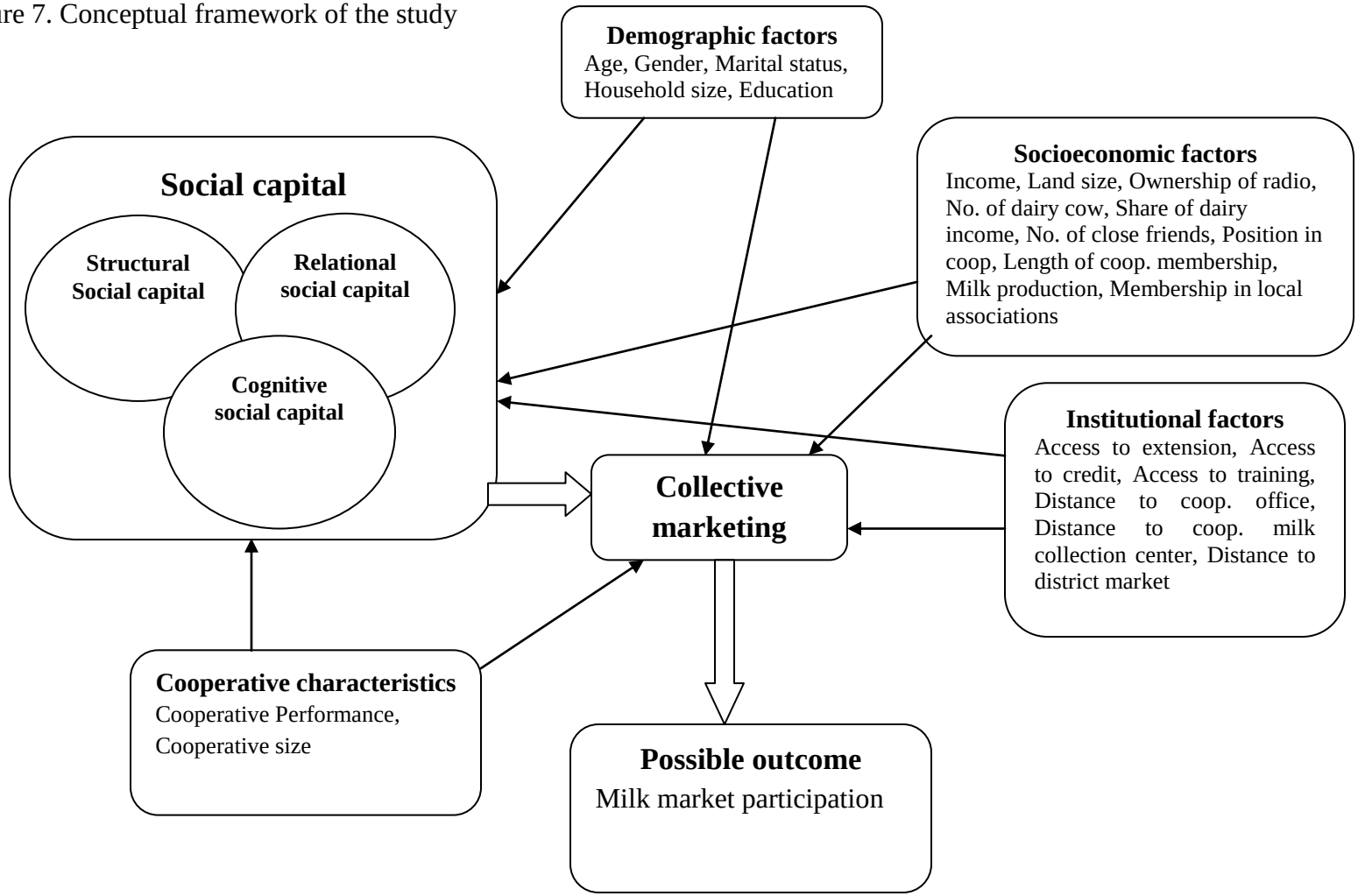
This study focuses on social capital and smallholder farmers' collective action in dairy cooperatives. From the review of extant literature on social capital it is evident that social capital

has critical role in enhancing collective action. Likewise, the review has also suggested that agricultural cooperatives are vehicles or instruments of collective action. For example, dairy cooperatives are organizations that address smallholder farmers' milk marketing constraints through collective action. Therefore, collective action through dairy cooperative is expected ultimately to enhance smallholder farmers' milk market participation in dairy cooperatives. Drawing on the literature, a conceptual framework (Figure 8) is developed to assess the dimensions of social capital at an individual farmer level and investigate its contribution to milk market participation in dairy cooperatives.

It is worth to use the multidimensional approach in studying social capital in order to have a solid base for a robust assessment of social capital. I integrate various facets to define social capital in three dimensions, namely structural, relational, and cognitive social capital through a set of attributes or sub-dimensions related to each of them in dairy cooperatives. The structural, relational, and cognitive social capital are a separate construct and measured directly from the individual farmers in the survey. These dimensions of social capital are determined by individual characteristics (demographic, socioeconomic, institutional), as well as cooperative characteristics.

It is also conceivable that individual social capital, individual characteristics (demographic, socioeconomic, institutional), as well as cooperative characteristics determine smallholder farmers' milk market participation in dairy cooperatives. These factors could have positive or negative effects in milk market participation in dairy cooperatives.

Figure 7. Conceptual framework of the study



Source: Constructed by the author on the basis of literature review

3.4. Summary

This chapter has set the stage to pursue the research on social capita and smallholder farmers' collective action in dairy cooperatives. The first section in the chapter presented the conceptual and theoretical perspectives. The section began with a discussion of smallholder farmers' collective action for market access. It conceptualized collective action as farmers' collective marketing in dairy cooperatives. The section presented a review of relevant social capital literature and provided rationale for its importance in building and maintaining collective action. It selected the most widely accepted framework of Nahapiet and Ghoshal (1998) that draws important distinctions between the structural, relational, and cognitive dimensions of social capital. The section then, presented how the structural, relational, and cognitive dimensions of social capital exist within cooperative and how they affect the members' participation in the cooperative. A review of literature on gender differences in social capital was also presented. This provided how social capital accrues to, or is accessed by men and women and how this led to uneven distribution of benefits between the groups. The section also presented a review of literature on gender**,** agricultural cooperatives, and market participation. It provided gender issues in cooperative and gender differences in market.

The second section reviewed empirical literature. The chapter reviewed the literature on the measurement of social capital and provided that the measuring social capital depends on elusive and intangible proxies (indicators). The section then, reviewed literature on individual determinants of social capital and provided individual and aggregate level determinants. It also reviewed various empirical studies and provided the determinants of dairy market participation. Empirical studies on social capital was also reviewed and provided how farmers use their social connections and relationships to improve their productivity, access market and build livelihoods. Finally, conceptual framework of the study was presented based on the review of the literature. The next chapter will outline research methodology, which will describe how data was collected and analyzed based on the conceptual framework presented at the end of this chapter.

CHAPTER 4: RESEARCH METHODOLOGY

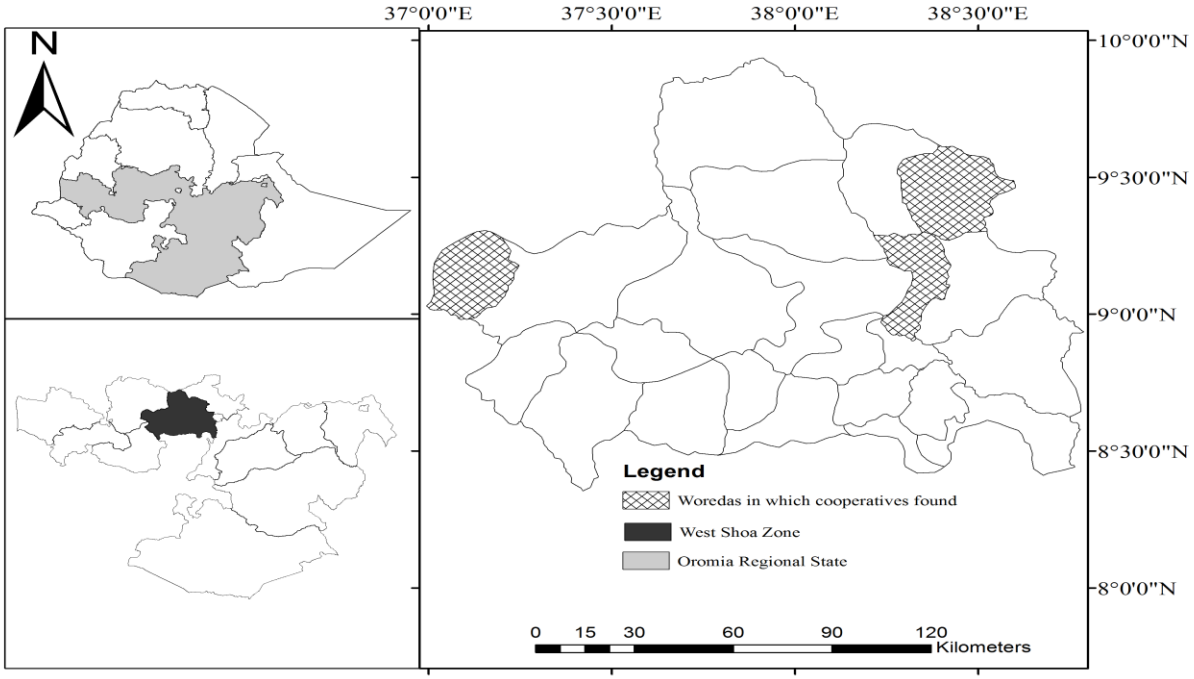
This chapter presents the methods and scientific reasoning behind the study. It presents the methodological approach used to collect and analyze data. The steps documented in this chapter are used to measure the dimensions of social capital at an individual farmer level and investigate their contribution to milk market participation in dairy cooperatives. The chapter includes the description of the study area, the research design, samples and sampling procedure, the field work, the challenges of data collection, methods of data analysis, and summary of the chapter.

4.1. Description of the study area

The dairy cooperatives selected for this study are located in West Shoa zone. This zone is one of the 12 zones of the Oromia region of Ethiopia. It is located on central Ethiopian plateau, at an altitude that ranges from 1000 to 3500 meters above sea level (OBFED, 2011). According to the 2017 population estimation by CSA (2013), West Shoa zone holds a total population of 2,701,287 of whom 1,356,810 are women and 1,344,477 are men. It has an area of 14,788.78 sq. km; with a population density of 182.66/sq. km. Biophysical attributes, like the availability of vast grazing areas, plain areas, temperate climate (23-25^{0}c), and abundant rainfalls (1300-1700 mm/year) offer high potential for crop production and livestock development. Smallholder agriculture remains an important source of livelihoods for a majority of the rural population in the zone. However, it is characterized by low productivity, lack of access to modern technology and market, and dependency on rainfall. The predominant farming system is mixed crop–livestock farming. Within this mixed farming, the most important crops grown are maize, wheat, teff, and barley; while cattle, goat, sheep, and horse are the commonly raised livestock (OBFED, 2011).

In West Shoa Zone, the dairy sector is characterized by majority smallholder farmers, low productivity, and an inadequate basic infrastructure for provision of production inputs and marketing services. The sector is overwhelmed by mixed crop-livestock farms and most of the dairy cattle are fed on crop by-products and residues. Despite the large dairy cattle population, milk production is still very low. Under the existing condition of smallholders, milk produced by a local cow is estimated at 1.4 liter per day for 182 days of lactation. The production per improved cow is estimated at 6 liter per day for 210 days of lactation. However, improved cows are rarely found in the rural areas of the zone (Fanos, 2012).

Figure 8. Map of the study areas



Source: Oromia Bureau of Finance and Economic Development (2011)

Literature pointed that market oriented smallholder dairying has tremendous potential for rural development. It increases household income and income effects extend positively to consumption and expenditure. Therefore, market oriented smallholder dairying is a viable tool to promote economic growth and alleviate poverty in rural areas (Staal et al., 2008). However, smallholder dairy production system is not market oriented in West Shoa Zone and milk produced by smallholders is primarily retained for home consumption. The remaining is processed into butter and cheese either to be consumed or sold. The primary reason for poor marketing of dairy products, among others, is the inefficient dairy products marketing characterized by high transaction cost and poor marketing facilities and services (Brandsma et al., 2012).

In West Shoa Zone, smallholder farmers face high milk marketing cost. The prevalence of thin milk markets and risk associated with milk marketing indicates that transactions costs have a key role in dairy marketing in the zone (Brandsma et al., 2012). A growing number of literature in Ethiopian dairy sector suggested that dairy cooperatives can reduce the transaction costs and enhance farmers' milk market participation (e.g. Holloway et al., 2000; Asfaw, 2009; Staal et al.,

2008; Azage et al., 2013). Cognizant of this fact, a number of dairy cooperatives have been established in zone with the intention of providing access to input and output markets.

West Shoa zone is strategically located in terms of its proximity to the major urban centers such as Addis Ababa, Ambo, and Holetta. This provides the opportunity to expand the market for its dairy products beyond the local and rural markets. Population growth, urbanization and income growth are also occasioning a massive increase in demand for the dairy products. These give smallholder farmers the opportunity to increase their income by producing and selling milk. However, it has been observed that high transaction costs for production and marketing constrain their participation in the emerging dairy markets. The marketing system is inefficient and underdeveloped giving the large majority of smallholder farmers' limited access to market (Fanos, 2012).

In West Shoa Zone there are ninety dairy cooperatives. The majority of the cooperatives are located in the rural areas where marketing of milk is difficult for the farmers. The road facilities are not well developed to get access to regular transportation. The bulk of their members are smallholder farmers who, besides keeping dairy animals, grow cereals and vegetable. Most the cooperatives began in the early 2007 and 2008, after fulfilling all the registration criteria enshrined in the new cooperative proclamation (147/1998). Current statistics from West Shoa Zone Cooperative promotion Office show that the cooperatives have a total number of 1134 members composed of 616 (54.3%) male and 518 (45.7%) female and a total capital of birr[11] 752,008.4 (WSZCPO, 2015).

The four dairy cooperatives selected[12] for this study were established in 2008 and 2009. The establishment of cooperative was initiated by the Woreda Cooperative Promotion Office. At the end of 2015, the cooperatives had 255 (104 male and 151 female) members (WSZCPO, 2015). The considerable proportion of female members may explain the fact that the role dairy cooperatives can play in improving the social and economic conditions of women. The focus group discussion with the members showed that they are indeed benefiting from the establishment of the cooperatives. The members pointed that the cooperative provided them the opportunity to increase their dairy income.

[11] Birr is an Ethiopian currency.
[12] See the procedure for selection of the dairy cooperatives in sampling and data collection section

Information from key informants showed that cooperative membership is open to dairy producers in the surroundings with at least one cow, capable of paying a registration fee and buys at least one share. The key informants pointed that the cooperatives have bylaw which is the fundamental instrument that create systems of the cooperatives to thrive as a member-owned business. Literature on cooperatives argued that bylaw guides the cooperative to perform business organization and define the duties and responsibilities of members and the management body of the cooperative (Szabo, 2010).

The key informants explained that the selected cooperatives are managed by Board of Directors which includes the chairperson of the cooperative. The Boards of Directors were elected through the general assembly and are expected to serve for a period of three years. The bylaws of the cooperatives indicated that the general assembly is the sovereign body and source of authority within the cooperatives. The board directors are mandated to take a day to day activity of the cooperatives. A board chairperson is elected and often chairs meetings at the Board and the General Assembly. He also represents the cooperative vis-à-vis third parties. The key informants also pointed that the cooperatives are managed by the members of the Board, the majority of whom is male. This indicates that female members are underrepresented in decision making at the management level.

At a focus group meeting, the farmers mentioned that the core function of the cooperatives is marketing of milk collected from members. This was also confirmed from the key informants. The cooperatives operate as business unit for milk bulking and selling to cooperative union. The key informants highlighted that the cooperatives operate on a smaller scale, own little capital equipment, and market raw milk. The cooperatives do not pay money on daily basis for the milk delivered by the farmers. They usually pay every two weeks. From the focus group discussion, one can understand that this payment scheme has created a problem for some of the farmers who highly depend on dairy income for their subsistence needs. The cooperatives are not equipped with refrigerator and it is difficult to keep and store milk for extended period. Although their core function is milk marketing, some of the cooperatives provide dairy production inputs such as feed.

4.2. Research design

This dissertation used a mixed-method research design where the collection and analysis of both quantitative and qualitative data were combined within a traditional quantitative study (Greene, 2007). This research design is the most appropriate for it offered an opportunity to employ both extensive (breadth) and intensive (depth) research approaches. The quantitative and qualitative data are simultaneously collected though the analysis of the qualitative data is carried out after the quantitative data is analyzed. Thus, the qualitative data set usually supplement the interpretation and clarification of results from the quantitative data set (Creswell and Clark, 2011).

In this research, the quantitative data was collected using survey while the qualitative data was collected using key informant interviews and focus group discussions. Creswell et al. (2007) argued that this design is important when there are different questions about the case that needs both quantitative and qualitative data set so as to provide sufficient knowledge. This design was appropriate since research on social capital and collective marketing require the integration of both quantitative and qualitative techniques that helps uncover the links between different dimensions of social capital and their impact on collective marketing (Grootaert and Van Bastelaer, 2002; Jones and Woolcock, 2007).

Warshawsky (2014) noted that the qualitative technique deals with how processes and experiences occur within the case to transfer knowledge to similar contextual settings. On the other hand, the quantitative aspect concerned with the determination of some general pattern, possible association and common properties among the general population. This helps to make generalizations based on observable data. Flick (2007) mentioned that mixed method research design focus on the complementary roles the different methods can play rather than as rival camps. The author argued that the quantitative and qualitative methods are used to achieve methodological triangulation at the data collection and analysis level.

In this research, a mixed methods approach was designed with combined quantitative and qualitative methods. The quantitative data collected through the survey while focus group discussion and key informant interview were used to collect the qualitative data that is used to explore some of the issues and findings from the quantitative study.

4.2.1. Research techniques

The survey approach was the first method employed in this research. Survey is the most comprehensive method for collecting quantitative data. When a researcher plans to collect data from a large research population, a survey is used. Survey's focus includes measurement procedure wherein the researcher selects a sample of respondents from the research population and administers a questionnaire to them (Ardales, 2008). A survey yields representative information about the research population. It can yield reliable results when it asks respondents about matters they do not find too threatening or private, and to which they can respond fairly definite answers (Pratt and Loizos, 2003). The second method employed qualitative tools to collect data through semi-structured interviews. The qualitative tools were employed to generate data that was used to supplement the interpretation and clarification of results from the quantitative analysis. In social capital study, Jones and Woolcock (2007) contended that focus group discussions and key informant interview are the most commonly used qualitative tools to generate narrative data.

Financial statements (balance sheet and income statement) of the cooperatives were collected from West Shoa Zone Cooperative Promotion Office. Other secondary data from the cooperatives files, published and/or unpublished documents from West Shoa zone and Federal Cooperative Agency, previous studies in other countries which have been conducted on similar area, articles, and the internet sites were reviewed.

4.2.2. Sampling and data collection

The quantitative data used in this study was collected through dairy cooperatives member survey conducted among 154 farmers in West Shoa zone from October – November, 2015. Population of the study is the members of dairy cooperatives. The technique of two-stage sampling procedure was adopted in selecting the sample farmers for the study. In the first stage, dairy cooperatives were selected on the basis of their performance. In the second stage, the sample farmers were selected from the selected dairy cooperatives.

4.2.2.1. Selection of dairy cooperatives

This study used the extra-value approach for evaluating the performance of cooperatives. The extra-value approach is preferred to the conventional measures of performance (return on equity, return on operating capital, net margins on sales etc.), which do not account for the cost of using

members' equity in financing a cooperative's operations. Furthermore, cooperatives do not have equity market prices to measure their performance and market value. Without stock market valuation of a cooperative's performance, members often are not sure how well their cooperative performs and whether the cooperative management has created or destroyed the value of the cooperative in its operations (Ling, 2006; 2014). In response to this situation, extra-value approach was proposed for evaluating the performance of cooperatives. According to Liebrand (2012) and Ling (2006; 2014), this approach accounts for the total cost of operations, including the cost of using equity, and measures performance in terms of earnings generated above this total operating cost (thus extra value). The authors pointed that the cost of using equity is the opportunity cost of equity capital. It is an interest charge on the equity used in the operation at a rate equivalent to the amount the money could earn elsewhere.

Dairy cooperatives require capital to market members' milk. The equity is supplied and owned by the members and need to have an opportunity cost that reflects the capital's value in alternative uses. If the net savings of the cooperative exceed the opportunity cost of members' equity, the cooperative enhanced the value of the equity and generated "extra value" for members. In the contrary, the cooperative reduced the value of the equity if it generates a negative extra value. For the extra-value approach to be an objective performance measure for comparing cooperative operations, extra value can be made neutral to scale and to mode of operations by an index (extra value index) that expresses extra value as a percentage of operating capital. The extra value index (EVI) is expression of extra value as a percentage of operating capital. This index is scale-neutral and used to compare performance of cooperatives of different sizes (Liebrand, 2012; Ling, 2006; 2014).

The extra-value approach was used to examine the performance of the dairy cooperatives in West Shoa Zone. Extra value calculated using the information commonly found on cooperative's financial statements (balance sheet and income statement) except for the interest rate on equity. Based on financial data of the cooperatives, extra value was calculated and expressed as a percentage of operating capital for the years 2012/13 and 2013/14.

Financial statements (balance sheet and income statement) of the dairy cooperatives were obtained from the registrar of Cooperative Promotion office in the zone. Out of 19 dairy

cooperatives, only 8 cooperatives were audited and have financial statement for the years 2012/13 and 2013/14 and therefore retained for performance comparison.

Extra value = Net savings – Interest on equity ……(1)

Where

Interest on equity = Members' equity X Interest rate[13] ……(2)

Note that the interest on equity is the opportunity cost of equity. The interest rate for calculating the opportunity cost of equity ideally should be the bank interest rate (Ling, 2014).

Extra-value index (EVI) = Extra value/operating capital X 100 ……(3)

Where,

Operating capital= Fixed assets[14] + Net working Capital ……(4)

Where,

Net working Capital= Current assets[15] – Current liabilities[16] ……(5)

Table 5. Ranking of dairy cooperatives by extra value index (EVI)

Dairy Cooperative	**Year of Establishment**	**EVI 2012/13**	**EVI 2013/14**	**Average EVI**	**Rank**
Bilachaa Bargaa	2008	-13.70	5.20	-4.25	7th
Biruh Tasfaa	2007	7.25	-1.98	2.64	5th
Daandii Guddina	2007	5.61	7.70	6.65	4th
Dhangaa Kusaayee	2008	78.06	47.63	62.85	2nd
Horii Gibee	2008	156.30	-18.60	68.85	1st
Kallacha Boruu	2008	-13.60	-10.83	-12.22	8th
Lalisee	2010	-4.30	9.36	2.53	6th
Taliilaa Bargaa	2006	2.50	13.57	8.04	3rd

Source: Computed from the financial statements of the dairy cooperatives

Four dairy cooperatives were selected based on EVI performance ranking (Table 5), representing 50% of the total sample. Two high performer and two low performer cooperatives were selected to ensure the representativeness of the sample. Horii Gibee and Dhangaa Kusaayee ranked first and second respectively and they are selected as high performer cooperative. Bilachaa Bargaa

[13] Interest on equity is Ethiopian commercial bank's minimum interest rate on saving (5% per annum)
[14] Fixed assets include all those things the dairy cooperative owns which will have a value over long time (>1 year).
[15]Current assets include assets that are used in operations by the dairy cooperatives during the reporting year.
[16] Current liability include obligation of the dairy cooperative that have a maturity date of less than one year.

and Kallacha Boruu ranked seventh and eighth respectively and they are selected as low performer cooperative.

4.2.2.2. Selection of farmers

The second stage involved a systematic random sampling procedure that was used to select every '*n*th' farmer in the selected cooperatives. The sampling frame included all members (255) of the four selected cooperatives. The sample size was determined and obtained based on studies of Krejcie and Morgan (1970)[17], which offers a table for determining sample size for a given population. Representative sample of 154 farmers were drawn from the population of 255 farmers, resulting in 60.4% of the total population. In terms of gender, the total sample comprises 83 female and 71 male members. Probability proportional to size was used to select sample farmers from the four selected dairy cooperatives.

Table 6. The study sample

Dairy Cooperative	**Member size**	**Sample size**
Bilachaa Bargaa	182	110
Kallacha Boruu	36	22
Dhangaa Kusaayee	22	13
Horii Gibee	15	9
Total	**255**	**154**

Source: Computed from the dairy cooperative's member list

About 8.4% of the sample farmers are females from female headed households. Yet, women can also be cooperative members when they are from a male headed household, which was observed for 45.5% of the sample farmers. Thus, 53.9% of the sample farmers are female, whereas 46.1% are male. The information from key informant interview pointed that the bylaws of the cooperatives allow more than one person per household to join the cooperatives, but this was not observed in this sample.

4.2.3. Data collection tools

A survey instrument was primarily developed to obtain data on farmers' dimensions of social capital in dairy cooperatives. Data was also collected from individual farmer on the following categories: individual and household characteristics, dairy production and marketing, and

[17] Krejcie and Morgan (1970) noted that sample size for a probability sample is determined in relation to the confidence level and sampling error. For this study, the sample size was set with confidence levels of 95% and sampling errors of 5%.

cooperative level information. These are the main areas of the survey instrument and can be observed in the sample questionnaire presented in Appendix I. The design of the social capital part of the questionnaire followed and adapted the suggested formatting of the World Bank (Grootaert et al., 2004), Australian Bureau of Statistics (2004), and other important questionnaires for measuring dimensions of social capital. To meet the research objectives, a number of modifications were made to ensure that it reflected the local and cooperative context.

The survey questionnaire was developed based on information from semi-structured interviews with key informants. First, interviews were conducted at Oromia Regional Cooperative Promotion Office to get first insights in cooperative structures. Information was gathered about the West Shoa zone and its primary dairy cooperatives. Second, interviews and informal conversations with various districts of the West Shoa zone were undertaken to check the information from the regional level. Third, data were also gathered from some primary dairy cooperatives, to get more insights in the main topics of the study.

Given that the survey items are either newly developed or adapted, the questionnaire was pretested with twelve farmers selected from the four dairy cooperatives. The pretest was carried out to test the clarity and applicability of the designed questionnaire and to learn the average time it takes to complete the survey. Four enumerators (two male and two female) who have experience in conducting a survey were selected and trained on the questionnaire including field trials. The questionnaire was translated into Afan Oromo (Oromiffa), the regional language of the farmers to be interviewed. Subsequently, the questionnaire was pretested with the farmers. The pretest helped the researcher to discover pitfalls and to adjust in accordance to the feedback. It also gave practical experiences for enumerators before they started collecting the main data.

After all the aforementioned procedures, a total of 154 surveys were conducted in October and November 2015 in the four selected dairy cooperatives. The average length of the interview time per interviewee was 1:30 hours. The survey took place at the premise of the cooperative where the privacy of the respondents was taken into account. Hence, each enumerator interviewed respondents separately and at a physical distance from each other in the cooperatives' compound. The completed surveys were checked on the spot so errors and missing could be corrected with in most cases. Moreover, the selected number of farmers exceeded the sample size in order to meet the required sample size. The survey questions primarily contained structured closed and

open-ended questions and a preference ranking. Most of the closed questions in the social capital part are measured by means of a Likert scale, an interval scale used to measure responses to various items on a five point scale.

Focus group discussions were another method of data collection used in this study. The use of focus group discussion as a research technique enables to collect qualitative data through group interaction on a topic determined by the researcher (Morgan, 1996). At the end of the survey, focus group discussion was performed with farmers in each of the four dairy cooperatives. The focus group discussions were based on topic lists (see appendix J). As stated above, the main purpose of the focus group discussion was to obtain more information to supplement the clarification and interpretation of results from the quantitative analysis.

The focus group discussion allowed the farmers to express their views around the topics listed. In the beginning, researcher explained the purpose of the group discussion. As a moderator for the discussion, the researcher introduced the topic for discussion based on semi-structured interview guide and gives a chance for the farmers to express their views. As far as possible, the discussion was made to be participatory and none would dominate the proceedings. Besides the researcher, the enumerators wrote down main points of the discussion. The focus group discussions were held at the cooperatives compound and lasted for about an hour.

Key informant interview was also another method of qualitative data collection for this study. The key informants were the chairpersons of the cooperatives. The chairpersons were assumed to add insight into the series of specific questions listed in Appendix K. Thus, the researcher was able to draw information useful in analyzing the data obtained from the survey. The interviews with each chairperson of the selected cooperatives were conducted by the researcher and took place in the office of the chairpersons. Each interviews lasted for about 45 minutes.

4.3. Method of data analysis

The method of data analysis proceeds in four stages. First, the researcher constructs composite indicator for measuring dimensions of social capital at a farmer level. Based on this, factors that determine the dimensions of social capital at a farmer level are identified. This is followed by analyzing gender differences in the dimensions of social capital and its implication on milk

market participation. Finally, the effect of trust and non-trust factors on farmers' milk market participation is examined.

PCAs were performed on the data set of indicators of social capital in order to construct composite indicators. The SUR was employed to identify the determinants of farmers' dimensions of social capital. Based on gender, an independent sample t- test was carried out to examine dimensions of social capital inequalities. And then, two-way ANOVA test was conducted to examine the relationship between gender differences in dimensions of social capital and milk market participation. Finally, The Heckman two-step procedure was employed to investigate the effect of trust and non-trust factors on farmers' milk market participation. Prior to this, composite indicator for measuring farmers' trust was constructed by performing PCA on the data set of indicators of trust. The analyses of this study were carried out using STATA econometric software version 12.

4.3.1. Measuring dimensions of social capital: the composite indicator approach

In this study, the structural dimension of social capital describes the structural characteristics of relationship of farmers in dairy cooperatives (Nahapiet and Ghoshal, 1998). This dimension is often measured using indicators of farmer's social connections and relationships (bonding and bridging ties) (Lin, 2001). While bonding social capital relates to farmer's social connections and relationship with his/her close friends and neighbors in the cooperative, bridging social capital relates to social connections and relationship with other members and cooperative extension agent (Woolcock, 2001; Part, 2008). The structural social capital was measured using 15 indicators (see Appendix A) which are designed to reflect the structural characteristics of relationships of the farmers in the cooperative.

The relational dimension of social capital describes the kind of personal relationship individuals have built with each other through a number of interactions. Measure of this dimension focuses on nature and quality of relationships and interactions among individuals (Nahapiet and Ghoshal, 1998). In this study, the relational social capital was measured using 10 indicators (see Appendix A) which are designed to reflect the relational characteristics (trust, reciprocity, and norm) of a farmer in dairy cooperatives (Gómez-Limón et al., 2014).

The cognitive dimension of social capital indicates the collective orientation of farmers in a cooperative (Lindstrand et al., 2011). This dimension is measured by using indicators focusing on civicness and cohesiveness (Sahin, 2007; Gómez-Limón et al., 2014). In this study, the cognitive social capital was measured using 6 indicators which are designed to reflect cognitive subdimensions (civicness and cohesiveness) in dairy cooperatives (see Appendix A).

When building an index to capture dimensions of social capital at individual level, it is necessary to select appropriate methodologies in order to capture and summarize the interactions among the indicators included in the index (OECD, 2008). The organization discussed the plurality of the approaches that have been used in constructing a composite indicator. It focused on the need for conceptual framework for the index, and the importance of multivariate analysis prior to the aggregation of the individual indicators. It also pointed out the tools for imputation of missing information, weighting and aggregation methodologies, and finally methods for assessing the robustness of the index.

A composite indicator aggregates multiple individual indicators into a single index on the basis of an underlying model. It measures multidimensional concepts which cannot be captured by a single indicator such as social capital. Composite indicators integrate information in a format that is easily understood and are therefore a valuable tool for conveying the multidimensionality of complex systems. However, the construction of composite indicator is not straightforward. It raises methodological challenges and a series of technical issues such as accuracy, reliability and appropriateness that need to be addressed adequately (Nardo et al., 2005; OECD, 2008).

To construct a composite indicator for measuring dimensions of social capital at an individual level in dairy cooperatives, the sequence suggested by the OECD (2008) was followed:

1. Developing theoretical framework
2. Selection of base indicators
3. Imputation of missing data
4. Multivariate analysis
5. Data normalization
6. Weightings and aggregation
7. Robustness and sensitivity analyses

As the first step in the development of the methodology, indicators were selected for measurement of dimensions social capital at a farmer level in dairy cooperatives. The selection of the indicators was based on the theoretical framework discussed in chapter 3 and considers the different attributes of the dimensions of social capital. At the beginning, a general catalog of indicators of individual social capital for each of the dimensions of social capital was constructed. The catalogs of indicator were identified based on an extensive review of the literature on social capital measurement and agricultural cooperatives. Second, theoretically well founded proxies of the different components of dimensions of social capital were selected to measure them at a farmer level in the cooperatives. Third, the proxies or indicators were adapted to this particular study and validated the resulting questionnaire using a pilot survey. Following this procedure, 15 structural, 10 relational, and 6 cognitive social capital indicators were obtained (see Appendix A).

With regard to step 3, the indicators dataset was complete. Thus, imputation of missing data was not required. The next section provides details on stage 4. It reports the main results of the PCA. At this step, the indicators in the dataset selected for aggregation convey quantitative information of different kinds. Nardo et al. (2005, p. 11) suggested that "when indicators are incommensurate with each others, and/or have different measurement units, it is necessary to bring these indicators to the same unit". Normalization (step 5) primarily serves this purpose. There are a number of normalization methods: ranking, standardization (or z-scores), min-max etc. In constructing social capital index, literature (e.g. Willy and Holm-Müller, 2013; Gómez-Limón et al., 2014) suggested min-max[18] normalization so that the values of all the normalized indicators would vary within a dimensionless range [0, 1]. Thus, "min-max" normalization was employed.

Once the normalization is done, indicators need to be weighted and aggregated (step 6) to obtain the values of the composite indicator. The options this study followed for this stage are described and justified. The weighting stage helps to identify the importance of the individual base indicators. In the construction of composite indicator, the weighting techniques can be classified into "normative" or "exogenous" (the assignment of weights on the basis of the experts' opinion,

[18] Min-Max normalizes "indicators to have an identical range [0, 1] by subtracting the minimum value and dividing by the range of the indicator values" (OECD, 2008, p. 28).

who knows the theoretical backgrounds) and "positive" or "endogenous" (the assignment of weights based on statistical methods) (Gómez-Limón et al., 2014).

There is limited expert capacity to assign proper weight to indicators of farmers' social capital in dairy cooperatives. Thus, the positive techniques that weight based on statistical methods were used. Among the quite rich menu of statistical methods, PCA is the most widely weighting technique in the literature of social capital because of its convenience (e.g. Sabatini, 2009; Willy and Holm-Müller, 2013; Gómez-Limón et al., 2014). Thus, this technique was employed.

The issue of aggregation of the information conveyed by the base indicators into a single index comes together with the weighting. Different aggregation rules are possible. Indicators could be summed up (e.g. linear aggregation), multiplied (geometric aggregation) or aggregation using non linear techniques (e.g. multi-criteria analysis). However, the process of selection of aggregation technique requires attention since it influences the type of compensation among indicators (Nardo et al., 2005; OECD, 2008).

When all indicators have the same measurement unit and ambiguities related to the scale effects have been neutralized, it is possible to apply linear aggregation (Nardo et al., 2005; OECD, 2008). According to the authors, this aggregation technique implicitly assumes total compensation among indicators i.e. poor performance in some indicators compensated by sufficiently high values of other indicators. Taking into account the complex and multidimensional (large number of base indicators) nature of social capital, literature (e.g. Nardo et al., 2005; OECD, 2008; Gómez-Limón et al., 2014) suggested that linear aggregation technique is useful. Thus, this technique was employed. The next step was to calculate the composite indicators for farmers' dimensions of social capital in dairy cooperatives.

PCA is a multivariate data analysis technique which is widely used for dimension reduction of large data sets in the presence of collinearity. PCA helps to capture most of the observed variance of the explanatory variables using the smallest possible number of new variables, called principal components (PCs) out of the variables X_j's where the PCs are the linear combination of the X's (OECD, 2008).

$$PC_i = \sum_{j=1}^{p} a_{ij} Xj \qquad i = 1,\ldots,k \quad j = 1,\ldots,p \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(6)$$

Where PC_i = the i^{th} farmer score on principal component i

X_j's = the k variables observed from the i^{th} farmer

$a_{ij=}$ the factor loading applied to the variable X_j (weight for observed variable j, as used in creating PC_i

The social capital indicators were subjected to factor analysis using PCA to construct composite indicators for the dimensions of social capital considered. PCA was conducted in three steps: First, the farmers in the dairy cooperatives were asked specific questions that were used as indicators of each of the dimensions social capital. Second, PCA with orthogonal rotation was carried out on the indicators of the dimensions of social capital. Kaiser–Meyer–Oklin (KMO) statistics was used to verify the sampling adequacy for the analysis. Bartlett's test of sphericity was also used to test whether correlations between indicators were large enough for PCA. Third, components were retained from step 2 with eigenvalues greater than unity. Furthermore, a Kaiser's varimax rotation was implemented to facilitate the interpretation of these components.

Once the PCs are extracted for the dimensions of social capital, the next step was the calculation of the intermediate composite indicators (ICI_j) for the specific dimensions corresponding to each principal components j. Here a linear weighted aggregation of the indicators was considered.

$$ICI_{ji} = \sum_{K=1}^{K=n} w_{kj} I_{ki} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(7)$$

Where ICI_{ji} = the intermediate composite indicator for the component j and farmer i

w_{kj} = weighting of indicator k in component j

I_{ki} = the normalized indicator k achieved by farmer i

Finally, the social capital index for the three dimensions was calculated as linear weighted aggregations of the intermediate composite indicators of the specific dimension as follows

$$SCIi = \sum_{j=1}^{i=n} \alpha_j ICI_j \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(8)$$

Where SCI_i = the value of the composite indicator for the farmer i

α_j = the weight applied to the intermediate dimension of social capital indicator j

By definition, the composite indicator for the specific dimension of social capital values for the individual farmer (SCI_i) range from 0 (the smallest value of social capital of a farmer) to 1 (the largest value of social capital of a farmer).

The final stage in the construction of composite indicator is robustness and sensitivity analysis. Literature suggested that these analyses should be undertaken to assess the reliability of the composite indicator. The analyses are key tools to examine the robustness of the message conveyed by a composite indicator (Nardo *et al.*, 2005; OECD, 2008). In this study, Cronbach's alpha[19] coefficient was used to verify the internal consistency of the variables included in the different principal components and the dimensions of social capital.

4.3.2. Determinants of social capital

4.3.2.1. Seemingly Unrelated Regressions

This study hypothesizes factors that determine the dimensions of social capital at a farmer level in dairy cooperatives. The hypothesis can be represented by a system of three equations as follows:

$$STSk = \beta_0 + \beta_i X_i + \varepsilon_1 \quad \ldots\ldots(9)$$

$$RLSk = \alpha_0 + \alpha_i X_i + \varepsilon_2 \quad \ldots\ldots(10)$$

$$CGSk = \gamma_0 + \gamma_i X_i + \varepsilon_3 \quad \ldots\ldots(11)$$

Where

STSk, RLSk, and CGSk are structural, relational, and cognitive social capital respectively.

X_i are vectors of independent variables that are considered to determine levels of social capital.

β_0, β_i, α_0, α_i, γ_0, and γ_i are parameters and vector of parameters to be estimated.

ε_1, ε_2, and ε_3 are error terms.

The relation between the dimensions of social capital is not univocal, as they interact and are connected and mutually reinforcing (Nahapiet and Ghoshal, 1998; Nardone et al., 2010). According to Jicha (2011), the dimensions of social capital have independent, yet complementary influences on individual participation in collective action. Thus, estimating

[19] Cronbach's alpha is the widely used method for assessing the extent to which a measurement produces consistent results. Its score ranges from 0 to 1 (OECD, 2008).

equations (9) to (11) is challenging due to the interdependency between the dimensions of social capital. This interdependency arises from the fact that the dimensions of social capital could be theoretically connected possibly through unobserved or unmeasured variables. This would give inefficient estimates if we estimate the equations separately via OLS. To avoid this problem, the three equations are estimated as a system using Seemingly Unrelated Regression (SUR) (Wooldridge, 2002).

Zellner (1960 cited in Wooldridge, 2002) developed the SUR model that accounts for the systematic correlation in the error terms, ε_1, ε_2 and ε_3. The SUR model is an extension of the OLS model that specifically facilitates efficient estimation of a system of multiple equations with cross-equation parameter restrictions and correlated error terms. The SUR allows nonzero covariance between the error terms for a given individual between the three equations, while assuming zero covariance between different individuals. This allows obtaining asymptotically more efficient estimates than OLS estimates (Wooldridge, 2002).

The SUR model assumes for each equation the vector of independent variables is full rank. Further, the model assumes that conditional on the independent variables, the error terms, ε_1, ε_2 and ε_3, are identical and independently distributed (*iid*) with mean zero and homoskedastic variance. It is further presumed that the variance matrix needs to be positive definite (Wooldridge, 2002). Error correlation tests are carried out to check whether the error terms, ε_1, ε_2 and ε_3, are correlated. The Breusch-Pagan Test of Independence rejects the null hypothesis of zero correlations across the equations (chi-square = 19.838; $p < 0.0002$). This shows that SUR estimation is an appropriate method to obtain efficient estimates.

4.3.2.2. *Hypotheses and variable definition*

In setting the study's hypothesis, the main interest is identifying the determinants of dimensions of social capital, and contributing to the understanding of the effect of the various factors on farmers' dimensions of social capital in dairy cooperatives. Variables hypothesized to explain farmers' dimensions of social capital were identified based on theoretical framework and past studies.

Dependent variable

The dependent variables represent the three dimensions of social capital: structural, relational, and cognitive. The dimensions of social capital variables were derived from principal component analysis described previously and were calculated as composite indicator. The composite indicator for the specific dimension of social capital ranges from zero to one.

Independent variable

Four categories of independent variables were included: demographic, socioeconomic, institutional, and cooperative. The following presents the definition of the variables and the hypotheses about the effect of variables on the dimensions of social capital. A description of the independent variables and their summary statistics is presented in Table 7.

Demographic factors

Age of the farmer is a continuous variable measured in years. It has different influence on dimensions of social capital. It has positive influence on trust and norms i.e. relational social capital (Kaasa and Parts, 2008) and a negative influence on structural social capital (social network) (Fidrmuc and Gërxhani, 2008; Kaasa and Parts, 2008). This study tests these hypotheses by incorporating age in the analysis of determinants of dimensions of farmers' social capital. It is also hypothesized that the relationship between farmer's age and social capital is quadratic and concave (Gómez-Limón et al., 2014). The authors revealed that with aging social capital first increases, up to a given threshold after which the relation becomes negative. Therefore, this study also expects to find a negative relationship between age squared and farmers' dimensions of social capital in dairy cooperatives.

Gender is a dummy variable that takes the value of one if the farmer is male and zero otherwise. Lowndes (2004) suggested that women have less structural social capital (social network) than men. In the contrary, women have high relational social capital i.e. they are more trustworthy and altruistic than men (Kormelinck, 2010) and have higher solidarity (cognitive social capital) due to their work responsibilities that depend on frequent collaboration (Westermann et al., 2005). This study tests these hypotheses by incorporating gender in the analysis of determinants of dimensions of farmers' social capital.

Marital status is a dummy variable that takes the value of one if the farmer is married and zero otherwise. Married men and women often have higher social capital. Single individuals are less

trusting and less engaged in civic activities than married individuals (Putnam, 1995). Therefore, this study expects to find positive relationships between marital status and farmers' dimensions of social capital in dairy cooperatives.

Education level is a continuous variable measured in formal years of schooling completed by the farmer. Education enhances trust and willingness to participate in organizations that generate benefit to the society (Haddad and Maluccio, 2003). It is viewed as the factor for accessing social networks that transmits values of reciprocity and cooperation (Kaasa and Parts, 2008). It is also believed to be important for understanding positive effects of associational activities and collective action that generates benefits to the society (Rupasingha et al., 2006). Therefore, this study expects positive relationship between education and farmers' dimensions of social capital in dairy cooperatives.

Socioeconomic factors

Income is a continuous variable measured in natural log of annual income of the household. Evidence shows that higher level of income is positively associated with trust, social networks (Kaasa and Parts, 2008), formal networks, and social norms (Parts, 2013). Income positively influences the participation of individuals in groups (Rupasingha et al., 2006). Therefore, this study expects to find positive relationships between income and farmers' dimensions of social capital in dairy cooperatives.

Ownership of radio is a dummy variable that takes the value of one if the farmer owns radio and zero otherwise. In Ethiopia, radio is the principal instrument of mass communication in agriculture. Modern communication systems such as radio could play an important role in enhancing social capital (Lin and Erickson, 2008). Radio provides an important source of information for farmers on the importance of cooperation that can enhance their participation in dairy cooperatives. Therefore, ownership of radio is expected to have a positive association with farmers' dimensions of social capital in dairy cooperatives.

Dairy cow is a continuous variable measured in the number of dairy cows owned by the farmer. In the context of dairy production, number of dairy cows can be considered as a proxy for wealth (McDoom, 2013). With increasing wealth, the participation in collective actions declines as the relative importance of potential benefits decreases. Wealthy farmers are less likely to participate

in collective action compared to poor farmers as they expect to benefit less from participation. Moreover, they have high opportunity cost of time compared to the poor (Ouma and Abdulai, 2009). Therefore, this study expects to find negative relationships between number of dairy cows and farmers' dimensions of social capital in dairy cooperatives.

Share of dairy income is a continuous variable measured in percentage of dairy income in total income of the household. It serves as a measure of the extent to which a farmer depend upon dairy for his/her livelihoods. Dairy cooperatives are not paying money on daily basis for the milk delivered by the farmers. They usually pay the farmers every fifteen days. This explains why farmers that highly depend on dairy for income sell their dairy product to other parties (traders) (Mujawamariya et al., 2013). It is obvious that farmers that sell dairy products to traders will not actively participate in the dairy cooperatives. Therefore, this study expects to find negative relationships between share of dairy income and farmers' dimensions of social capital in dairy cooperatives.

Close friends is a continuous variable measured in the number of close friends the farmer has in the cooperative. The number of close friends in an organization is positively associated with individual's propensity to accumulate organizational capital (Katungi et al., 2007). Individuals who have more close friends are much better at eliciting trustworthy behavior (Glaeser et al., 1999). Therefore, this study expects to find positive association between number of close friends and the farmers' dimensions of social capital in the dairy cooperatives.

Position is a dummy variable that takes the value of one if the farmer held position in the cooperative and zero if the farmer is ordinary member. Position in the cooperative makes difference in individual's social capital as it is associated with network advantages. Position holders tend to have larger and more diverse networks that generate more social capital than ordinary members (Bian, 2008). Therefore, position in dairy cooperatives is expected to have a positive association with farmers' dimensions of social capital examined here.

Membership is a continuous variable measured in the number of year the farmer has been member of the cooperative. Higher social capital accrues to individuals with a relatively longer period of affiliation. Individuals with relatively long periods of membership more actively participate in group activities. They also have an opportunity to develop and expand social

networks (Sampson, 1988 cited in Larsen et al., 2004). Therefore, the effect of length of membership on farmers' dimensions of social capital in dairy cooperatives is expected to be positive.

Local association is a continuous variable measured in the number of local association the farmer belong. Membership in multiple local associations is a vehicle through which social capital can be accumulated (Lin and Erickson, 2008). Participation in multiple associations facilitates the extensity of individual's social networks (Hsung and Lin, 2008). Therefore, numbers of local association to which the farmer belongs expected to have a positive association with his/her dimensions of social capita in dairy cooperatives.

Table 7. A description of variables determining social capital and their summary statistics

Variable	**Description**	**Mean**	**Std. Dev.**
Age	Age of the member (years)	43.14	11.78
Gender	Gender of the member (male = 1, female = 0)	0.46	0. .50
Marital status	The marital status of the member (married=1, other=0)	0.88	0.32
Education	Number of years of schooling of the member (years)	2.67	3.76
Income	Natural log of annual income of the household (birr)	9.93	0. 82
Radio	Member ownership of radio (yes=1, no=0)	0.66	0.48
Distance from farmer's house to coop. office	Distance from the farmer's house to cooperative office (minute)	44.54	26.87
Dairy cow	Dairy cow owned by the member (number)	2.64	1.45
Share of dairy income	Percentage of the dairy income in the total income of the household (percent)	57.47	29.11
Close friends	Close friends of the member in the cooperative (number)	3.10	3.56
Position	Member position in the cooperative (1= held position, 0= ordinary member)	0. 15	0.36
Membership	Length of membership (years)	4.02	2.99
Local associations	Number of local association the member belong (number)	3.74	1.28
Extension services	Access to dairy extension services (yes=1, no=0)	0.81	0.40
Training access	Member received training/education about the cooperative (yes=1, no=0)	0.72	0.45
Cooperative performance	The performance of the cooperative (1= high performer (+ extra value), 0= low performer (- extra value))	0.14	0.35
Cooperative size	The size of the cooperative (1= small, 0= large)	0.29	0.45

Source: Survey data (2015)

Institutional factors

Training is a dummy variable that takes the value of one if the farmer received training/education about the cooperative and zero otherwise. Training facilitates farmers' understanding and

knowledge on cooperatives and their potentials. It has a positive impact in increasing participation in cooperatives. Training promotes the building of network and trust, which contribute to increased levels of social capital (Brune et al., 2005). Therefore, this study expects to find positive association between training access and farmers' dimensions of social capital in dairy cooperatives.

Access to extension service is a dummy variable that takes the value of one if the farmer had access to dairy extension services and zero otherwise. Access to extension service stimulates information exchange that is important for building social capital (Katungi et al., 2006). It can play an important role in enhancing bridging social capital that can increase access to knowledge and resources (van Rijn et al., 2012). Therefore, this study expects to find positive relationships between access to extension service and farmers' dimensions of social capital in dairy cooperatives.

Distance from the farmer's house to cooperative office is a continuous variable measured in minute. This distance has a negative effect on the participation of the farmer in collective action (Mensah et al., 2012). In other words, the further away the farmer's house, the less likely the farmer is to commit and participate in the cooperative, implying that distance to farmers' house has a negative effect on individual's social capital. Therefore, distance from farmers' house to cooperative office is expected to have a negative relationship with farmers' dimensions of social capital in dairy cooperatives.

Cooperative factors

Performance of the cooperative is a dummy variable that takes the value of one if the cooperative generated positive extra value and zero if the cooperative generated negative extra vale. The efficacy of community organizations has positive association with farmers' social capital. It enhances farmers' participation in the organizations (Jicha, 2011). Therefore, this study expects to find positive association between performance of cooperatives and farmers' dimensions of social capital in the dairy cooperatives.

Cooperative size is a dummy variable that takes the value of one if the cooperative is small size (number of members ≤60) and zero if the cooperative is large size (number of members > 60). Small size farmer organizations have higher social capital density because people have closer

spatial and emotional contacts (Uphoff and Wijayaratna, 2000). The optimal cooperative size for dairy cooperatives in Ethiopia is estimated at 60 members (Francesconi, 2009) Therefore, this study expects to find positive association between small size cooperative and farmers' dimensions of social capital in the dairy cooperatives.

4.3.3. Gender differences in dimensions of social capital

4.3.3.1. Independent sample t-test

Independent sample t-test was used to investigate whether there are gender differences in the dimensions of social capital: structural, relational, and cognitive. That is, it is evaluated whether mean dimensions of social capital for women and men are significantly different from each other. With an independent-samples *t* test, each farmer must have scores on two variables, the grouping (gender) variable and the test (dimensions of social capital) variable. The grouping variable divides cases into two mutually exclusive groups (women and men) while the dimensions of social capital describe measures of farmers' structural, relational, and cognitive dimensions of social capital in dairy cooperatives. One of the assumptions of t-test is that the samples are randomly drawn from normally distributed populations with unknown population means (Kothari, 2004).

4.3.3.2. Hypotheses

As far as gender is concerned, there is considerable difference between women's and men's structural social capital. Women's social networks are located in areas different to those of men's social networks. While women's social networks are traditionally associated with solving domestic problems and more strongly embedded in neighborhood area, men's social networks extended beyond the neighborhood area (Lowndes, 2004). Women tend to connect more with family and female neighbors whereas men's networks include fewer neighbors and more friends, advisors, and co-workers (Moore, 1990). Women's structural social capital profile is more suited to bonding social capital rather than bridging social capital. Women have fewer bridging social capital that links them with diverse acquaintances that move in different social circles. So, women's structural social capital catalyzes informal activities in the immediate community and provides a resource for their own and their families' well-being (Lowndes, 2004). Therefore, Hypothesis 1 is presented:

H1. Women have lower structural social capital than men in dairy cooperatives.

Agrawal (2000) stated women have more reciprocal relationships and engage in reciprocal supportive relations. Westermann et al. (2005) indicated that in groups where women are present, the norms of reciprocity are more likely operate. Women tend to build relational social capital based on norms of collaboration and solidarity than men (Molinas, 1998). Women value collaboration, altruism and conflict management more than men. Thus, they build stronger kinship and friendship relations than men (Agarwal, 2000; Molyneux, 2002).

Women tend to build more relational social capital than men (Das, 2009). According to Lowndes (2004), women's social capital is rooted in trust and mutuality. The author indicated that women have more trust on their neighbors than men. Kormelinck (2010) showed that women have more trust in cooperatives compared to men. She revealed that women are more trustworthy and altruistic than men in coffee marketing cooperatives in Ethiopia. Plaisier (2010) also showed that women have more institutional trust than men in Ethiopian coffee marketing cooperatives. Therefore, Hypothesis 2 is presented:

H2. Women have higher relational social capital than men in dairy cooperatives.

Putnam (1995) suggested that women invest more time in associational life than men. Similarly, Caiazza and Putnam (2002) indicated that women are better in civic engagement which is a crucial tool for advancing their status. Women more actively involved than men in an organization (Lowndes, 2004). Women are a source of social cohesion which is a crucial input for collective action (Padmaja et al., 2006) and solidarity in collective action increases with the presence of women in the group (Westermann et al., 2005). In addition, Westermann et al. (2005) argued that women are more altruistic and show higher solidarity than men due to their work responsibilities that depend on frequent collaboration. Therefore, Hypothesis 3 is presented:

H3. Women have higher cognitive social capital than men in dairy cooperatives.

4.3.4. Gender differences in dimensions of social capital and milk market participation

4.3.4.1. Two-way ANOVA

Two-way ANOVA is a tool for estimating the effects of two factors on a continuous response variable with the goal of detecting differences in means for two factor categories (Kothari, 2004). Two-way ANOVA test was conducted to explore the relationship between gender differences in

mean dimensions of social capital (structural, relational, and cognitive) and milk market participation in dairy cooperatives. It was used to determine if there is a relationship between gender differences in mean dimensions of social capital and milk market participation.

4.3.4.2. Hypotheses

As a result of differing structural social capital, women and men have different level of access to information. Women's structural social capital is much less likely to provide access to information about business and other opportunities. Women are more likely to lack bridging social capital that links them to valuable business opportunities (Kim and Sherraden, 2014). This creates significant economic disadvantage for women (Molyneux, 2002) that has implications for whether women and men are equally able to draw upon their structural social capital to participate in milk market participation. Therefore, Hypothesis 4 is presented:

H4. Women have lower milk market participation than men that is attributed to their low structural social capital in dairy cooperatives.

Liang et al. (2015) revealed that relational social capital has a positive influence on members' participation in cooperatives. The authors asserted that farmers' trust in the cooperative enhances loyalty and enthusiasm in participating in collective activities. James and Sykuta (2005) showed that trust enhances farmers marketing of output through their cooperative. As it is suggested above, women tend to have more relational social capital than men. More specifically, they have more trust in cooperative than men. Based on these arguments, women supposed to have high milk market participation than men in dairy cooperatives. Therefore, Hypothesis 5 is presented:

H5. Women have higher milk market participation than men that is attributed to their high relational social capital in dairy cooperatives.

Liang et al. (2015) argued that the cognitive dimension of social capital is more important to participation in collective action. Farmers' common understanding of collective orientation is one of the crucial factors to their participation in cooperatives. As it is pointed by Putnam (1995), women more engaged in civic activities and invest more in associational life than men. Women have more homogeneous interest, greater interdependency, and an everyday experience of collaboration that strengthen social cohesion in group. As a consequence, women are expected to participate better in groups and achieve better outcomes (Agarwal, 2000). Based on these

arguments, women supposed to have better milk market participation than men in dairy cooperatives. Therefore, Hypothesis 6 is presented:

H6. Women have higher milk market participation than men that is attributed to their high cognitive social capital in dairy cooperatives.

4.3.5. The effect of trust and other factors on milk market participation

4.3.5.1. Measuring trust: the composite indicator approach

The study focused on institutional trust. The sample dairy cooperatives have ordinary members, a board of directors, chairperson, and various committees. There is also a cooperative extension worker who participates in the promotion of cooperatives. Therefore, institutional trust was operationalized in the survey as (1) trust in board members, (2) trust in chairperson, (3) trust in committee members, (4) trust in cooperative members (close friends, neighbors, and other members), and (5) trust in cooperative extension worker. Trust was measured by asking questions that prompt farmers to rate how much he “personally trusts each of the above persons in carrying out his/her responsibility of serving the members”. Using a five-point scale varying from very small extent to very great extent, farmers ranked their level of trust on the above persons.

The trust indicators were subjected to PCA to construct a composite indicator for measuring trust at farmer level. As it is pointed by OECD (2008), PCA captures most of the observed variance of the explanatory variables using principal components (PCs) out of the variables X_j ’s where the PCs are the linear combination of the X ’s.

$$PC_i = \sum_{j=1}^{p} a_{ij} Xj \qquad i = 1,\ldots,k \quad j = 1,\ldots,p \qquad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(12)$$

Where PC_i = the i^th farmer score on principal component i

X_j’s = the k variables observed from the i^{th} farmer

$a_{ij=}$ the factor loading applied to the variable X_j (weight for observed variable j, as used in creating PC_i

As it is pointed in the previous section, PCA was conducted in three steps: First, the farmers were asked specific questions that were used as indicators of extent of trust they have in the

above persons. Second, PCA with orthogonal rotation was carried out on the indicators of trust. Kaiser–Meyer–Oklin (KMO) statistics was used to verify the sampling adequacy for the analysis. Bartlett's test of sphericity was also used to test whether correlations between indicators were large enough for PCA. Third, components were retained from step 2 with eigenvalues greater than unity. Furthermore, a Kaiser's varimax rotation was implemented to facilitate the interpretation of these components.

Once the PCs are extracted for trust, the next step was the calculation of the intermediate composite indicators (ITI_j) for trust corresponding to each principal components j. Here a linear weighted aggregation of the indicators was considered.

$$ITI_{ji} = \sum_{k=1}^{k=n} w_{kj} I_{ki} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3)$$

Where ITI_{ji} = the intermediate composite indicator for the component j and farmer i

w_{kj} = weighting of indicator k in component j

I_{ki} = the normalized indicator k achieved by farmer i

Finally the trust index was calculated as linear weighted aggregations of the intermediate composite indicators of the specific dimension as follows

$$T_i = \sum_{j=1}^{i=1} \alpha_j ITI_{ji} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (4)$$

Where T_i = the value of the composite indicator for the farmer i

α_j = the weight applied to the intermediate trust indicator j

The trust composite indicator values for the individual farmer (T_i) range from 0 (the smallest value of trust of a farmer) to 1 (the largest value of trust of a farmer).

Robustness and sensitivity analysis are the final stage in the construction of composite indicator for trust. The analyses should be undertaken to assess the reliability and robustness of the message conveyed by a trust composite indicator (OECD, 2008). In this study, Cronbach's alpha coefficient was used to verify the internal consistency of the variables included in the trust composite indicator.

4.3.5.2. Determinants of milk market participation

The specifications of the empirical models used to determine the effect of trust and other factors influencing farmers' decision to participate in milk marketing and their intensity of participation (quantity of milk marketed) through the dairy cooperatives conditional upon their participation follows the selectivity models (Asfaw, 2009; Francesconi, 2009; Berhanu, 2012; Nga et al., 2012; Kiwanuka and Machethe, 2016). In selectivity models, farmers' decision to participate in the market can be seen as a sequential two-stage decision-making process. In the first-stage, farmers make a discrete choice whether or not to market milk through dairy cooperatives. In the second-stage, conditional on their decision to market, farmers make continuous decision on the intensity of participation. In the first-stage, standard probit model was used to analyze the farmers' discrete decision to participate in milk marketing. In the second stage, censored regression model with correction for selection bias to model was used to analyze the effects of variables influencing the intensity of participation in terms of the quantities of milk marketed through dairy cooperatives.

Standard probit model to examine the farmer's participation decision follows random utility model and its specification is given below following Wooldridge (2002).

$$y^* = z'\alpha + \varepsilon_1 \quad \text{.....(15)}$$

$$y_i = 1 \ \ if \ \ y^* \succ 0$$

$$y_i = 0 \ \ if \ \ y^* \leq 0$$

Where y* is a latent (unobservable) variable representing farmer's discrete decision whether or not to participate in milk marketing. This variable is associated with the desired level of participation or utility derived from market participation; *z* is a vector of independent variables hypothesized to affect farmer's decision to participate in milk marketing; α is a vector of parameters to be estimated which measure the effects of various independent variables on the farmer's decision whether to participate in milk marketing; ε_1 is normally distributed disturbance term with zero mean and constant standard deviation of σ_1, the disturbance term captures all unmeasured variables that influence the likelihood of the farmer's decision to participate in milk marketing; *y* is a dependent (discrete response) variable for status of farmer's participation in milk marketing which takes on the value of 1 if the farmer participates in milk marketing and 0 otherwise.

Standard normal density functions or the probability of the farmer participating or not participating in milk marketing are given, respectively, as:

$$p(y=1) = p(y^* \succ 0) = \Phi(z'\alpha) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(16)$$

$$p(y=0) = p(y^* \prec 0) = 1 - \Phi(z'\alpha)$$

In the probit model estimation, signs of parameter estimates and the coefficients statistical significance show the direction of the response associated with the presence or level of a particular variable. For example, a variable with positive parameter estimate indicates that the probability of a farmer choosing to participate in milk marketing increases with the presence or level of the variable while a negative parameter estimate indicates the opposite effect. However, the probit parameter estimate does not indicate by how much a particular variable increases or decreases the likelihood of choosing to participate in milk marketing. Thus, there is a need to compute the marginal effects of the independent variables on the probability of farmer to choose to participate in milk marketing. For continuous independent variables, Wooldridge (2002) showed that the marginal effect is computed by multiplying the coefficient estimate (α) by the standard probability density function given above by holding the other independent variables at their mean values:

$$\partial p(y=1)/\partial z = \alpha\Phi(z'\alpha) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(17)$$

For the dummy independent variables, the marginal effects are analyzed by comparing the probabilities that result when the dummy variables take their two different values while holding all other independent variables at their sample mean values (Wooldridge 2002).

$$LnL(\alpha y, z) = \sum_{y=1} \ln(\Phi(z'\alpha) + \sum_{y=0} \ln(1 - \Phi(z'\alpha)) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(18)$$

Maximum likelihood (ML) estimation for the probit model is carried out using STATA econometric software version 12. ML estimates are consistent, asymptotically normal, and asymptotically efficient. To obtain efficient estimators accounting for heteroskedasticity in the data, robust standard errors were computed.

Conditional on the decision to participate in milk marketing, the variables influencing farmer's quantity of milk marketed (intensity of participation) through the dairy cooperatives is modeled

using Tobit or censored regression model. The model widely discussed in Ethiopian dairy market participation literature (e.g. Holloway et al., 2000; Francesconi, 2009; Asfaw, 2009). The Tobit model, which was first proposed by James Tobin (Tobin, 1958), is used for a situation where the dependent variable is censored from below, above, or both. In a situation where the dependent variable is censored, the OLS estimators are biased downwards and the Tobit model is the predominant and, seemingly, recommended (Wooldridge, 2002).

In this study, the dependent variable (quantity of milk marketed through dairy cooperatives) involves lower limit censoring at zero for a significant proportion of the observations. When the dependent variable is censored, the OLS model fails to account for the qualitative difference between limit (zero) observations and non-limit (continuous) observations. Estimation using the OLS model omits the limit observations that would yield a bias and ignoring this bias would be discarding relevant information. Furthermore, including the limit observations as though they were ordinary observations also yields a bias. The Tobit model is a sensible approach to overcome these limitations (Wooldridge, 2002).

Following Wooldridge (2002), the Tobit model can be defined as:

$$v^* = x'\beta + \varepsilon_2 \quad \text{……(19)}$$

$$v_i = v^* \ \ if \ v^* \succ 0$$

$$v_i = 0 \ \ if \ v^* \leq 0$$

Where v* is a latent showing the desired or optimal level of milk marketed through the cooperative by the farmer which is observed if $v^* > 0$ and unobserved otherwise; v is the observed quantity of milk marketed through dairy cooperatives; x is a vector of independent variables (including trust) affecting the level of milk market participation which is a subset of z; β is a vector of parameters to be estimated; and ε_2 is assumed to be independently and normally distributed disturbance term with zero mean and constant standard deviation of σ_2. The above specification shows that the observed milk marketed is equal to the desired milk marketed if the desired milk marketed is greater than zero. Otherwise, zero milk marketed is observed.

Moreover, the desired milk marketed can take on negative values; however, values of v^* less than or equal to zero are unobserved, thus, v^* is censored at zero. Condition for Tobit or

censored regression model is that at least some of the observations must be censored, *v** would always equal to *v* and the true model would be a linear regression instead of being Tobit regression model. Because *v** is normally distributed, v has a continuous distribution over positive values. Tobit estimation has two important density functions. First, the density of *v* equal to zero given *x* is given as:

$$p(v=0\mid x)=p(v^{*}\prec 0\mid x)=1-\Phi[x'\beta/\sigma] \qquad \ldots\ldots(20)$$

Second, the density of *v* given *x* for *v* greater than zero is given as:

$$p(v\succ 0\mid x)=p(v^{*}\succ 0\mid x)=\tfrac{1}{\sigma}\phi[(v-x'\beta)/\sigma] \qquad \ldots\ldots(21)$$

The interpretation of the estimation results from the censored regression model requires the examination of the marginal effects of the independent variables on conditional expected value of the dependent variable (v). As in the case of linear regression model, the interpretation of the estimation results based on the parameter estimates of the independent variables is not straight forward. Following Wooldridge (2002) the mathematical expressions for the marginal effects of the independent variables on conditional expected value of the dependent variable (v):

$$\partial E(v\mid x,v\succ 0)/\partial x=\beta(1-\delta(x'\beta/\partial))[x'\beta/\partial+\delta(x'\beta/\partial)] \qquad \ldots\ldots(22)$$

Where δ is given as:

$$\delta=[\phi(x'\beta)/\Phi(x'\beta)] \qquad \ldots\ldots(23)$$

Finally, the log-likelihood function to be maximized in order to obtain the parameter estimates of the Tobit model and marginal effects is given based on the probability density functions of equations (20) and (21) as follows:

$$\ln L(\beta,\partial\mid v,x)=\sum_{v\succ 0}\ln\left[\tfrac{1}{\partial}\phi(v-x'\beta/\partial)\right]+\sum_{v=0}\ln[1-\Phi(x'\beta/\partial)] \qquad \ldots\ldots(24)$$

The problem with the above censored model specification is that the two-stage decision-making processes are not separable due to unmeasured household level variables affecting both the discrete and continuous decisions thereby leading to the correlation between the errors in the Probit and Tobit equations. This situation is referred to selectivity bias. If the two errors are correlated, the estimated parameter values on the variables affecting the quantities of milk marketed are biased (Wooldridge, 2002). Thus, there is a need to specify a model that corrects for selectivity bias while estimating the factors that influence the quantity of milk marketed. For

this purpose, in the first step, Mills ratio is calculated using predicted probability values obtained from the first-stage probit regression of the decision to participate in milk marketing. In the second step, then, in order to test and correct for selectivity bias, the Mills ratio is included as one of the independent variables in the level of participation regression. This two-stage estimation approach which enables correcting for selectivity bias is called Heckman's two-stage procedure. Thus, the level of participation regression with correction for sample selection bias becomes:

$$v = x'\beta + \lambda[\phi(x'\beta)/\Phi(x'\beta)] + \varepsilon_3 \quad \text{...(25)}$$

Where $\phi(.)/\Phi(.)$ is the Mills ratio; λ is the coefficient on the Mills ratio; ϕ is standard normal probability density function; Φ is the standard cumulative distribution function; ε_3 is normally distributed disturbance term with zero mean and standard deviation of σ_3. ε_3 is not correlated with ε_1 and ε_2 and the other independent variables. λ is not significantly different from zero under the null hypothesis of no sample selection bias. If there is no significant selection bias, the Tobit model will be estimated without the inclusion of inverse mills ratio in the regression.

Maximum likelihood (ML) estimation for the Tobit model is carried out using STATA econometric software version 12. For Tobit model estimation, validity of normality and heteroskedasticity assumptions are critical. To obtain efficient estimators accounting for heteroskedasticity in the data, robust standard errors were computed.

4.3.5.3. Hypotheses and variable definition

In setting the study's hypothesis, the main interest is identifying the effect of trust on farmers' milk market participation in dairy cooperatives. The study also investigates other determinants of farmers' milk market participation. The variables hypothesized were identified based on theoretical framework and past studies.

Dependent variables

Milk market participation decision is a dummy variable that represents the probability of milk marketing through the cooperative by the farmer that is regressed in the first stage of two stages estimation procedure. For the farmer who marketed the variable takes the value of one whereas it takes the value of zero for the farmers who did not market.

Intensity of milk market participation is a continuous variable in the second stage of the estimation procedure. It is measured in liter and represents the quantity of milk marketed through the cooperative by the farmer.

Independent variable

Four categories of independent variables were included: demographic, socioeconomic, institutional, and cooperative. The following presents the definition of the variables and the hypotheses about the effect of the independent variables on milk market participation in dairy cooperatives. A description of the variables and their summary statistics is presented in Table 8.

Demographic factors

Age of the farmer is a continuous variable measured in years. It is a proxy indicator for experience in farming. It is believed that higher age, and therefore, more experience in farming will improve market participation and marketable surplus (Ehui et al., 2009). Older farmers tend to have more milking cows increasing the probability of milk market participation and intensity of participation (Nga et al., 2012). Therefore, this study expects to find positive relationships between age and farmers' milk market participation in dairy cooperatives.

It is also hypothesized that the relationship between farmer's milk market participation decision and intensity of participation, and age is quadratic and concave. In other words, as age gets older, farmers tend to have more dependents and hence the probability of participation and intensity of participation declines (Ehui, *et al*, 2009). Therefore, this study expects a non linear (parabolic) relationship between age and milk market participation in dairy cooperatives, implying that younger and older farmers to have a lower milk market participation.

Gender is a dummy variable that takes the value of one if the farmer is male and zero otherwise. Compared to male counterparts, women face constraints that hinder their participation in cooperatives. Gender norms and practices influence economic capabilities and opportunities of women participation in cooperatives (Jones et al., 2010). Moreover, women's access to productive resources and services, such as education, information is often constrained and thereby hinder their economic opportunities (World Bank et al., 2009). Therefore, this study expects women to have less milk market participation in dairy cooperatives.

Household size is a continuous variable that is measured in the number of members in a household. Dairying is labor intensive activity, dairy production and marketable surplus is a function of labor (Woldemichael, 2008). Household size is an indicator for the availability of family labor for production activities which in turn has a positive impact on milk market participation. In the contrary, household size indicates the consumption level of a household which in turn has a negative impact on the marketable surplus (Alene et al., 2008). Therefore, the effect of household size on farmers' milk market participation in dairy cooperatives cannot be determined a priori. This study tests these contrasting hypotheses.

Education level is a continuous variable measured in formal years of schooling completed by the farmer. It has a positive effect on milk market participation in dairy cooperatives. Education plays a key role in adoption of new technologies and believed to improve the readiness of a farmer to accept new dairy innovations and ideas. Education helps in processing price, demand, and supply information which in turn enhances willingness to produce more and increase milk market participation decision and intensity of participation (Nga et al., 2012). Therefore, this study expects a positive relationship between education level of the farmers and milk market participation in dairy cooperatives.

Number of children is a continuous variable measured in the number of children less than six years of age in a household. It has been proved that milk is the most important product for child nutrition. Thus, there is a competition between milk for child requirement and the amount needed for markets. It is believed that households with more children aged less than six years old need more amount of milk for consumption (Staal *et al.*, 2006). Therefore, the number of children in the household is expected to affect farmers' milk market participation in dairy cooperatives negatively.

Socioeconomic factors

Farmers' trust is derived from principal component analysis described previously and is computed as composite indicator. The trust composite indicator ranges from zero to one. Trust is an important factor explaining farmers' decisions for marketing their output through cooperative. It increases the likelihood that farmers' marketing of agricultural output through their cooperative (James and Sykuta, 2006). It positively and significantly influences the proportion of milk marketed in Zambian dairy sector (Kiwanuka and Machethe, 2016). Therefore, trust is

expected to have a positive relationship with farmers' milk market participation in dairy cooperatives.

Dairy cow is a continuous variable measured in the number of dairy cows owned by the farmer. The number of dairy cows influence marketable surplus through both total production and the marginal costs of production. The number of dairy cows has positive effect on the total milk production of the household. It is also believed that additional dairy cows lower marginal costs of production. Thus, the number of dairy cows increases the likelihood of milk market participation and intensity of participation of the household (Holloway et al., 2000). Therefore, this study expects a positive relationship between number of dairy cows owned by the farmers and milk market participation in dairy cooperatives.

Share of dairy income is a continuous variable measured in percentage of dairy income in the total income of the household. It serves as a measure of the extent to which a farmer depend upon dairy for his/her livelihoods. Mushtaq et al. (2007) showed that dependency on resource is an important condition that influences the participation of individuals in collective action. Thus, the higher the farmers' dependency on dairy for his/her livelihood, the higher will be the likelihood of farmers' milk market participation in dairy cooperatives. Therefore, this study expects to find positive relationships between share of dairy income and farmers' milk market participation in dairy cooperatives.

Land size is a continuous variable and it is the total land owned by the household in hectare. As a factor for dairy production, land is important for forage and pasture development to feed dairy cows. It is believed that as the size of land increases, the proportion of land allocated for dairy feed development increases. Land size is an important production factor having a direct impact on the probability of milk market participation and level of participation (Berhanu, 2012). In the contrary, Staal et al. (2006) showed a negative relationship between land size and milk market participation decision and marketable volume. However, in this study land size is expected to have a positive relationship with farmers' milk market participation in dairy cooperatives.

Milk production is continuous variable and it is the quantity of milk produced per day in liter. The quantity of milk produced per day has positive effect on the likelihood of milk market participation and quantity supplied to the market. As quantity of milk produced per day

increases, the percentage share of quantity consumed declines and quantity marketed increases (Holloway et al., 2000; Berhanu, 2012). Therefore, the quantity of milk produced per day is expected to affect farmers' milk market participation in dairy cooperatives positively.

Table 8. A description of variables determining market participation and their summary statistics

Variable	Description	Mean	Std. Dev.
Milk marketed	Average quantity of milk the farmer marketed through the cooperative (lt/month)	100.99	105.77
Trust	Composite indicator of farmer's trust [0,1]	0.66	0.17
Age	Age of the farmer (years)	43.14	11.78
Gender	Gender of the farmer (male = 1, female = 0)	0.46	0. .50
Education	Number of years of schooling of the farmer (years)	2.67	3.76
Household size	Number of household members (number)	6.18	1.83
Children (< 6 years)	Number of children in the household (number)	0.69	0.87
Number of dairy cow	Dairy cow owned by the household (number)	2.64	1.45
Distance to district market	Distance from the farmer house to the district market (minute)	117.47	60.22
Distance to collection center	Distance from the farmer house to the cooperative milk collection center (minute)	52.76	37.10
Share of dairy income	Percentage of the dairy income in the total income of the household (percent)	57.47	29.11
Land size	Total land owned by the household (ha)	2.20	2.19
Credit	Access to credit (yes=1, no=0)	0.09	0.29
Extension services	Access to dairy extension services (yes=1, no=0)	0.81	0.40
Milk production	milk production of the household per day (lt/day)	6.29	4.92
Cooperative performance	The performance of the cooperative (1= high performer (+ extra value), 0= low performer (- extra value))	0.14	0.35

Source: Survey data (2015)

Institutional factors

Access to credit is a dummy variable that takes the value of one if the farmer has access to credit and zero otherwise. Availability of credit improves the financial capacity of the farmers to access inputs that has a positive impact on their production and marketing capacity. Credit is critical in accessing market opportunities (Berhanu and Hoekstra, 2007). Therefore, access to credit is expected to influence farmers' milk market participation in dairy cooperatives positively.

Access to extension service is a dummy variable that takes the value of one if the farmer had access to dairy extension services and zero otherwise. Dairy extension services are crucial in enhancing farmer skills and knowledge, linking farmers with improved dairy technologies. It is instrumental in improving intellectual capital that helps in enhancing dairy production and

impact milk market participation decision and level of participation (Holloway and Ehui, 2002). Therefore, access to dairy extension service is expected to influence farmers' milk market participation in dairy cooperatives positively.

Distance from the farmer house to the cooperative milk collection center is a continuous variable measured in minutes. The farther away a farmer from the cooperative milk collection center, it would be costly to deliver milk to collection center. It is believed that proximity to the collection center positively influence the likelihood of delivering milk to the center (Holloway et al., 2000). Therefore, this study expects a negative relationship between distance to cooperative milk collection center and farmers' milk market participation in dairy cooperatives.

Distance from the farmer house to the district market is a continuous variable measured in minutes. The farther away a household from the district market, the more costly and difficult it would be to get involved in this market i.e. the higher would be transportation costs and loss due to spoilage. Thus, distance to district market affect accessing dairy cooperative milk market outlet choice positively (Holloway et al., 2000). Therefore, distance to district market expected to influence farmers' milk market participation in dairy cooperatives positively.

Cooperative characteristics

Performance of the cooperative is a dummy variable that takes the value of one if the cooperative generated positive extra value and zero if the cooperative generated negative extra value. It is the EVI performance measure that indicates whether members' capital is earning more, or less, than it could in alternative investments. Studies showed that cooperatives that strongly perform (generate earnings for members) positively influence members' commitment to collective marketing (Tremblay et al., 2002; Plaiser, 2010). Farmers use alternative marketing channels if they find the performance of the cooperative unsatisfactory (Demeke, 2007). Therefore, this study expects to find positive relationship between cooperatives that create value for their members (positive extra value) and farmers' milk market participation in dairy cooperatives.

4.4. Summary

This chapter presented details of the research methodology adopted for this study. It presented the description of the study area. The dairy cooperatives selected for this study is located in West Shoa zone. A mixed-method research design was chosen to illustrate the social capital and

collective action in dairy cooperatives. In this method, the collection and analysis of both quantitative and qualitative data were combined within a traditional quantitative study. Quantitative data analysis was carried out on primary data collected in a survey of 154 dairy cooperative members in West Shoa zone. The qualitative data set was used to supplement the interpretation and clarification of results from the quantitative data set.

The chapter provided the survey approach which is the first method employed in this study. Survey is a comprehensive method for collecting quantitative data. The second method employed qualitative tools (focus group discussions and key informant interview) to collect data through semi-structured interviews. A two-stage sampling procedure was used in selecting the sample farmers for this study. In the first stage, dairy cooperatives were selected using extra value index. In the second stage, the sample farmers were selected from the selected dairy cooperatives using systematic random sampling procedure. Probability proportional to size was used to select sample farmers from the cooperatives.

The chapter also presented the method of data analysis that proceeded in four stages. First, it presented how a composite indicator is constructed for measuring dimensions of social capital at a farmer level. PCAs were performed on the data set of indicators of dimensions of social capital for constructing composite indicators. Second, it presented how the determinants of dimensions of social capital are identified. The SUR was employed to identify the determinants of farmers' dimensions of social capital. Third, it analyzed gender differences in the dimensions of social capital using an independent sample t-test. And then, the relationship between gender differences in dimensions of social capital and milk market participation was examined using two-way ANOVA test. Finally, the effect of trust and non-trust factors on farmers' milk market participation decision and intensity of participation were investigated using probit and Tobit models respectively. The next chapter will present the description of the sample farmers in the cooperatives.

CHAPTER 5: RESULT AND DISCUSSION - DESCRIPTIVE ANALYSIS

This chapter presents the demographic, socioeconomic, institutional, and cooperative characteristics of the sample farmers. The chapter is sub-divided into four sections. The first section describes the characteristics of the sample farmers according to market participation. The second section deals with membership benefits and problems of the cooperatives according to market participation. The third section describes the characteristics of the sample farmers according to gender. The last section gives summary of the chapter.

5.1. Characteristics of the sample farmers according to market participation

Out of the sample farmers interviewed, 100 (64.9%) of the farmers marketed milk through the cooperatives (participant) while 54 (35.1%) of the farmers didn't market milk through the cooperatives (non-participant) in the year 2014/15. The average age of the sample farmers was about 43.1 years (Table 9). This indicates that farmers in the cooperative are in their most productive years. The corresponding figure for participant and non-participant was about 41.6 and 46.0 years respectively. There is statistical significant difference between participant and non-participant in age. The non-participants are more aged than the participants. In terms of educational attainment, the average number of years of formal schooling completed by the sample farmers was 2.7 years. This indicates that the farmers in the dairy cooperatives have low level of formal education. The average number of years of formal schooling completed by participants and non-participants were 2.5 and 3.1 years respectively (Table 9).

As shown in Table 9, the average household size of the sample farmers was 6.1 persons. The average household size of the sample farmers that participated in milk marketing through the cooperatives was 6.0 persons. The corresponding figure for the non-participant was 6.4 persons. The average land size of the sample farmers was 2.2ha. The sample farmers that participated in milk marketing had a land size of 2.0ha. The corresponding figure for the non-participant was 2.6 ha. On the average the sample farmers owned 2.6 dairy cows. This indicates that the farmers own few heads of dairy cows. The average holding of dairy cows by the participants and non participants were 2.9 and 2.1 cows respectively. There is statistical significant difference between participants and non-participants in number of dairy cows owned. The participants owned more dairy cows than the non-participants. This indicates that the number of dairy cow is

one of the factors for milk market participation. This is in conformity with the findings of Holloway et al. (2000) and Berhanu (2012).

On average, the sample farmers generated a dairy income of birr 13450 (Table 9). The participants generated a dairy income of birr 17120 whereas the non-participants generated an income of birr 6655 from dairy. There is statistically significant difference in dairy income generated between participant and non-participant. The dairy income generated was greater for participant than the non- participant. As it is shown in Table 9, the average share of dairy income in the total income of the sample members is 57.5%, indicating that the sample farmers derive more than half of their annual income from the sale of dairy products. The figure for the participants and non-participants were 68.0% and 36.5% respectively. There is statistical significant difference between participants and non-participants in the share of dairy income in the total income. The participant derived more of their income from dairy than the non participants.

Table 9. Characteristics of the sample farmers according to market participation: continuous variables

Variable	Participant (n=100)		Non-participant (n=54)		T-value	Total sample (n=154)	
	Mean	St. Dev	Mean	St. Dev		Mean	St. Dev
Age (years)	41.6	12.5	46.0	9.8	2.24*	43.1	11.8
Education (years)	2.5	3.8	3.1	3.7	0.94	2.7	3.8
Household size (No)	6.0	1.7	6.4	2.0	1.22	6.1	1.8
Land size (ha)	2.0	2.0	2.6	2.4	1.75	2.2	2.2
Dairy cow (No)	2.9	1.5	2.1	1.3	-3.29**	2.6	1.5
Annual dairy income (birr)	17120	13665	6655	9923	-4.96**	13450	13418
Share of dairy income (%)	68.0	23.0	36.5	27.7	-7.73**	57.5	29.1
Distance to milk coll. center (min)	41.0	28.2	74.5	41.7	5.91**	52.8	37.1
Distance to coop. office	45.9	24.4	42.0	31.0	-0.85	44.5	26.9
Ave. milk production (liters/day)	7.1	4.5	4.7	5.3	-2.94**	6.3	4.9
Length of membership (years)	4.1	3.2	3.8	2.5	-0.62	4.0	3.0

*and ** denotes significance level at 5% and 1% respectively.
Source: Survey data (2015)

Table 9 shows that the average distance from cooperative milk collection center to farmers' houses was 52.8 minute. The average distance to milk collection center for the participant was 41.0 minutes and the figure for non-participants was 74.5 minutes. There is statistical significant difference between participants and non-participants in the distance to cooperative milk collection center. The non- participants travel more distance to the milk collection center than the participants. This finding shows that distance to milk collection center is one of the factors to milk market participation. The non-participants were farther away from collection center and thus it would be costly to deliver their milk to collection center as it is suggested by Holloway et al. (2000).

As shown in Table 9, the average milk produced by the sample farmers was 6.3 liters per day. The average milk production by the participants and non-participants were 7.1 and 4.7 liters per day respectively. There is statistical significant difference between participants and non-participants in their daily milk production. The participants produced more milk per day than the non-participants. This indicates that the quantity of milk produced per day is important variable explaining milk market participation (Holloway et al., 2000; Berhanu, 2012). The average length of membership of the sample farmers in the cooperatives was 4.0 years (Table 9). The average length of membership for participants was 4.1 years while the corresponding figure for non-participants was 3.8 years.

Out of the total sample farmers, 88.3% were married (Table 10). The corresponding figure for the participant and non-participant were 55.8% and 32.5% respectively. Extension service enhances farmers' skills and knowledge and links them to improved dairy technologies (Holloway et al., 2000; Berhanu, 2012). Table 10 shows that dairy extension service was reached out to 80.5% of the sample farmers. The service was accessed by both participants (50.0%) and non-participants (30.5%).

Credit is an important resource for smallholder farmers to finance their dairy farm operation which have influence in market participation (Berhanu and Hoekstra, 2007). The majority (90.9%) of the sample farmers had no access to credit for their dairy farm operation while 61.0% and 29.9% were participant and non participant respectively (Table 10). However, there are credit and saving and micro-finance organizations such as Oromia Credit and Saving Share Company that provide financial services for investment in the livestock sector. These

organizations extend short-term loan for a maximum of two years for livestock. Such a loan may not be suitable for investment in dairy production because of its relatively long gestation period. Moreover, 20.9% of the sample farmers mentioned high interest rate as a reason for not accessing this credit from such institutions.

Table 10. Characteristics of the sample farmers according to market participation: categorical variables

Variable	Participant (n=100)		Non Participant (n=54)		χ^2-value	Total sample (n=154)	
	n	%	n	%		n	%
Marital status					1.48		
Married	86	55.8	50	32.5		136	88.3
Other	14	9.1	4	2.6		18	11.7
Extension service					2.25		
Yes	77	50.0	47	30.5		124	80.5
No	23	14.9	7	4.5		30	19.5
Credit service					3.30		
Yes	6	3.9	8	5.2		14	9.1
No	94	61.0	46	29.9		140	90.9
Training access					11.28**		
Yes	81	52.6	30	19.5		111	72.1
No	19	12.3	24	15.6		43	27.9
Position in coop.					0.84		
Yes	13	8.4	10	6.5		23	14.9
No	87	56.5	44	28.6		131	85.1

*and ** denotes significance level at 5% and 1% respectively.
Source: Survey data (2015)

One of the problems of development of cooperatives is the lack of awareness of the members as to the principle and objectives of the cooperative way of operating. Continuous training and education equip the farmers with the skill, knowledge and confidence to enable them use, participate in and control the cooperative more effectively and to be more cooperative (Ortmann and King, 2007). The majority of sample farmers (72.1%) are trained in technical skills and cooperative business (Table 10). The corresponding figure for participants and non –participants were 52.6% and 19.5% respectively. The participants had more access to training than the non participants. Out of the sample farmers, 14.9% held leadership positions (board member, committee member, secretary etc.) in the cooperatives while 8.4% and 6.5% were participants and non –participants respectively.

5.2. Membership benefits and problems of the cooperatives according to market participation

As regards to patronage refund[20], 48.1% of the sample farmers received patronage refund from their cooperatives while 43.5% and 4.5% were participant and non participant of milk marketing through the cooperatives (Table 11). There is statistical significant difference between participants and non-participants in receiving patronage refund. More of the participants received patronage refund than non-participants. This indicates that paying out of patronage refunds is a major motivation for milk market participation as it is suggested by Demeke (2007). The focus group discussion with the farmers also showed that patronage refund is one of the driving forces in encouraging members' milk market participation.

The guarantee of commercialization of milk is the main advantage the sample farmers possess from the cooperatives. About 66.9% of the sample farmers stated that the cooperative guaranteed market and payment for their milk (Table 11). The corresponding figure for participants and non-participants were 43.5% and 4.5% respectively. There is statistical significant difference between the two groups, indicating more of the participants perceived that the cooperative guaranteed market and payment for their milk than non-participants. At the focus group discussions, the farmers mentioned that the cooperatives guarantee the existence of a market, which reduce their markets risks and allowed them to expand dairy production. The information obtained from key informants (chairpersons) also revealed that the farmers seek their cooperative for its market assurance.

Dairy cooperatives serve the economic needs of its members by securing better price. However, only 39.6% of the sample farmers perceived that the cooperatives provide better prices for their milk (Table 11). The figure for participant and non participant were 37.0% and 2.6% respectively. There is statistical significant difference between the two groups, indicating more of the participants perceived that the cooperative provide better prices for their milk than non-participants. On average, the cooperatives provided birr 11.2/liter to their farmers. In some areas of the study, private milk assemblers buy milk from some free rider member and non-member farmers for an average price of birr 12.0/liter. Some members also sell milk to consumers, restaurant and hotel owners in the nearby towns for an average price of birr 14.6/liter. This

[20] Patronage refund refers to the amount of money the member receives from the surplus the cooperative distribute in proportion to the members' participation (Black and Knutson, 1985).

indicates that the cooperative price is not similar or better than other buyers. Thus, the price incentives are not sufficient for the farmers to be satisfied.

Table 11. Membership benefits and problems of the cooperatives according to market participation

Variable	Participant (n=100)		Non-Participant (n=54)		χ^2-value	Total sample (n=154)	
	n	%	n	%		n	%
Patronage refund					41.01**		
Yes	67	43.5	7	4.5		74	48.1
No	33	21.4	47	30.5		80	51.9
Guaranteed market and payment					116.78**		
Yes	97	63.0	6	3.9		103	66.9
No	3	1.9	48	31.2		51	33.1
Increased price for milk					36.05**		
Yes	57	37.0	4	2.6		61	39.6
No	43	27.9	50	32.5		93	60.4
Mismanagement					1.50		
Yes	16	10.4	13	8.4		29	18.8
No	84	54.5	41	26.6		125	81.2
Weak loyalty & commitment					4.10*		
Yes	75	48.7	32	20.8		107	69.5
No	25	16.2	22	14.3		47	30.5
Payment problem					7.60**		
Yes	31	20.1	6	3.9		37	24.0
No	69	44.8	48	31.2		117	76.0
Information problem					0.01		
Yes	54	35.1	29	18.8		83	53.9
No	46	29.9	25	16.2		71	46.1
Meeting attendance					2.62		
Never	1	0.6	1	0.6		2	1.3
Rarely	32	20.8	11	7.1		43	27.9
Sometimes	36	23.4	21	13.6		57	37.0
Often	31	20.1	21	13.6		52	33.8
Participation in election					5.84**		
Yes	73	47.4	29	18.8		102	66.2
No	27	17.5	25	16.2		52	33.8

*and ** denotes significance level at 5% and 1% respectively.
Source: Survey data (2015)

At focus group meetings, the farmers also mentioned that the cooperatives do not provide remunerative price for their milk. However, they pointed that selling milk through their

cooperative have many advantages. First, most of the farmers know that the cooperative is their own and they think that the cooperative's success depends on its members' loyalty and commitment. Second, the farmers believed that the cooperative has an advantage of genuine measurement (no cheating in the volume). The farmers also recognized that if they sell their milk through the cooperative, they can get patronage refund at the end of the year.

The key informants pointed that the cooperative price is fixed at a cooperative union level taking into account the market. They stated that the cooperative price for the farmers' milk more or less competes with rarely found private milk assemblers and other buyers in distant towns. They also pointed that the farmers benefit from patronage refund and genuine measurement of the cooperatives in addition to the price they received. Had there not been the cooperatives in the area, the majority of the farmers will not have a market to sell their milk. Even those that sell to rarely found private milk assemblers, they sell at a much lower price than they receive now. The informants believed that it is the cooperatives that introduce competition in the area.

In Ethiopia, one of the common problems of cooperatives is mismanagement (Plaisier, 2010; Ruben and Heras, 2012). Out of the sample farmers, 18.8% complained of cooperative mismanagement by leaders and the corresponding figure for participant and non participant were 10.4% and 8.4% respectively (Table 11). According to the key informants, mismanagement in the cooperatives is usually manifested by the poor financial management, lack of updated basic records, and lack of regular audits. In West Shoa zone, there is limited government capacity to inspect the cooperatives and detect such management failures. The informal conversations with various districts of heads of cooperative promotion office showed that there is limited capacity to offer regular (yearly) audit to all the cooperatives and this prone to mismanagement.

The other cooperatives problem is members' weak loyalty and commitment (Plaisier, 2010; Ruben and Heras, 2012). The majority (69.5%) of the sample farmers mentioned that there is weak members' loyalty and commitment in the cooperatives while 48.7% and 20.8% were participant and non participant respectively (Table 11). There is statistical significant difference between participants and non participants. Studies (e.g. Szabo, 2010; Barraud-Didier et al., 2012) argued that members' loyalty and commitment are weak where the level of trust between the members and the management is low. This would negatively affect the cooperative's performance.

Table 11 shows that about 24.0% of the sample farmers raised payment problems while 20.1% and 3.9% were participant and non participant respectively. There is statistical significant difference between the two groups, indicating more of the participants raised the problem of payment than non-participants. The cooperatives usually pay money every fifteen days for the milk delivered by the farmers. Some farmers might highly depend on dairy income for their subsistence needs. Thus, the payment scheme (every two weeks) may be a problem to them.

Communication between management and members is important for the development of cooperatives. However, more than half of the sample farmers (53.9%) were dissatisfied with information they receive from the cooperative leaderships (Table 11). The corresponding figure for participant and non participant were 35.1% and 18.8% respectively. The focus group discussions showed that there is information gap. The farmers feel that the cooperative management does not keep members informed about the cooperative operations. With regard to the actions taken by the farmers to solve the above problem/s, more than half of the sample farmers (54.4%) didn't take any action. About 11.0% of the farmers only talked about the problem among themselves. A smaller proportion (1.5%) of the farmers contacted leaders while 2.9% attended protest meeting.

The sample farmers were asked to rate frequency of their attendance of meetings in the cooperative. Only 33.8% of the farmers regularly attended meetings. 37.0% of the farmers sometimes attended meetings while 27.9% of the farmers rarely attended meetings (Table 11). There were also farmers (1.3%) that never attend meetings. The figures show that most of the farmers lack regular participation in the affairs of their cooperative. This is also confirmed from the key informant interview. The information from focus group discussion showed that the cooperatives properly convene annual general meetings. Out of the four selected cooperatives, three cooperatives convene regular monthly meetings and the other convenes meeting every six months. However, if there is/are a problem/s which needs the participation of the members, the cooperatives call on an urgent meeting.

One of the most important characteristics of cooperatives is the principle of democratic governance. This principle indicates that each member has one vote in the General Assembly. Out of the sample farmers, 66.2% participated in the current cooperative leaders' elections (Table 11). The figure for participant and non-participant were 47.4% and 18.8% respectively.

There is statistical significant difference between participant and non participant. The participants more participated in the election of their leaders than the non-participants. The information from focus group discussions pointed that the farmers democratically elect their representatives at the General Assembly. They elect the Board of Directors which represent and manage their cooperative. They also elect members for different committee.

5.3. Characteristics of the sample farmers according to gender

As shown in Table 12, the average age of female and male members is about 40.9 and 45.8 years, respectively. There is statistically significant difference between the two groups in age. Men have a higher age than women in the cooperatives. The average number of years of formal schooling completed by female members is 0.6 years whereas the male members have on average 2.0 years of formal schooling. There is statistically significant difference between female and male members in years of formal schooling completed. Female members have low level of formal education than male members. This implies that female members have low level of participation than male members in cooperatives as it is suggested by Bernard and Spielman (2009). The authors pointed that women's participation in Ethiopian cooperatives increases with the number of formal schooling years.

Table 12 shows that the average female and male members' household size is 6.0 and 6.4 persons, respectively. The average landholding of female and male members is 1.7 and 2.8 ha, respectively. There is statistically significant difference in landholding size between the two groups. Female members have smaller landholding than male members, which can affect their milk market participation. The findings of Bernard et al. (2007) showed that land size is an important variable explaining farmers' participation in agricultural cooperatives in Ethiopia.

As shown in the Table 12, the average number of dairy cow owned by female member households is significantly lower than the average number of dairy cow owned by male member households (i.e. 2.4 cows and 2.9 cows), respectively. The findings show that there is statistically significant difference in the ownership of dairy cow between female and male members, which can affect milk market participation as it is revealed by Holloway et al. (2000) and Berhanu (2012). The average time taken by the sample members to reach to the cooperative milk collection center is 52.8 minutes. The corresponding figure for female and male members is 54.8 and 50.4 minutes, respectively.

Table 12. Characteristics of the sample farmers according to gender: continuous variables

Variable	Women (n=83)		Men (n=71)		T-value	Total sample (n=154)	
	Mean	Std Dev.	Mean	Std Dev		Mean	Std Dev.
Age (years)	40.9	11.5	45.8	11.7	-2.58*	43.1	11.8
Education (years)	0.6	2.0	5.1	3.9	-9.01**	2.7	3.8
Household size (No)	6.0	1.8	6.4	1.9	-1.61	6.2	1.8
Land size (ha)	1.7	2.0	2.8	2.2	-3.47**	2.2	2.2
Dairy cow (No)	2.4	1.2	2.9	1.7	-2.24*	2.6	1.5
Ann. dairy income (birr)	11144	7198	16146	17864	-2.34*	13450	13418
Share of dairy income (%)	65.6	27.1	48.0	28.7	3.89**	57.5	29.1
Distance to milk coll. center (min)	54.8	41.0	50.4	32.1	0.72	52.8	37.1
Ave. milk production (liters/day)	5.0	3.1	7.8	6.1	-3.60**	6.3	4.9

*and ** denotes significance level at 5% and 1% respectively.
Source: Survey data (2015)

With regard to annual dairy income, the average annual dairy income of female members is birr 11144 whereas the average annual dairy income of male members is birr 16146. Statistically significant difference in the average annual dairy income is also observed for the two categories. The average share of dairy income in the total income of female and male members is 65.6% and 48.0%, respectively. There is statistically significant difference in the share of dairy income in the total income between the two groups. Dairy income has a larger share in the total income of female than male members (Table 12).

Table 12 shows that the average milk production of female and male member is 5.0 liters/day and 7.8 liters/day, respectively. There is statistically significant difference in the average milk production between the two categories. Female members produce lower quantity of milk per day than male members, which may affect their milk market participation. This may be attributed to the fact that the female member households have less dairy productive resources and less access to services than male member household. As it is showed in this descriptive analysis, female member households have less land size and dairy cow number, and they also have less access to extension and credit services.

As shown in Table 13, 45.5% of the male members and 42.9% female members are married. In general, this indicates that married members join dairy cooperative to support their livelihood.

Dairy extension service is reached out to 72.3% of female members and 90.1% of male members. There is statistically significant difference in access to dairy extension between the two groups. Male members, compared to female members, have a higher access to dairy extension agents. This reflects that female member households generally have not been accessed equally by dairy extension workers nor benefited equally from the service that enhances skill and knowledge and improves dairy productivity. The latter enhances market participation in dairy cooperatives (Berhanu, 2012). Dairy credit service is extended to 3.6% of female members and 15.5% of male members (Table 13). There is statistically significant difference in access to credit services between the two groups. Female members have less access to credit services that improve financial capacity to access production inputs which have influence in market participation (Berhanu and Hoekstra, 2007).

Table 13. Characteristics of the sample farmers: categorical variables

Variable	**Women (n=83)**		**Men (n=71)**		**χ^2-value**	**Total sample (n=154)**	
	n	**%**	**n**	**%**		**n**	**%**
Marital status					7.73		
Married	70	45.5	66	42.9		136	88.3
Other	13	8.4	5	3.2		18	11.7
Extension service					7.77**		
Yes	60	72.3	64	90.1		124	80.5
No	23	27.7	7	9.9		30	19.5
Credit service					6.53*		
Yes	3	3.6	11	15.5		14	9.1
No	80	96.4	60	84.5		140	90.9
Position in cooperative					18.16**		
Yes	3	3.6	20	28.2		23	14.9
No	80	96.3	51	71.8		131	85.1
Training access					0.18		
Yes	61	73.5	50	70.4		111	72.1
No	22	26.5	21	29.6		43	27.9

*and ** denotes significance level at 5% and 1% respectively.
Source: Survey data (2015)

Table 13 shows 73.5% female members and 70.4% male members receive training and education that equip them with cooperative principle. About 3.6% female member and 28.2% male member held leadership positions in the cooperatives. There is statistically significance difference between the two groups. This indicates female members have low level of participation and under-representation in the management of the cooperatives. The information

from the key informant interviews pointed that the majority of the female members have reproductive and household responsibilities which constrain the amount of time available for them to actively participate in cooperatives. Further they pointed low level of education as one factor contributing to their low level of participation in leadership.

5.3. Summary

The chapter described the sample farmers according to market participation. The result from independent sample t-test showed that there are significant differences between market participant and non-participant in age, number of dairy cow owned, annual dairy income, share of dairy income, distance to milk collection center, and average daily milk production. The result from Chi square test also indicated that there is significant difference between the two groups in access to training. The chapter also presented membership benefits and problems of the cooperatives according to market participation. The result from Chi square test showed that there is significant difference between the two groups in patronage refund received, perception of guaranteed market and increased price, loyalty and commitment, payment problem, and participation in election. Finally, the chapter characterized the sample farmers according to gender. The results from independent sample t-test showed that there are statistical significant differences between female members and male members in age, education level, land size, number of dairy cows, annual daily income, share of dairy income, and average daily milk production. The results from Chi square test also indicated that there are statistical significant differences between the two groups in extension service, credit service, and position in the cooperatives. The next chapter will present the constructions of composite indicators for measuring dimensions of social capital. Based on these results, the determinants of dimensions of social capital will be identified. Gender differences in dimensions of social capital and its effect on milk market participation will be analyzed. Finally, the effect of trust on milk market participation will be analyzed.

CHAPTER 6: RESULTS AND DISCUSSION- ADVANCED ANALYSIS

This chapter presents and discusses the results of PCA, SUR, independent sample t- tests, ANOVA tests, and Heckman two-step procedure. The chapter is sub-divided into four sections. The first section presents the constructions of composite indicators for measuring dimensions of social capital. The results capturing the determinants of dimensions of social capital are presented in the second section. The third section presents results of gender differences in dimensions of social capital and its effect on milk market participation. The fourth section presents the results of effect of trust and non-trust factors on milk market participation. The last section gives summary of the chapter.

6.1. Constructing composite indicators for measuring dimensions of social capital

This section aims to construct reliable and valid composite indicators for measuring dimensions of social capital of farmers in dairy cooperatives. PCAs were performed on the indicators of dimensions of social capital in order to construct a composite indicator for measuring structural, relational, and cognitive social capital.

Structural social capital

After applying PCA to structural social capital data set of the farmers, four components were retained, explaining 59.0% of the total variance. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was found to be 0.781. Bartlett's test of sphericity was significant (chi-square = 767.2; $p < 0.000$) and shows that the correlations are large enough for PCA. These statistical tests support the appropriateness of performing PCA on the structural social capital data set.

As shown in Table 14, the indicators selected for the bonding social capital and bridging social capital were adequate and highly correlated with the latent variables analyzed i.e. bonding social capital and bridging social capital. Thus, the bonding social capital and bridging social capital are explained by at least one single principal component. The indicators reached the highest loadings for the specific component explaining the bonding social capital and bridging social capital they were selected for. Table 14 shows that the first principal component explained 23.1% of the total variance. It is closely related to bridging social capital. This component is characterized by high loading of network ties with board members and cooperative extension agent. This network allows farmers to acquire information and knowledge about the cooperative (Putnam, 2000).

Table 14. Factor loadings for the rotated factors underlying structural social capital

Indicators[a]	PC1 Bridging	PC2 Bonding	PC3 Bridging	PC4 Bonding & Bridging
Bonding1	0.2293	-0.0431	0.1986	-0.1601
Bonding2	-0.0245	**0.5931**	0.0542	-0.0308
Bonding3	-0.0810	-0.1482	-0.0407	**0.6163**
Bonding4	-0.0288	0.0976	0.2408	0.1987
Bonding5	0.0122	**0.6231**	-0.0765	-0.1149
Bonding6	0.0146	0.2291	-0.3925	0.2995
Bridging1	0.1069	-0.0293	**0.5566**	0.1253
Bridging2	-0.0501	0.3663	**0.4645**	0.1390
Bridging3	0.0744	0.0075	0.1395	**0.5909**
Bridging4	**0.4828**	-0.0884	-0.0018	-0.0222
Bridging5	**0.4110**	-0.0083	0.0796	0.0656
Bridging6	0.1763	0.1578	-0.3767	0.2012
Bridging7	**0.4130**	0.0488	0.0474	-0.1013
Bridging8	**0.4351**	0.0028	0.0174	-0.0204
Bridging9	0.3558	0.0620	-0.2057	0.1048
Eigen value	3.45682	1.98473	1.82988	1.57655
Variance explained	23.1%	13.2%	12.2%	10.5%
Cumulative % of variance explained	23.1%	36.3%	48.5%	59.0%
Overall Cronbach's alpha	0.804			
Bartlett's test of sphericity chi-value	767.2**			
Kaiser-Meyer-Olkin measure of sampling adequacy	0.781			

** denotes significance level at 1%

[a] Full details of observable variables used in the analysis are reported in Appendix A

Note: Component loadings greater than |0.40| are highlighted in bold print

Source: Survey data (2015)

The second principal component, which explained 13.2% of the total variance, related to bonding social capital. It has a high loading of network ties with close friends and neighbors in the cooperatives. As it is suggested by Putnam (2000), this network enables the farmers to exchange information and resource. It provides bases for trust and cooperation. The third principal component explained 12.2% of the total variance. This component represents bridging social capital that is characterized by high loadings of networks with other members of the cooperative. Part (2008) suggested that this network broadens farmers' exchange of information and knowledge about the cooperative. The fourth principal component explained 10.5% of the variance and was found to be related to both bonding and bridging social capital. It has a high loading of network ties with close friends and other members of the cooperatives. Flora and

Flora (2003) pointed that this network enhances farmers' cooperation and participation in the cooperative.

Structural social capital index was developed following the equation (6) to (8). An individual value for the index was computed for each of the sample farmers. The index ranges between 0 and 1, where a value of 0 for no structural social capital and a value of 1 for the highest structural social capital in the cooperative. The index measures the extent of farmers' social connections and relationships in dairy cooperatives. The sample farmers scored a structural social capital that range from 0.330 to 0.787 (Appendix C).

Finally, Cronbach's alpha was used to assess the internal consistency of the four components and structural social capital index (Appendix B). A Cronbach's alpha score of 0.70 is widely acceptable minimum score for the assessment of measurement reliability (Nunnally, 1978 cited in OECD, 2008). The reliability coefficient (Cronbach's alpha) was found to be 0.804, which shows the analysis captured the underlying pattern of correlation between the variables well, further supporting the results provided.

Relational social capital

PCA was performed on relational social capital date set and three components were retained, explaining 55.5% of the total variance. The Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) was found to be 0.793 while the Bartlett's test for Sphericity was significant (chi-square = 278.5; $p < 0.000$) and shows that the correlation is large enough for PCA. The statistical tests indicate that the data is suitable for conducting PCA. The indicators selected for trust, reciprocity, and norm were adequately and highly correlated with latent variables analyzed i.e. trust, reciprocity, and norm. Thus, the variables (trust, reciprocity, and norm) are explained by at least one single principal component. The indicators reached the highest loading for specific component explaining the trust, reciprocity, and norm they are selected for (Table 15).

Table 15 shows that trust represents the first principal component, which explained 30.9% of the total variance. This component has high loadings of trust. Hansen et al. (2012) pointed that a high level of trust fosters cooperation. Trust motivates farmers to engage with their cooperatives. The second principal component explained 12.6% of the variance and it was found to be related to reciprocity. This component is characterized by high loadings of reciprocity in the

cooperative. Putnam (2000) stated that a high level of reciprocity among farmers increases cooperative exchange, offering beneficial resources. The third principal component, which explained 12.0% of the total variance, closely related to norms. This component has high loadings of norms in the cooperative. Norm facilitates collective action by shaping and controlling farmers' behavior (Ostrom and Ahn, 2007).

Table 15. Factor loadings for the rotated factors underlying relational social capital

Indicators[a]	PC1 Trust	PC2 Reciprocity	PC3 Norm
Trust1	**0.3963**	0.0813	0.2814
Trust2	**0.3464**	0.0626	-0.0650
Trust3	**0.4121**	-0.1479	-0.0628
Trust4	**0.4385**	-0.2328	-0.1615
Trust5	**0.3830**	-0.1860	-0.0329
Recipro1	**0.3350**	**0.3845**	0.0803
Recipro2	-0.1378	**0.6847**	-0.0629
Recipro3	0.2552	**0.4142**	0.1507
Norm1	0.0121	0.0260	**0.7913**
Norm2	-0.1331	-0.2998	**0.4757**
Eigen value	3.08497	1.25998	1.20365
Variance explained	30.9%	12.6%	12.0%
Cumulative % of variance explained	30.9%	43.5%	55.5%
Overall Cronbach's alpha	0.695		
Bartlett's test of sphericity chi-value	278.5**		
Kaiser-Meyer-Olkin measure of sampling adequacy	0.793		

** denotes significance level at 1%
[a] Full details of observable variables used in the analysis are reported in Appendix A.
Note: Component loadings greater than |0.30| are highlighted in bold print
Source: Survey data (2015)

Following equations (6) to (8), relational social capital index was developed. An individual value for the index was computed for each of the sample farmers. The index varies between 0 and 1, where a value of 0 for no relational social capital and a value of 1 for the highest relational social capital. The index measures the nature and quality of interaction and relationship of a farmer in dairy cooperatives. The sample farmers scored a relational social capital that range from 0.219 to 0.792 (Appendix C). A reliability analysis was performed to assess the internal consistency of the relational social capital index (Appendix B). A Cronbach's alpha score was found to be

0.695. Since this score is close to the minimum reliability coefficient level (0.7), it is considered acceptable.

Cognitive social capital

To investigate the extent of the underlying relationships of the cognitive social capital, PCA was performed on the indicators. The result shows that the variables can be summarized with two components that account for 63.1% of the explained variance (Table 16). The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.736 and Bartlett's test of sphericity was significant (chi-square = 200.2; $p < 0.000$). Taken together, these tests support the appropriateness of performing PCA on the cognitive social capital data set.

Table 16. Factor loadings for the rotated factors underlying cognitive social capital

Indicators[a]	Comp1 Civicness	Comp2 Cohesiveness
Cohes1	0.2401	**0.4720**
Cohes2	0.0306	**0.5964**
Cohes3	-0.1584	**0.6406**
Civic1	**0.4793**	0.0179
Civic2	**0.5519**	0.0382
Civic3	**0.6181**	-0.0966
Eigen value	1.94497	1.83824
Variance explained	32.4%	30.6%
Cumulative % of variance explained	32.4%	63.1%
Overall Cronbach's alpha	0.726	
Bartlett's test of sphericity chi-value	200.2**	
Kaiser-Meyer-Olkin measure of sampling adequacy	0.736	

** denotes significance level at 1%

[a] Full details of observable variables used in the analysis are reported in Appendix A.

Note: Component loadings greater than |0.30| are highlighted in bold print

Source: Survey data (2015)

As shown in Table 16, the indicators selected for civicness and cohesiveness were adequately and highly correlated with latent variables analyzed i.e. civicness and cohesiveness. Thus, the variables civicness and cohesiveness are explained by at least one single principal component. The indicators reached the highest loading for specific component explaining the civicness and cohesiveness they are selected for. The first principal component, which explained 32.4% of the total variance, related to civicness. It has a high loading of awareness of cooperative affairs and

confidence to influence things happening in the cooperative. The level of civicness shows farmers propensity to keep them informed about the cooperative affairs. The second principal component, which explained 30.6% of the variance, related cohesiveness. This component has a high loading of perception of farmers regarding similarity among them on cooperative issues. Cohesiveness reflects the extent of farmers' understanding of the cooperative goals (Sahin, 2007).

After applying PCA, the cognitive social capital index was developed following the equations (6) to (8). An individual value for the index was computed for each of the sample farmers. The index varies between 0 and 1, where a value of 0 for no cognitive social capital and a value of 1 for the highest cognitive social capital. The index measures the farmers' understanding of collective goals in dairy cooperatives. The sample farmers scored a cognitive social capital that range from 0.184 to 0.770 (Appendix C). The internal consistency of the cognitive social capital index was measured using Cronbach's alpha (Appendix B). The coefficient was found to be 0.726, verifying the reliability of the index.

6.2. Identifying determinants of dimensions of social capital

In this section the results of empirical investigation of determinants of dimensions of social capital are presented and discussed. The Seemingly Unrelated Regression result for the three dimensions of social capital is presented in Table 17.

Structural social capital

Marital status, education, share of dairy income, and length of membership were found to influence structural social capital in the dairy cooperatives. Marital status has a positive influence on structural social capital. The finding shows that married farmers have better social connections and relationships with the members. Marriage increases the extent of a farmers' access to the members. This fact is in line with the common notion in sociology that indicates married people are more socially involved than other people as it is indicated in Putnam (1995). The findings of Kormelinck (2010) also showed that married female members have better connection with the members than widowed female members in Ethiopian coffee marketing cooperatives. Thus, they showed better participation in the coperatives due to their access to information.

Education level has a positive association with structural social capital in dairy cooperatives which is generally consistent with most previous studies suggesting the important effects of education on social capital. The finding provides evidence that educated farmers have better social connections and relationships with the members. More educated farmers have high extent of access to the members. This may be attributed to the fact that education enhances social networks (Christoforou, 2005; Kaasa and Parts, 2008). The findings of Eshetu and Assefa (2015) indicated that educated farmers have more access to information that increases their participation in dairy cooperatives in Ethiopia. The plausible reason for this is that educated farmers have more structural social capital that enhances their access to the members.

Table 17. SUR estimation results of determinants of dimensions of social capital

Variables	**Structural social capital**		**Relational social capital**		**Cognitive social capital**	
	Coeff	**z-value**	**Coeff**	**z-value**	**Coeff**	**z-value**
Age	0.0042	1.06	0.0016	0.30	-0.0096	-1.69
Age squared	-0.0001	-0.73	0.0001	0.02	0.0001*	2.17
Gender	-0.0138	-0.70	0.0084	0.32	-0.0077	-0.27
Marital status	0.0613*	2.75	-0.0128	-0.43	-0.0069	-0.22
Education level	0.0097**	3.05	-0.0098*	-2.32	-0.0015	-0.33
Income	-0.0003	-0.02	0.0154	0.93	0.0171	0.97
Ownership of radio	-0.0038	-0.24	0.0690**	3.27	0.0091	0.41
Distance to coop. office	0.0003	0.94	-0.0003	-0.80	0.0002	0.45
Number of dairy cow	-0.0096	-1.48	-0.0093	-1.08	-0.0380**	-4.11
Share of dairy income	-0.0009**	-2.63	-0.0007	-1.56	-0.0005	-1.08
Number of close friends	0.0039	1.81	0.0065*	2.27	0.0127**	4.15
Position in coop	-0.0345	-1.33	-0.0056	-0.16	0.0010	0.03
Length of membership	0.0065*	2.07	-0.0032	-0.76	-0.0011	-0.24
Number of local associations	-0.0105	-1.79	0.0162*	2.07	-0.0039	-0.46
Access to training	0.0237	1.22	0.0082	0.32	0.0594*	2.15
Access to extension service	0.0291	1.54	0.0223	0.88	0.0223	0.83
Cooperative performance	-0.0088	-0.23	0.0275	0.53	-0.03499	-0.64
Cooperative size	-0.0234	-0.87	-0.0052	-0.14	-0.0143	-0.37
Constant	0.3824**	2.49	0.1867	0.91	0.5383*	2.46
R-squared	0.2821		0.2526		0.2610	
N. of observations	154					

*and ** denotes significance level at 5% and 1% respectively

Source: Survey data (2015)

As expected, share of dairy income negatively influences structural social capital in dairy cooperatives. This relationship might be suggestive of the following facts. First, farmers that

highly depend on dairy for income sell milk to other buyers for their subsistence needs as cooperatives don't pay money on daily basis for the milk delivered by the farmers. Second, some farmers sell butter and cottage cheese (*ayib*) in village and district markets as the cooperatives don't buy these products. It is obvious that farmers that sell their dairy products to other buyers involve in limited activities in the dairy cooperatives. They are also less likely to cooperate with the members. Thus, they have less social connections and relationships with the members, indicating their less extent of access to the members.

Number of close friends positively influences the structural social capital in dairy cooperatives as expected. This is evidence that closed network made up of strong ties is the source of structural social capital. The finding suggests that farmer social connections and relationships increases with the increase in the number of close friends they have in the cooperatives. The length of membership is also found to have a positive influence on structural social capital in dairy cooperatives. The finding reveals that the length of membership is linked to increased social connections and relationships with the members. Longer membership helps the farmer to get know others more, and expand social networks. It increases the extent of farmers' access to the members. Sampson (1988 cited in Larsen et al., 2004) also stated that people with relatively long periods of membership have an opportunity to develop and expand social networks.

Relational social capital

The relational social capital was found to be influenced by education level, ownership of radio, number of local associations, and number of close friends of a farmer in the dairy cooperative. Education level is negatively associated with relational social capital. Contrary to our hypothesis, less educated farmers have higher quality of relationship and interaction. As suggested by Kaasa and Parts (2008), education helps to access social networks that transmit values of reciprocity and cooperation. However, such value transmission may not always be supportive of generating trust - education may foster individualistic attitude that can reduce the motivation for cooperation (Parts, 2013). The level of reciprocal exchanges is lower among more educated farmers. This may be attributed to the fact that reciprocity is closely interrelated to trust (Putnam, 2000). The adherence to cooperative norm is more likely lower among more educated farmers. This reflects the fact that norms and trust have strong association (Knack and Keefer, 1997). The finding of

Plaisier (2010) also revealed similar result. It showed that less educated farmers have high trust in coffee marketing cooperatives in Ethiopia.

Availability of information tool (radio) is found to have positive effect on relational social capital in dairy cooperative. It is associated with better quality of relationship and interaction among the farmers. The finding shows that information tools such as radio strengthens farmers' norms of cooperation. It helps them develop trust on cooperative and participate by being conscious of the benefits of cooperation. Lin and Erickson (2008) also indicated that communication system such as radio enhances individual social capital. Number of close friends is positively associated with relational social capital in dairy cooperatives. It positively influences the quality of relationship and interaction among the farmers. The result shows that the level of trust is higher for farmers who have more close friends. Having many close friends is also positively related to the level of reciprocal exchanges and adherence to cooperative norms. This provides evidence that strong ties among farmers elicit trust, reciprocal exchanges, and adherence to norms in dairy cooperatives. Glaeser et al. (1999) also suggested that people who have more close friends are much better at eliciting trustworthy behavior.

Membership in multiple local associations positively influences the relational social capital in dairy cooperatives. It positively influences the quality of relationship and interaction among the farmers. This finding suggests that multiple local association membership facilitates the extensity of farmer's social relations (Hsung and Lin, 2008) with other farmers that has a positive impact on trust, reciprocity, and adherence to norms in dairy cooperatives. Putnam (1995) also pointed that membership in associations is a source of trust and of social ties.

Cognitive social capital

The cognitive social capital was associated with age, number of dairy cows, number of close friends, and training access in the dairy cooperatives. In the contrary to the hypothesis, age shows a "U"-shaped relationship with cognitive social capital. The implication is that the youngest and oldest farmers displayed higher understanding of collective goals. They have more awareness about their cooperative affairs. They have also better perception regarding similarity among the farmers on the cooperative issues. This finding may be attributed to the fact that the middle group farmers are more concerned with immediate personal gain. By the time they aged, however, "their life experience has probably taught them the importance and true value of

cooperation, and they thus demonstrate higher levels of voluntary cooperation" (Qin et al., 2011, p. 361).

As expected, number of dairy cows (proxy for wealth) is negatively associated with cognitive social capital in the dairy cooperative. It negatively influences farmer's understanding of collective goals i.e. wealthy farmers have lower attitudes towards collective goals. They have lower awareness of the cooperative affairs and a sense of solidarity. As it is suggested by Ouma and Abdulai (2009), wealthy farmers are less likely to participate in collective action initiatives and expect to benefit less from intensive participation. And this may have contributed to attitudes associated with less sense of solidarity and civic engagement of wealthy farmers in dairy cooperatives. Number of close friends is positively associated with cognitive social capital in the dairy cooperatives. It positively influences farmer's understanding of collective goals. The finding suggests that having more close friends enables the farmer in exchanging knowledge and sharing experience that promote civic engagement. Such a closed network also contributes to a higher sense of solidarity in dairy cooperatives.

Training access positively influence cognitive social capital in the dairy cooperatives. It is positively associated with farmer's understanding of collective goals. The result reveals that training/education on cooperative raises farmer's awareness of the benefits derived from collective marketing. This, in turn, increases his/her civic engagement in the cooperative. Training also contributes to a higher sense of solidarity in dairy cooperatives. Similarly, Ephrem (2014) showed that training increases the farmers believe in the power (strength) of cooperation.

6.3. Analysis of gender dimensions of social capital and milk market participation

This section investigates gender differences in dimensions of social capital and its effect in milk market participation in dairy cooperatives. First, it compares the mean dimensions of social capital by gender. Second, it explores whether or not gender differences in mean dimensions of social capital are still significant among groups formed by introducing the milk market participation variable.

6.3.1. Gender differences in dimensions of social capital

The Kolmogorov–Smirnov test was used to determine if samples are randomly drawn from normally distributed populations. The results of the test show that the distributions of dimensions of social capital are normal (Table 18). The dimensions of social capital according to gender also

showed normal distribution (Appendix H). As expected, the finding of the independent sample t-test shows significant difference in the mean of structural social capital by gender, supporting the hypothesis (H1) in section 4.3.3.2.

Table 18. Distribution of dimensions of social capital

Dimensions	N	Min	Max	Mean	Std. Dev.	Kolmogorov-Smirnov[a]
Structural	154	0.3295	0.7868	0.5326	0.0992	0.069 (0.423)
Relational	154	0.2186	0.7924	0.4381	0.1299	0.089 (0.148)
Cognitive	154	0.1837	0.7703	0.5040	0.1395	0.086 (0.179)

[a] Statistic testing the null hypothesis that the sample is drawn from a normal distributed population (*p* value in parentheses)
Source: Survey data (2015)

The finding indicates that women have less structural social capital than men in dairy cooperatives (Table 19). It shows that women have less social connections and relationships with other members than men. Women have lower linkage (network tie) with other members. Women have less extent of access to other members. This indicates that women have less access to information and resources than men. This may be attributed to the fact that the prevailing dominant gender norms and practices in rural areas that create gender power relations at household and community level. Women's continued household responsibilities and care duties in Ethiopia (Jones et al., 2010) restrict the range of social activity they are involved in, including their connections and relationships (network tie) with other members in dairy cooperatives. The finding is consistent with previous studies that contend women have low structural social capital than men (e.g. Lowndes, 2004; Kim and Sherraden, 2014).

Table 19. Mean of dimensions of social capital according to gender

Dimensions of Social capital	Women (n=83)		Men (n=71)		T-value	Total sample (n=154)	
	Mean	Std Dev.	Mean	Std Dev.		Mean	Std Dev.
Structural	0.5165	0.0875	0.5514	0.1089	-2.20*	0.5326	0.0992
Relational	0.4336	0.1342	0.4433	0.1255	-0.46	0.4381	0.1299
Cognitive	0.5135	0.1245	0.4929	0.1554	0.91	0.5040	0.1395

*and ** denotes significance level at 5% and 1% respectively.
Source: Survey data (2015)

Results of the *t* test for independent samples indicated there is no statistically significant difference in the mean of relational social capital by gender. However, the finding shows that women have less relational social capital than men in dairy cooperatives contrary to the

expectation. Similarly, there is no statistically significant difference in the mean of cognitive social capital by gender. However, the finding shows that women have higher cognitive social capital than men in dairy cooperatives as expected (Table 19).

6.3.2. Gender differences in dimensions of social capital and milk market participation

Two-way ANOVA test was conducted to explore the relationship between gender differences in dimensions of social capital and milk market participation in dairy cooperatives. Result of the ANOVA test confirms that there is a relationship between gender differences in structural social capital and milk market participation (Table 20). Women have less milk market participation than men that is attributed to their lower structural social capital, supporting the hypothesis (H4) in section 4.3.4.2.

Table 20. Mean of dimensions of social capital according to gender and market participation

Dimensions of social capital	**Market participation** Participant (n=100) Non-participant (n=54)	**Gender**		**p-value for ANOVA**
		Women (n=83)	Men (n=71)	
Structural	Participant	0.4936	0.5509	0.0064**
	Non-participant	0.5669	0.5521	
Relational	Participant	0.4324	0.4342	0.7523
	Non-participant	0.4361	0.4574	
Cognitive	Participant	0.5017	0.4970	0.5523
	Non-participant	0.5394	0.4866	

*and ** denotes significance level at 5% and 1% respectively.
Source: Survey data (2015)

As a result of differing social connections and relationship and correspondingly different levels of access to valuable information and resources regarding the importance and benefits of marketing through the cooperatives, women and men experience difference in milk market participation. Compared to men, women have lower linkage (network tie) with other members as it is found out above. This indicates that women have less extent of sharing information and resources that can improve their participation in economic activities in the cooperatives. This finding reinforces the growing consensus that social connections and relationships increase information and resource sharing from which an individual can benefit (Putnam, 2000). The finding is coherent with the previous studies on women. Women have less social connections that could increase information sharing and access to resources available to improve their wellbeing (Katungi et al., 2006; Kim and Sherraden, 2014).

6.4. Examining the effect of trust and non-trust factors on milk market participation

This section investigates the effect of trust and non-trust factors on farmers' milk market participation in dairy cooperatives. PCA method, first, is used to construct a composite indicator for farmers' trust. Second, the Heckman two-step procedure is employed to investigate the effect of trust and other factors on farmers' milk market participation.

6.4.1. Measuring trust

Trust was measured using 6 indicators of farmers' trust on members (close friends, neighbors, and other members), board, chairperson, various committees, and cooperative extension worker. After applying PCA to trust data set, two components were retained, explaining 68.60% of the total variance. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was found to be 0.851. Bartlett's test of sphericity was significant (chi-square = 502.4; $p < 0.000$) and shows that the correlations are large enough for PCA. These statistical tests support the appropriateness of performing PCA on trust data set (Table 21).

Table 21. Factor loadings for the rotated factors underlying trust

Indicators[a]	**PC1** **Trust in management**	**PC2** **Trust in members**
Trust in close friends	0.1202	**0.8556**
Trust in neighbors	0.3716	-0.0460
Trust in other members	0.3455	0.3237
Trust in board of directors	**0.4720**	-0.0739
Trust in chairperson	**0.4381**	-0.0479
Trust in committee members	**0.4566**	-0.0334
Trust in coop extension worker	0.3240	-0.3902
Eigen value	3.64586	1.15604
Variance explained	52.08%	16.51%
Cumulative % of variance explained	52.08%	68.60%
Overall Cronbach's alpha	0.829	
Bartlett's test of sphericity chi-value	502.4**	
Kaiser-Meyer-Olkin measure of sampling adequacy	0.851	

** denotes significance level at 1%

[a] Full details of observable variables used in the analysis are reported in Appendix A.

Note: Component loadings greater than |0.40| are highlighted in bold print

Source: Survey data (2015)

As shown in Table 21, the indicators selected for trust are adequate and highly correlated with the latent variables analyzed. Thus, trust in members and trust in management were explained by

at least one single principal component. The indicators for the specific component reached the highest loadings explaining trust in members and trust in management they were selected for. Table 21 reveals that the first principal component explained 52.08% of the total variance. It is closely related to trust in management. The second principal component, which explained 16.51% of the total variance, related to trust in members.

Trust composite indicator was developed following the equation (12) to (14). An individual value for the index was computed for each of the sample farmers. The index ranges between 0 and 1, where a value of 0 for no trust and a value of 1 for the highest trust in the cooperative. The index measures the extent of farmer's trust in the cooperatives. Finally, Cronbach's alpha was used to assess the internal consistency of the trust composite indicator (Table 21). A Cronbach's alpha score of 0.70 is widely acceptable minimum score for the assessment of measurement reliability (Nunnally, 1978 cited in OECD, 2008). The reliability coefficient (Cronbach's alpha) was found to be 0.829, which shows the analysis captured the underlying pattern of correlation between the variables well, further supporting the results provided.

6.4.2. Determinants of probability of milk market participation

Table 22 shows the first-stage probit model estimation of the determinants of the probabilities of the farmer to participate in milk marketing through the dairy cooperatives. The marginal effect for a given explanatory variable is evaluated at the means of all other independent variables. Several criteria were used to assess the overall goodness of fit for the probit model parameter estimates. First, the log-likelihood ratio test is applied to assess the overall joint significance of the explanatory variables in explaining the variations in the farmer's likelihood to participate in milk marketing. The null hypothesis for the log-likelihood ratio test is that all coefficients are jointly zero. The model chi-square test applying appropriate degrees of freedom shows that the overall goodness-of-fit of the probit model is statistically significant at a probability of 1%. This indicates that jointly the independent variables included in the regression model explain the variations in the farmers' probability to participate in milk marketing. Second, the McFadden's Pseudo-R^2 is computed and the obtained value shows that the independent variables included in the probit regression explain significant proportion of the variations in the dairy farmers' likelihood to participate in milk marketing. The probit model explains 49% of the variations in the likelihood of farmers to participate in milk marketing through the dairy cooperatives. Third,

the correct prediction rate of the probit model is obtained. It is observed that the probit model predicts about 86.36% of the cases correctly. Fourth, the standard errors of the parameters estimated are also corrected for the non-constant variances.

The probit model results showed that out of 16 independent variables, eight variables explained probability of milk marketing through the dairy cooperatives. These variables are age, age squared, number of children, number of dairy cow, distance to milk collection center, share of dairy income, land size, and cooperative performance.

In the contrary to expectation, age of the farmer is observed to be negatively associated with farmer's likelihood of milk market participation in dairy cooperatives. However, the significant and positive effect of age squared demonstrates that the probability of participating in milk marketing increases again after a certain age threshold. Martey *et al.* (2012) suggested that this relationship can be explained by farming experience, which is usually positively correlated with age. The authors suggested that experienced farmers are able to take better production decision and have higher probability of participating in the market. As expected, number of children affects the likelihood of participating in milk marketing through the dairy cooperatives negatively. The marginal effect further confirms that probability of participating in milk marketing decreases by 11.8% for an increase in number of children. The finding revealed that households with more children aged less than six years old less likely to participate in milk marketing as milk for child requirement increases. This finding coincides with the findings of Staal *et al.* (2006).

Number of dairy cow positively influences milk market participation in dairy cooperatives. An increase in the number of dairy cow increases the probability of milk marketing by 16.9%. This can be explained by the fact that an additional dairy cow increases the total milk production, increasing the likelihood of the farmer's milk marketing through the dairy cooperatives. This is in line with Holloway et al. (2000) and Berhanu (2012) who illustrated the positive influence of number of dairy cows to milk market participation. Distance to cooperative milk collection center negatively affects the farmers' likelihood of milk market participation. This indicates that as the farmer distance from the milk collection center increases by a minute, the farmer likelihood of participating in milk marketing decreases by 0.5%. This stems from the fact that longer distances increase travel time and travel costs, which impact negatively on milk market

participation. The findings of Holloway et al. (2000) also showed that farmers' proximity to the collection center positively influence the likelihood of delivering milk to the center.

Table 22. First-stage probit estimation results of determinants of probability of market participation

Explanatory variable	**Coefficient**	**Robust Std. err**	**Marginal effect** $\partial p(y=1/x)/\partial x$
Trust	1.006	0.866	0.331
Age	-0.226**	0.077	-0.075
Age squared	0.002*	0.001	0.001
Gender	0.273	0.341	0.090
Education	-0.030	0.053	-0.010
Household size	0.088	0.101	0.029
Number of children	-0.357*	0.182	-0.118
Number of dairy cow	0.513**	0.154	0.169
Distance to district market	0.003	0.003	0.001
Distance to milk collection center	-0.014**	0.004	-0.005
Share of dairy income	0.032**	0.007	0.010
Land size	-0.151*	0.061	-0.050
Access to credit	-0.046	0.405	-0.015
Access to extension services	0.218	0.456	0.072
Milk yield	-0.029	0.057	-0.009
Cooperative performance	1.699**	0.588	0.560
Constant	2.902	1.910	
Number of Observations	154		
Correctly classified observations (%)	86.36		
Pseudo R^2	0.49		
Wald X^2 (16)	76.69**		
Log likelihood	-50.737419		

*and ** denotes significance level at 5% and 1% respectively.
Using heteroskedasticity-robust standard errors.
Source: Survey data (2015)

As expected, share of dairy income positively influence the likelihood of farmers' milk market participation in dairy cooperatives. The marginal effect also confirms that an increase in percentage of the dairy income in the total income of the farmer, the probability of the farmer's milk market participation increase by 1%. This indicates that dependence on dairy for an income is an important factor in farmer's decision to participate in milk marketing. In the contrary to expectation, land size negatively influences the probability of milk market participation in dairy cooperatives; each additional hectare of land decreases the probability by 5%. The result suggests that the number of farmers producing milk for market have been increasing in the

vicinity of towns with the aid of purchasing pasture from other farmers or government holdings. Thus, the negative relationship between land size and milk market participation suggest that large land size is not necessarily required for market oriented dairy production. Staal *et al.* (2006) also found similar result.

As expected, the cooperative that strongly performed (generated earnings for members) positively influenced the likelihood of farmer's milk market participation. Creation of a value for the members (positive extra value) increases the probability of milk market participation in dairy cooperatives. The marginal effect also confirms that generation of earnings for the members (positive extra value) increases the likelihood of member's milk market participation by 56%. The finding indicates that the value a cooperative generates over and above its expenses, including an opportunity cost for its equity capital, can be utilized as a patronage refund. This fund is one of the driving forces in encouraging farmers' decision to participate in milk marketing. The finding resonates with that of Demeke (2007) who revealed that paying out patronage refunds is a major motivation for participation in Ethiopian coffee marketing cooperatives. The findings of Tremblay et al. (2002) and Plaiser (2010) also showed that strongly performing cooperatives influence members' collective marketing.

6.4.3. Determinants of intensity of milk market participation

The results of Heckman two-stage and Tobit regression estimations for intensity of milk market participation in dairy cooperatives conditional on farmer's decision to participate in milk marketing are given in Table 23. The coefficients on the Mill's ratio (lambda) in the Heckman two-stage estimation are not significant at the probability of less than 5%. This indicates there is no sample selection bias, there are no unobservable household characteristics influencing the farmer's likelihood to participate in milk marketing through the dairy cooperatives and thereby affecting intensity of participation. Thus, since there is no sample selection bias, the determinants of intensity of milk market participation in the cooperatives is analyzed and reported based on the results of Tobit model. The marginal effects for the censored sample (v) are calculated at the means of all other variables and given in columns 6. The Tobit model chi-square shows that the overall goodness of fit of the model is statistically significant at a probability of less than 1%. This indicates that jointly the variables included in the model explain the variations in the farmers' intensity of milk market participation in the cooperatives.

Trust, age, age squared, number of children, distance to collection center, share of dairy income, and access to extension service were found to be statistically significant. Trust positively and significantly influences the intensity of farmers' milk market participation in dairy cooperatives, as expected. The result reveals that an increase in the level of trust of the farmer would increase the level of milk market participation by 76.71%. Thus, trust is an important factor influencing farmers' level of milk market participation in dairy cooperatives. Similarly, Kiwanuka and Machethe (2016) showed trust is a key factor explaining farmers' intensity of milk market participation in Zambian dairy sector contractual arrangements.

Similar to the probit model estimation of probability of milk market participation in the cooperatives, age (the linear term) was found to have a negative coefficient, while age squared (the quadratic term) was found to have a positive coefficient, and both coefficients were statistically significant. This indicates that there is a U-shaped relation between age and intensity of milk market participation. That is, the intensity of milk market participation declines in age until it reaches a minimum at age of about 43— roughly the mean in the data — and then rises thereafter. Hence, the level of milk market participation in the cooperative appears to pick up for farmers at least 43 years old, indicating the learning period required for involvement in dairy production for the market. This finding is similar to Berhanu and Hoekstra (2007) that showed the U-shaped relation between age of household head and the quantity of cereal crop (teff) sold.

Number of children has negative relationship with intensity of milk market participation in the cooperatives as expected. An increase in number of children decreases farmer's level of milk market participation by 13.84%. The implication of this result is that households with more children aged less than six years old need more quantity of milk for consumption as milk is an important product for child nutrition. This finding is similar to Staal *et al.* (2006) that revealed the number of children negatively influence household's intensity of milk market participation. Distance from the farmer house to the cooperative milk collection center negatively influence farmer's intensity of milk market participation in the cooperatives. The result showed that farmer's level of milk market participation decreases by 0.62 % for each one minute increment of walk from the farmer house to the milk collection center. This implies that the farther is a farmer from the milk collection center, the more difficult and costly it would be to supply milk for marketing through the cooperatives. Benyam et al. (2016) also found out similar result.

Table 23. Tobit estimation results for quantity of milk marketed through the cooperatives

Explanatory variable	**Coefficient**	**Robust Std. err**	**Marginal effect** $\partial E(y/y>0)/\partial x$
Trust	140.3363*	67.284	76.7120
Age	-9.6212*	4.437	-5.2592
Age squared	0.0895*	0.044	0.0489
Gender	17.3900	17.628	9.5059
Education	3.4185	3.459	1.8686
Household size	6.9749	5.668	3.8127
Number of children	-25.3238*	9.870	-13.8427
Number of dairy cow	16.5576	13.639	9.0509
Distance to district market	0.3790	0.219	0.2072
Distance to milk collection center	-1.1360**	0.374	-0.6210
Share of dairy income	2.0881**	0.482	1.1414
Land size	-7.5430	5.142	-4.1232
Access to credit	-0.8104	33.224	-0.4430
Access to extension services	46.7489 *	24.069	25.5543
Milk production	9.3927	6.605	5.1343
Cooperative performance	41.4312	42.629	22.6475
Constant	-67.9937	113.212	
Sigma	91.0232		
Number of Observations	154		
Pseudo R^2	0.0972		
Wald X^2 (16)	7.73**		
Log likelihood	-622.7587		

*and ** denotes significance level at 5% and 1% respectively.
Using heteroskedasticity-robust standard errors.
Source: Survey data (2015)

As expected, share of dairy income is positively associated with intensity of milk market participation in the cooperatives. For an increase in percentage of the dairy income in the total income of the farmer, the level of milk market participation increases by 1.14%. The extent to which a farmer depends upon dairy for his/her livelihoods (salience) is an important factor that influences intensity of milk market participation in the cooperatives as it is suggested by Mushtaq et al. (2007). Access to extension service has positive relationship with level of milk market participation in the cooperatives. Farmers who have accessed dairy extension service have higher quantity of milk marketed through the cooperatives. Access to dairy extension service increases quantity of milk marketed by 25.55%. The result indicates that dairy extension service is crucial in enhancing skills and knowledge, linking with improved dairy technologies,

and improving intellectual capital which are important in increasing dairy production and quantity of milk marketed. The finding coincides with the findings of Holloway and Ehui (2002).

6.5. Summary

This chapter presented the results and discussion of the study. A range of the statistical and econometric models were employed to meet the objectives of the study. In doing this, numerous important findings were identified. Overall, PCAs provide a viable approach for measuring farmers' social capital in dairy cooperatives. To this end, this study contributed to the process of developing reliable, valid and consistent measures of social capital. It presented a theoretically informed measurement framework which has guided the construction of composite indicators for measuring dimensions. The SUR model investigated the various individual and aggregate level determinants of dimensions of social capital, while contributing to the understanding of the demographic factors, socioeconomic factors, and features of the cooperative that determine the stock of farmers' social capital in dairy cooperatives.

The independent sample t- tests were carried out to examine gender differences in dimensions of social capital and found out that women have less structural social capital than men in dairy cooperatives. The result of the ANOVA test also revealed that there is a relationship between gender difference in structural social capital and milk market participation. Finally, the study investigated the effect of trust and non-trust factors on farmers' milk market participation in the dairy cooperatives. The Heckman two-step procedure was used to determine the effect of trust and other factors on the decision of milk market participation and intensity of participation in the cooperatives. The first-stage probit model estimation results showed that trust doesn't affect farmers' decision to participate in milk market in the cooperatives. However, the results of the Tobit regression revealed that there is a positive relationship between farmers' trust and the intensity of market participation (quantity of milk marketed) in the cooperatives. The results of the study also indicated that various demographic, socioeconomic, and institutional factors influence farmers' milk market participation decisions and intensity of participation in the cooperatives. The next section will present the summary, conclusion, and implications of the study.

CHAPTER 7: SUMMARY, CONCLUSIONS, AND IMPLICATIONS

This last chapter contains five sections. The first section summarizes the study. The second section highlights the major findings of the study. The third section presents the conclusion to this study. The fourth section discusses the implications of this work. The fifth section suggests some future work and areas of focus that are worth investigating further.

7.1. Summary of the study

Background

Literature suggests that agriculture remains to be the most important economic activity in Ethiopia, providing income, employment and foreign exchange. Within the sector, smallholder farmers are the overwhelming actors, contributing to 96% of crop production and 95% of milk production. Ethiopia holds the largest livestock population that contributes about 7.9% of the total GDP and 20.5% of agricultural GDP. The country has huge potential for dairy development due to its large milking livestock population, diverse topographic and climatic conditions, and large market for dairy products.

Market participation considered as an effective route for smallholder farmers to benefit from economic opportunities that increase their income. Smallholder farmers, the foundation of Ethiopian agriculture, face many constraints that hinder their market participation. However, they face high transaction costs that considerably reduce their incentives to take advantage from participation in markets. In the case of dairy, the existence of relatively high marketing costs for milk, the prevalence of limited milk markets, and the riskiness attached to milk marketing suggests that transaction costs play a key role in dairy marketing.

Studies have paid attention to collective action as a mechanism to overcome smallholder farmers' marketing constraints. Collective marketing enables smallholder farmers to pool their output, realize economics of scale in marketing, and bargain for better terms of trade in the marketplace. Acting collectively, farmers can reduce transaction costs and secure access to high value markets and services. However, collective marketing requires the coordination of efforts by individuals to further their shared interests.

Cooperative is a more formal expression of collective action. It addresses smallholder farmers' marketing constraints through collective action. As self-driven and autonomous formal

organization which is jointly owned and controlled, cooperative depends on high involvement and interaction among members in decision making and distribution of benefits. Interpersonal relations are the foundation upon which cooperation, communication and coordination within a cooperative are based. Social interactions are crucial within cooperatives in the sense that they create social networks, sustain norms, build trust and values, and influence social and economic outcomes.

The concept of social capital has been acknowledged as an important factor in building and maintaining collective action. Social capital, an attribute of individuals and of their relationships, enhances individuals' ability to solve collective action problems. Social capital in the form of trust, reciprocity and networks play a key role in facilitating interactions among individuals that leads to collective outcomes. Social capital is a resource developed and owned by individuals pursuing different livelihood strategies requiring coordination and collective action.

Various models have been advanced to capture the elusive concept of social capital, but one of the most widely accepted frameworks is that of Nahapiet and Ghoshal (1998). Their framework draws important distinctions between the structural, relational, and cognitive dimensions of social capital. The conceptualization of social capital in this study followed Nahapiet and Ghoshal (1998) framework because (1) the model has been developed from an organizational (cooperative) perspective and (2) it offers comprehensive conceptualization of social capital that accommodates the major concerns of the existing literature i.e. the dimensions are inclusive and ensure the representation of the different features identified in social capital. .

The Structural dimension relates to the formation of interpersonal linkages between members. Structural social capital facilitates information sharing and exchange, which enable interaction and knowledge transfer among the members. The relational dimension relates to the kind of personal relations individuals have built up between them through interactions in cooperative. Relational social capital facilitates social and resource exchange, enhances communication and cooperation between the members. The cognitive dimension relates to the shared vision that facilitates the understanding of mutual goals and ways of acting in a cooperative. Cognitive social capital promotes shared vision and goals, and collective values that create a sense of shared responsibility and collective action. By fostering social capital, thus, farmers can be prompted to participate in their cooperatives and work together for mutual benefit.

Measuring social capital in cooperatives can provide a reliable indication of farmers' social connections and relationships, quality of relationships and interactions, and understanding of collective goals. Social capital measurement depends on elusive and intangible proxies. Many of the measurement approaches have usually used their own *ad hoc* methodology by focusing on particular proxy variables for human relationships and behavior with which the concept is associated.

Social capital is a productive asset that is built up through individual's investment. An individual's social capital results from the individual's efforts and as a consequence of the social environment. It is determined by individual and aggregate level factors. Social capital is unevenly distributed in collective action and that there is gender differences in the dimensions of social capital. Gender inequality creates difference in potential use of the resources embedded in social networks, or the mobilization of social capital in cooperatives. This difference in social capital constrains the effectiveness of collective marketing.

Trust enhances cooperation and smoothes communication and coordination, which essentially reduce transaction costs and generates economic benefits. Cooperative members expect to obtain advantages from enhanced market power and more effective bargaining capacity. For this, they need to translate their cooperative behavior into collective action. They should be committed to market their produce through the cooperative. These commitments are inherently based on trust within the cooperatives– both between members and management and among members.

Purpose of the study

The overall purpose of this study was to construct composite indicators and measure the dimensions of social capital at a farmer level and investigate its contribution to milk market participation in dairy cooperatives. The specific objectives of the study were to (a) construct composite indicators for measuring dimensions of social capital at a farmer level; (b) Identify the determinants of dimensions of social capital at a farmer level; (c) Analyze the relationship between gender differences in the dimensions of social capital and market participation; (d) Determine the effect of trust and non-trust factors on farmers' market participation.

Methods and approaches used in the study

A mixed methods design was employed to collect the data. Quantitative data analysis was carried out on primary data collected in a survey of 154 dairy cooperative members in West Shoa zone of Oromia region, Ethiopia. A two-stage sampling procedure was used to select the sample farmers for the study. The first stage involved the selection of dairy cooperatives on the basis of their performance. Extra-value approach was developed and used for selecting four dairy cooperatives. The second stage involved the selection of sample farmers from the selected dairy cooperatives. Systematic random sampling procedure was used to select every '*n*th' farmer in each selected cooperative. Qualitative tools were also used to supplement the interpretation and clarification of results from the quantitative analysis. A survey instrument was primarily developed to obtain data on farmers' dimensions of social capital in dairy cooperatives. Data was also collected from individual farmer on the following categories: individual and household characteristics, dairy production and marketing, and cooperative level information.

Composite indicators for measuring dimension of social capital were constructed by performing PCAs on the data set of indicators of farmers' dimensions of social capital. SUR was employed to identify the determinants of farmers' dimensions of social capital. Based on gender, an independent sample t- test was carried out to examine dimensions of social capital inequalities among farmers. And then, two-way ANOVA test was conducted to examine the relationship between gender differences in dimensions of social capital and milk market participation. The Heckman two-step procedure was employed to investigate the effect of trust and non- trust factors on farmers' milk market participation. Prior to this, composite indicator for measuring farmers' trust was constructed by performing PCA on the data set of indicators of trust.

7.2. Major findings of the study

Measuring social capital

This study presented a theoretically informed measurement framework which has guided the construction of composite indicators for measuring social capital. The measurement method presented represents a step forward in establishing an operational measure of individual social capital in the context of dairy cooperatives. First, the measurement addresses the dimensions of the concept characterized in the literature of an organization (structural, relational and cognitive). This allows avoiding the tautological criticisms of some previous social capital studies. Second,

the study summarized the elements of dimensions of social capital in meaningful ways, while still creating a single measure for each dimension which shows strong statistical validity. It provided single, synthetic measures for each dimensions of social capital which are reliable, valid, and consistent. The measures are also robust and exhibit construct validity.

Determinants of social capital

Seemingly Unrelated Regressions (SUR) was employed to identify the determinants of farmers' dimensions of social capital in dairy cooperatives. The results supported the argument that the hypothesized determinants influence the different dimensions of social capital in different ways. Most of the statistically significant determinants supported the hypotheses drawn from the previous studies. Nevertheless, there were some results that differ from most previous studies. There were also results for which there are no previous results to compare with. The results of SUR showed that marital status, education, and length of membership positively influence the structural social capital. The relational social capital is positively influenced by ownership of radio, number of close friends and membership in multiple local associations. Number of close friends and training access positively influence the cognitive social capital. In the contrary to the expectation, share of dairy income and education negatively influenced the structural and relational dimensions respectively. The number of dairy cows also negatively influenced the cognitive social capital.

Gender differences in the dimensions of social capital and milk market participation

This study analyzed gender differences in the dimensions of social capital (structural, relational, and cognitive) and their effect on milk market participation in dairy cooperatives. The results of the independent sample t- tests supported the argument that women have less structural social capital than men. The findings showed that women have less social connections and relationships with other members than men. This indicates women have lower linkage (network tie) with other members. The result of the ANOVA test also revealed that there is a relationship between gender difference in structural social capital and milk market participation. Women have less milk market participation than men that is attributed to their lower structural social capital. As a result of differing social connections and relationship and correspondingly different levels of access to valuable information and resources, women have less milk market participation than men.

Effect of trust and non trust factors on milk market participation

The Heckman two-step procedure was employed to investigate the effect of trust and non-trust factors on farmers' milk market participation in dairy cooperatives. The first-stage probit model estimation results indicated that trust has no relation with the decision to participate in milk marketing through the cooperatives. However, the results from the Tobit regression supported the hypothesis that there is a positive relationship between farmers' trust and intensity of milk market participation. Trust has a significant influence on the quantity of milk marketed through the dairy cooperatives. The results also indicated that age, number of children, number of dairy cow, distance to milk collection center, share of dairy income, land size, and cooperative performance determine farmers' milk market participation decision. The results also showed that most of the factors determining decision of participation also determined intensity of participation. Age, number of children, distance to milk collection center, share of dairy income, and access to extension service were found to determine the intensity of milk market participation.

7.3. Conclusions

The GoE has promoted agricultural cooperatives as part of the effort to improve smallholder farmers' livelihoods by linking them to markets. Despite remarkable growth in the number of cooperatives, the aim to integrate farmers with market through the cooperatives remains unmet. The failure to understand the role of social capital as farmers' propensity to engage in collective marketing is the prime cause of the problem. Therefore, this study's overarching goal was to construct composite indicators and measure the dimensions of social capital at a farmer level and investigate its contribution to milk market participation in dairy cooperatives.

This study focused on four dairy cooperatives that have been established to address smallholder farmers' market constraints in West Shoa zone, Oromia Region, Ethiopia. Through an appropriate mixed-method research design and constructing composite indicators for measuring dimensions of social capital at a farmer level, this study extended the existing knowledge on social capital, with a particular reference to the contribution of social capital to smallholder farmers' milk market participation in dairy cooperatives.

Foremost, social capital – conceptualized as an attribute of smallholder farmers and of their relationships that enhance their engagement in collective marketing - significantly contributes to

farmers' milk market participation in dairy cooperatives. This study empirically tested the model of individual social capital in dairy cooperatives. It developed theoretically based and empirically valid measures of dimensions (structural, relational, and cognitive) of social capital at a farmer level. This contributes to the methodological literature of social capital research through development of a viable approach for measuring farmers' dimensions of social capital in dairy cooperatives. It developed a reliable, valid, and consistent measure of dimensions of social capital that can be utilized for assessing the stock of social capital and developing appropriate intervention in dairy cooperatives.

Individual farmers' social capital is considered as prerequisite for positive outcomes for individual farmer and the members as whole in cooperatives. Based on the measures of dimensions of social capital, this study identified determinants of farmers' dimensions of social capital in dairy cooperatives. It identified various demographic, socioeconomic, and institutional factors that influence farmers' stock of social capital. This can contribute to understanding of determinants of dimensions of social capital at a farmer level. This information can help in designing strategies to improve the stock of social capital in dairy cooperatives.

Social capital builds and maintains collective action in gender differentiated cooperatives. However, social capital is unevenly distributed in cooperatives and there is gender difference in social capital. Social capital accrues to, or is accessed by men and women differently and thus the benefits derived therein are also unevenly distributed. In line with this fact, this study provided evidence on gender differences in the dimensions of social capital and their effect in milk market participation in dairy cooperatives. The study revealed that gender difference in structural social capital. It showed that women have less structural social capital than men. Moreover, it revealed the implication of difference in structural social capital on milk market participation. As a result of difference in structural social capital, women have less milk market participation than men. This information can contribute to the wider discussions on how to increase women's market participation in dairy cooperatives. It can help in designing strategies that promote market participation in gender differentiated cooperatives.

Studies particularly emphasized the important role of trust in cooperatives. Trust has become an important component of relational social capital that is highly related to farmers' market participation in cooperatives. This study constructed a composite indicator for measuring trust at

farmer level. It developed a reliable, valid, and consistent measure of farmer's trust. With regard to the contribution of trust for market participation, this study revealed that trust positively and significantly influences the quantity of milk marketed through dairy cooperatives. This information contributes to the existing knowledge of the role of trust in cooperatives. It provided evidence that trust is a significant factor explaining farmers' market participation in cooperatives. This study also identified other determinants of farmers' milk market participation. It revealed that various demographic, socioeconomic, and institutional factors influence farmers' milk market participation. This information can be used in designing strategies to improve farmers' milk market participation in dairy cooperatives.

In general, this study provided an important insight in understanding the role of social capital as a way to enhance farmers' market participation in dairy cooperatives. This, in turn, can help the designing of appropriate policies to improve smallholder farmers' livelihoods by linking them to market through cooperatives.

7.4. Implications

7.4.1. Methodological implication

In this study measures for the dimensions of social capital (structural, relational, and cognitive) were successfully established. However, there were a number of conceptual and practical challenges in measuring the dimensions of social capital- each closely related to others and yet distinctly unique. Perhaps it is this challenge of measuring both the close ties and unique attributes of these dimensions that has left the need for better measures of social capital in cooperatives for such a long period of time. The internal consistency of measures of dimensions of social capital shows reliability in excess of $\alpha > 0.70$ (the widely acceptable minimum score). The Kaiser-Meyer-Olkin (KMO) and Bartlett's test of sphericity also supported the empirical validity. In general, the statistical tests support the creation of a single measure for each dimensions of social capital.

The study generated and tested measures for the three dimensions of social capital that may serve as foundations for future social capital research in cooperatives. A number of literature on social capital have pointed that social capital is conceptualized as multidimensional. It has been argued that including multiple dimensions to describe a theoretical perspective is an important strength for an empirical research. However, research on this theoretical assertion was missing in dairy

cooperatives. Most of the previous studies have limited their analysis to only one or two of social capital dimensions: structural and cognitive or a combination of two. Very few studies (Sahin, 2007; Turner, 2011) have investigated the three dimensions of social capital in other non business organizations. This study provides empirical support for the conceptualization of social capital as being comprised of the three dimensions: structural, relational and cognitive.

This study primarily contributed to methodological aspects of researching social capital in cooperatives. Early on in this study there was the intention to build on empirical work that has been conducted in social capital research in cooperatives to date. As it was asserted earlier, a thorough review of literature found no measures for the three dimensions of social capital in dairy cooperatives. It is believed that the measures developed and tested in this study make a strong contribution for scholars building a valid and reliable tradition for social capital research in dairy cooperatives.

7.4.2. Policy implications

Measuring social capital at a farmer level in dairy cooperatives

The study provided a viable approach for measuring farmers' social capital in dairy cooperatives. It developed a reliable, valid and consistent measure of social capital which gives policy makers a solid basis for a robust assessment of social capital. This, in turn, allows more accurate interventions in building social capital in dairy cooperatives.

Enhancing the stock of farmers' social capital in dairy cooperatives

It is widely believed that educated farmers have better understanding of the role the dairy cooperatives can play in improving the living conditions of the farmers. The finding showed that education has positive effect on farmers' structural social capital which is important in the formation of interpersonal linkages for information sharing and knowledge transfer among the farmers in dairy cooperatives. Therefore, investment in education system in the area is an important way to strengthen social capital in dairy cooperatives.

The finding supports a policy by governmental, NGO, and other concerned organizations to invest in social capital by creating enabling environment in which local associations develop and flourish. Local associations (both formal and informal) have beneficial consequences for building social capital in dairy cooperatives by generating interpersonal trust and reinforcing social ties.

Promotion of cooperatives through mass media such as radio creates awareness about the benefits of cooperation. The finding revealed that ownership of radio improves farmers' cognitive social capital. For this reason, the ongoing mass media (radio) educational approaches needs to be strengthened as one of the major mechanisms in building social capital in dairy cooperatives.

Training was found to be an important factor for building farmers' cognitive social capital. Hence, strengthening the existing trainings and capacity building measures by Woreda Cooperative Promotion Offices and NGOs can contribute to increased levels of farmers' social capital in dairy cooperatives.

Enhancing farmers' milk market participation in dairy cooperatives

The study showed that there is gender difference in structural social capital in dairy cooperatives. Women have less structural social capital than men. Given that more than half of the members (53.9%) are women, strengthening women's structural social capital enhance their milk market participation. The following are points to be considered in improving gender difference in structural social capital in dairy cooperatives.

- One important strategy to strengthen women's structural social capital is to provide gender-sensitive social capital development program for women in dairy cooperatives. This includes training of extension agents who need to develop a more critical way of dealing with these issues.
- The creation of structural social capital requires investment of time and effort. Social capital is produced through repeat of interactions between the farmers in dairy cooperatives. Increasing farmers' interactions through committing resources and time towards cooperative ceremonies and events should be stressed.
- Gender differences in social capital should be addressed through providing continuous gender training and capacity building on gender mainstreaming to both cooperative promotional offices at different level (Zone, woreda, and kebele) and management body of the cooperatives.
- Strengthening structural social capital requires considerations of the structural conditions that create unequal opportunities for women to social capital. Attention need to be given

to gender within social networks of the cooperative and the broader context of gender differences within which social networks are forged.

- The findings of the study show that female members have low level of participation and under-representation in leadership in the cooperatives. There is a need to participate women in the leadership to ensure their representation in decision making at the management level.

The study showed that trust is crucial for milk market participation in dairy cooperatives. It is useful to create the conditions which generate farmers' trust:

- Improving the competency of cooperative management in its everyday actions can have a positive impact on trust level of the farmers.
- Cooperative management need to communicate more and share information with the farmers as it is the basis of individuals' trust.
- Trust generated by "relations" may not be adequate to keep the effective operation of the cooperative, it is also necessary to design and exercise reward and punishment system. Reward affects trust by influencing farmers' perceptions about each others' motives and their perceptions of joint performance. Punishment increases the cost of farmers' behavior of breaching the bye-law and elevates the trust of the other farmers.
- Given that trust is a crucial attribute in the relationship between the cooperative management and farmers, the management should strive to engage in these behaviors.

The distance from farmers' house to cooperative milk collection center negatively influences the decision to participate and the intensity of participation of milk marketing through dairy cooperatives. Establishing additional fixed and satellite milk collection centers and improving the marketing infrastructure (better road network) should be taken into account by the cooperatives and other concerned governmental and non-governmental bodies.

The dairy extension service appears to be effective in promoting milk market participation (volume of milk marketed). It should be strengthened through redesigning or reforming implementation strategies aimed at increasing farmers' milk market participation.

Female members have less dairy productive resources and access to services, resulting in lower milk production. This negatively influences their milk market participation. Reducing these

inequalities can improve women's participation in collective milk marketing in dairy cooperatives.

The performance of cooperatives influences farmers' decision to participate in milk market ing through the dairy cooperatives. The finding showed that the value a cooperative generates over and above its expenses encourages farmers' milk market participation. To create value (generate earnings for members) then a cooperative has to increase the rate of return by improving the operating margins.

7.5. Limitations of the study and suggestion for future research

Some limitations should be recognized with respect to this study and can be considered as possible directions for future research.

The first limitation of this study is that a sample of 154 farmers was drawn from four selected dairy cooperatives. A larger sample size would certainly have increased the power of the statistical tests. It may have offered more insights into the role of social capital in farmers' market participation. However, I believe that the observations (154 samples) provided enough statistical power to detect interesting and significant results. Finding the results that I did is encouraging in light of the small sample size, and suggests the possibility of potentially stronger results in a larger sample.

Extra-Value Index (EVI) was developed and used for selecting four dairy cooperatives. EVI, an objective performance measure, is scale-neutral and used to compare performance of cooperatives of different sizes (Ling, 2014). The size of dairy cooperatives may affect its performance (Huang, 2009). Future study that supplements procedures for controlling size effect would increase its internal validity. Despite this limitation, this study's selection of two cooperatives with positive extra value and two cooperatives with negative extra value ensure the representativeness of the sample cooperatives.

Because data were collected from four dairy cooperatives, inferences are only claimed for farmers in these cooperatives. To improve the external validity of its findings, this study would be first to expand to a larger sample of dairy cooperatives.

While there is statistical support for the three measures of dimensions of social capital in this study, the analysis presented raises fundamental question about the validity and usefulness of the measurement approach developed in other geographical and institutional settings. This leads to a comment, which is that future studies will verify this.

In studying determinants of farmers' dimensions of social capital, only 25-30% of the variance was explained by the variables hypothesized to explain farmers' dimensions of social capital. This leaves substantial room for the consideration of other determinants of dimensions of social capital in dairy cooperatives in the study area. Future researches that cover some attributes of the community can help to identify more determinants of dimensions of social capital that are important for policy.

This study explored social capital inequalities according to gender and its effect on milk market participation. One limitation of this is that it does not reveal any difference between female members from female headed households and female members from male headed households. This could give rise to some omission because their constraints may be different. Therefore, future researches should take this into account.

This study focused on cross-sectional data set. Social capital varies over time. Therefore, a panel data set (or longitudinal data) would have better facilitated the analysis. This is likely to yield more precise estimates that are easier to interpret. Future researches should be carried out to examine whether the results of this study are consistent with a set of results emerging from a panel data set.

Trust data were only collected through survey due to budget constraint. Measures of trust could be derived from behavior in experimental games. The internal validity of survey measures of trust would increase if supplemented by collecting additional attitudinal data from experimental games.

There is lack of sufficient studies testing the relationship between social capital and smallholder farmers' market participation in cooperatives that would permit comparative analyses. However, this study provides a promising start with virtually limitless potential for future investigation.

REFERENCE

Addis, E. & Joxhe, M. (2016). Gender Gaps in Social Capital: A theoretical interpretation of the Italian evidence. Working Papers Series. Sapienza – University of Rome.

Agrawal, B. (2000). Conceptualizing environmental collective action: Why gender matters. *Cambridge Journal of Economics*, 24, 283–310.

Aldridge, S., Halpern, D., & Fitzpatrick, S. (2002). Social capital: A discussion Paper. Performance & Innovation Unit. Admiralty Arch. London

Alene, A.D., Manyong, V.M., Omanya, G., Mignouna, H.D., Bokanga, M., & Odhiambo, G. (2008). Smallholder market participation under transaction costs: Maize supply and fertilizer demand in Kenya. *Food Policy,* 33, 318-328.

Alesina, A. & Ferrara, E. (2000). The Determinant of Trust. *NBER Working Paper*, No. 7621.

Ardales, V. (2008). *Basic concepts & methods in research*, Manila: Educational Publishing House.

Asfaw Negassa (2009). *Improving smallholder farmers' marketed surplus & market access for dairy products in Arsi zone, Ethiopia.* Research Report 21. ILRI, Addis Ababa, Ethiopia.

Australian Bureau of Statistics, 2004. Measuring social capital: an Australian framework and indicators. ABS Catalogue No. 1378.0, Canberra.

Azage Tegegne, Berhanu Gebremedhin, Hoekstra, D., Berhanu Belay, & Yoseph Mekasha (2013). *Smallholder dairy production and marketing systems in Ethiopia: IPMS experiences and opportunities for market-oriented development*. Working Paper 31. Nairobi: ILRI.

Barr, A. (2003). Trust and expected trustworthiness: experimental evidence from Zimbabwean villages. *The Economic Journal* 113, 614–630.

Barraud-Didier, V., Henninger, M-C., & Akremi, A.E. (2012). The relationship between members' trust and participation in the governance of cooperatives: The role of organizational commitment. *International Food and Agribusiness Management Review,* 15(1), 1-24.

Barrett, C.B. (2008). Smallholder market participation: Concepts and evidence from eastern and southern Africa. *Food Policy,* 33, 299-317.

Bellemare, M., & Barrett, C. (2006). An ordered Tobit model of market participation: Evidence from Kenya and Ethiopia. *American Journal of Agricultural Economics, 88*(2), 324– 337.

Benyam Tadesse, Zekarias Shumeta, & Taye Tolemariam (2016). Determinants of Dairy Farmers' Market Participation in the Major Dairy Producing Towns of Jimma Zone of Southwest Ethiopia. *Food Science and Quality Management*, Vol.52.

Bekele Shiferaw, Obare, G., Muricho, G.,& Silim, S.(2009).Leveraging institutions for collective action to improve markets for smallholder producers in less-favored areas. *Afjare*, 3 (1).

Bekele Shiferaw, Hellin, J, & Muricho, G. (2011). Improving market access and agricultural productivity growth in Africa: what role for producer organizations and collective action institutions? *Food Science*, 3, 475–489.

Berhanu Gebremedhin, & Hoekstra, D. (2007). Cereal marketing & household market participation in Ethiopia: The Case of Teff, Wheat & Rice. AAAE Conference Proceedings: 243-252.

Berhanu Gebremedhin & Moti Jaleta, 2012. Market orientation and market participation of smallholders in Ethiopia: Implications for commercial transformation. Selected paper prepared for presentation at the IAAE Triennial Conference, Foz do lguacu, Brazil,

Berhanu Kuma (2012). Determinants of Dairy Products Market Participation and Market Outlet Choices in Wolaita Zone, Ethiopia. PhD Dissertation, Haramaya University, Dire Dawa.

Bernard T., Gashaw Tadesse, & Solomon Lemma (2013). Agricultural cooperatives in Ethiopia: Results of the 2012 ATA Baseline Survey. International Food Policy Research Institute, Washington, D.C.

Bernard, T., Eleni Gabre-Madhin, & Alemayehu Seyoum (2007). Smallholders' Commercialization through Cooperatives: A Diagnostic for Ethiopia. Discussion Paper 00722, IFPRI, Washington, D.C.

Bernard, T. & Spielman, D.J. (2009). Reaching the rural poor through rural producer organizations? A study of agricultural marketing cooperatives in Ethiopia. *Food Policy*, 34(1), 60–69.

Bernard, T., Spielman, D., Alemayehu Seyoum, Eleni Gabre-Madhin (2010). *Cooperatives for Staple Crop Marketing: Evidence from Ethiopia*. Research monograph 164, IFPRI, Washington, D.C.

Bian, Y. (2008). The Formation of Social Capital among Chinese Urbanites: Theoretical Explanation and Empirical Evidence, in N. Lin and B.H., Erickson, eds., Social Capital: *An International Research Program.* Oxford University Press, Oxford.

Bisung, E. (2015). Social capital, collective action and the water-health nexus in rural Kenya. PhD Dissertation. University of Waterloo, Waterloo, Ontario.

Bolin, K., Lindgren, B., Lindström, M., Nystedt, P. (2003). Investments in social capital – implications of social interactions for the production of health. *Social Science & Medicine*, 56, 2379–2390.

Borgatti, S.P., & Foster, P. (2003). The network paradigm in organizational research: A review and typology. *Journal of Management*, 29 (6), 991-1013.

Borzaga, C., & Galera, G. (2014). The potential of the social economy for local development in Africa: An exploratory report. Directorate-General for external policies of the European Union policy department, Belgium.

Bourdieu, P. (1986). The forms of capital. In J. G. Richardson (Eds), *The Handbook of Theory: Research for the Sociology of Education* (pp. 241-258). New York: Greenwood Press.

Brandsma, W., Dawit Mengistu, Binyam Kassa, Mahlet Yohannes, & van der Lee, J. (2012). *The Major Ethiopian Milksheds; Wageningen*, Wageningen UR Livestock Research, Livestock Research Report 735.

Brehm, J. and Rahn, W. (1997). Individual-Level Evidence for the Causes and Consequences of Social Capital. *American Journal of Political Science*, 41(3): 999-1023.

Brune, N., Bossert, T., Bowser, D., & Solis, F. (2005). Building Social Capital through Human Capital Development Programs in Rural Nicaragua: An Evaluation of MSH Management and Leadership Programs in Waslala and Pantasma. USAID.

Burt, R. S. (2007). Secondhand Brokerage: Evidence on the Importance of Local Structure for Managers, Bankers, and Analysts**.** *Academy of Management Journal*, 50(1), 119-48.

Caiazza, A. & Putnam, R.D. (2002). Women's Status and Social Capital Across the States. Institute for Women Policy Research Publication #I911

Central Statistics Authority (2005). *Agricultural sample survey 2004/05*: Report on area and production of major crops. Statistical bulletin 331. Addis Ababa, Ethiopia

_____(2007). Summary and statistical report of 2007 population & housing census. FDRE population and census commission. Addis Ababa

_____(2009). *Agricultural sample survey 2008/09.* Report on livestock and livestock characteristics. Statistical bulletin 446. Addis Ababa, Ethiopia.

_____ **(**2010). Agricultural sample survey. Report on crop and livestock product utilization. Statistical Bulletin 468. Addis Ababa, Ethiopia.

_____(2013) Population projection of Ethiopia for all regions at woreda level from 2014 – 2017. Addis Ababa, Ethiopia.

_____(2014). *Agricultural sample survey 2013/14*: Report on area and production of major crops. Statistical bulletin 532. Addis Ababa, Ethiopia

_____(2017). *Agricultural sample survey 2016/17*: Livestock and livestock characteristics. Statistical bulletin 585. Addis Ababa, Ethiopia

Chamberlin J. (2008). It is a small world after all: defining smallholder agriculture in Ghana. Discussion Paper 00823, IFPRI, Washington, D.C.

Chirwa, E.W. & Matita, M. (2012). From Subsistence to Smallholder Commercial Farming in Malawi: A Case of NASFAM Commercialization Initiatives. London, Future Agricultures Consortium.

Christoforou, A. (2005). On the determinants of social capital in Greece compared to countries of the European Union, FEEM Working Paper No. 68.05, Fondazione Enrico Mattei, Milano.

Cleaver, F. (2005). The Inequality of Social Capital and the Reproduction of Chronic Poverty. *World Development*, 33(6), 893-906.

Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology, 94*, 95-120.

Coleman, J. S. (1990). *Foundations of Social Theory*, Cambridge, Mass. Harvard University Press.

Creswell, J. (2007). *Qualitative inquiry and research design: Choosing among five approaches* (2nd ed.). Thousand Oaks, CA: Sage.

Creswell, J. & Clark, P. V. (2011). *Designing and conducting mixed methods research*. (2nd Ed). Thousand Oaks, CA: Sage.

Dakhli, M. & De Clercq, D. (2004). Human capital, social capital and innovation: a multicountry study. *Entrepreneurship & Regional Development* 16: 107–128.

Das, N. (2009). Understanding of Social Capital in Gender-based Participatory JFM Programme: An Evidence from West Bengal. Centre for Studies in Social Sciences, Calcutta, India.

Demeke Tilahun (2007). Performance of coffee marketing co-operatives and members' satisfaction in Dale District: SNNPRS-Southern Ethiopia. MSc Thesis, Haramaya University.

Dereje Tadesse, Workneh Ayalew and Hegde, B.P. (2005). Survey of traditional cattle production systems and preferred cattle functions in North and south Wollo zones, Ethiopia. *Ethiopian Veterinary Journal* 9(1):91–108.

Diao, X., Alemayehu Seyoum, Yu, B., & Pratt, A. (2010). Economic importance of agriculture for sustainable development and poverty reduction: The case study of Ethiopia. Global Forum on Agriculture. Policies for Agricultural Development, Poverty Reduction and Food Security OECD headquarters, Paris.

Dodd, V. (2012). Social Capital and Subjective Well-being: The Case of Rural Ethiopia. MSc thesis, Clemson University.

Ehui, S., Beninz, S., & Paulos Zelekawork (2009). Policy Options for Improving Market Participation and Sales of Smallholder Livestock Producers: A case study of Ethiopia Draft prepared for presentation at the 27th Conference of the IAAE, Beijing, China.

Ephrem Dejene (2014). Assessment of Members' Perceptions towards Factors Influencing the Success of Cooperatives. MBA Thesis, Mekelle University, Mekelle.

Eshetu Tefera & Assefa Gebre (2015). Performance and determinants of household's participation in dairy marketing cooperatives: The case of Lemu-Arya & Bekoji dairy cooperatives, Arsi zone, Oromiya region, Ethiopia. *Global Journal of Agricultural Economics, Extension and Rural Development*, 3 (3), 214-229

Ethiopia Agricultural Transformation Agency, 2014. Transforming Agriculture in Ethiopia. Annual Report. Addis Ababa.

Fanos Mekonnen (2012). Zonal diagnosis and intervention plan West Shoa, Oromia. The Livestock and Irrigation Value chains for Ethiopian Smallholders (LIVES) project. Addis Ababa.

Federal Cooperative Agency (2015). Cooperative movement in Ethiopia: performances, challenges and intervention options. Annual bulletin report. Addis Ababa, Ethiopia.

Federal Cooperative Agency (2016). Agricultural cooperatives January 7, 2016. http://www.fca.gov.et/# (accessed on March 30, 2017).

Federal Democratic Republic of Ethiopia (1998). Proclamation no. 147/1998 to provide for the Establishment of Cooperative Societies. Federal Negarit Gazeta, Addis Ababa, Ethiopia.

_____ (2002). Proclamation no. 274/2002 to provide for the Establishment of Cooperatives' Commission. Federal Negarit Gazeta, Addis Ababa, Ethiopia.

Felleke, G. & Geda, G. (2001). The Ethiopian dairy development policy: a draft policy document. Ministry of agriculture , Addis Ababa, Ethiopia.

Fidrmuc, J. & Gërxhani, K. (2008). Mind the gap! Social capital, East and West. *Journal of Comparative Economics*, 36 (2), 264–286.

Fischer, E. & Qaim, M. (2012). Linking Smallholders to Markets: Determinants and Impacts of Farmer Collective Action in Kenya. *World Development, 40*(6).

Flick, U. (2007). Triangulation of qualitative and quantitative research, Chapter 7 (pp. 91-107) in "*Managing Quality in Qualitative Research*".

Flora, C. & Flora, J. (2003). Social Capital. *In Challenges for Rural America in the Twenty-First Century*, edited by D.L. Brown and L.E. Swanson. University Park, Pennsylvania: Pennsylvania State University Press.

Food and Agriculture Organization (2011). *The State Of Food and Agriculture 2010-2011.Women in Agriculture: Closing the Gender Gap for Development.* Rome.

_____2012 *Livestock sector development for poverty reduction: an economic and policy perspective – Livestock's many virtues*. *Rome*

Francesconi, G.N. (2009). Cooperation for competition Linking Ethiopian farmers to markets. PhD thesis, Wageningen University.

Fredu Nega, Mathis, E., Deckers, J., & Tollens, E. (2009). Gender, Social Capital, and Empowerment in Northern Ethiopia. *Munich Personal RePEc Archive Paper No. 24629.*

Gizachew Getaneh (2005). Dairy marketing patterns and efficiency: The Case of Ada' Liben District, eastern Oromia. M.Sc. Thesis, Alemaya University, Dire Dawa.

Glaeser, E. L., Laibson, D., Scheinkman, J.A., Soutter, C.L. (1999). What is social capital? The determinants of trust and trustworthiness. Working Paper 7216. NBER, Cambridge.

Glaeser, E. L. (2001). The Formation of Social Capital. *Canadian Journal of Public Policy* 2,34-40.

Gómez-Limón, J.A., Vera-Toscano, E., Garrido-Fernández F.E. (2014). Farmers' contribution to agricultural social capital: Evidence from Southern Spain. *Rural Sociology. 79* (3), 380-410.

Gorton, M., Sauer, J., Peshevski, M., Bosev, D., Shekerinov, D., & Quarrie, S. (2010). The dimensions of social capital and rural development: evidence from water communities in the Republic of Macedonia. *Paper prepared for presentation at the 118th seminar of the European Association of Agricultural Economists), jubljana, Slovenia.*

Granovetter, M.S. (1985). Economic Action and Social Structure: The Problem of Embeddedness. *American Journal of Sociology, 91*(3), 481–510.

Greene, J. (2007). *Mixed methods in social inquiry*. San Francisco, CA: Jossey-Bass.

Grootaert, C. (1999). Social Capital, Household Welfare and Poverty in Indonesia. World Bank Working Paper Series 2148, Washington, DC.

Grootaert, C., Narayan, D., Jones, V.N., & Woolcock, M. (2004). Measuring social capital: an integrated questionnaire. World Bank working paper; no. 18, Washington, D.C.

Grootaert, C. & Van Bastelaer, T. (2001). Understanding and measuring social capital: A synthesis of findings & recommendations from social capital initiative. Social capital initiative working paper 24, World Bank, Washington, D.C.

Grootaert, C. & Van Bastelaer, T. (2002). Understanding and Measuring Social Capital: A Multidisciplinary Tool for Practitioners: World Bank. Washington D.C.

Gulati, R., Norhria, N., & Zaheer, A. (2000). Strategic networks. *Strategic Management Journal* 21, 203-215.

Haddad, L. & Maluccio, J.A. (2003). Trust, membership in groups & household welfare: Evidence from KwaZulu-Natal, South Africa. *Economic Development & Cultural Change,* 51, 573–601.

Hansen, M., Morrow, J., & Batista, J. (2002). The impact of trust on cooperative membership retention, performance, and satisfaction: an exploratory study, *International Food and Agribusiness Management Review,* 5, 41-59.

Hogeland, J.A. (2004). How culture drives economic behavior in cooperatives. *Journal of Rural Cooperation* 32(1), 19-36.

Holloway, G. and Ehui, S. (2002). Expanding market participation among smallholder livestock producers: A collection of studies employing Gibbs sampling and data from the Ethiopian highlands. Socio-economics and Policy Research Working Paper 48. ILRI, Nairobi, Kenya.

Holloway, G. J., Nicholson, C.F., Delgado, C., Staal, S., & Ehui, S. (2000). Agro-Industrialization through Institutional Innovation, Transaction Costs, Cooperatives and Milk Market Development in the East African Highlands. *Agricultural Economics*, 23: 279-288.

Hong, G., Sporleder, T., 2007. Does social capital influence member participation in agricultural Cooperatives? Presented at NCERA-194 Annual Meeting, Ohio State University, Columbus, Ohio.

Hsung, R. & Lin,Y. (2008). Social Capital of Personnel Managers: Causes and Return of Position-Generated Networks and Participation in Voluntary Associations, in N. Lin and B.H., Erickson, eds., Social Capital: *An International Research Program.* Oxford University Press, Oxford.

Huang, X. (2009). Performance of farmer cooperatives. Ph.D. Dissertaton. Sichuan Agricultural University, China.

Jagwe, J.N. (2011). The impact of transaction costs on the participation of smallholder farmers and intermediaries in the banana markets of Burundi, Democratic Republic of Congo and Rwanda. PhD Dissertation. University of Pretoria, Pretoria.

James, H. & Sykuta, M. (2005). Property rights & organizational characteristics of producer-owned firms & organizational trust. *Annals of Public* & *Cooperative Economics,* 76(4), 545–580.

James, H. & Sykuta, M. (2006). Farmer Trust in Producer- and Investor owned Firms: Evidence from Missouri corn and soybean producers, *Agribusiness*, 22(1): 135–153.

Jayne, T.S., Haggblade, S., Minot, N., & Rashid, S. (2011). Agricultural commercialization, rural transformation and poverty reduction: what have we learned about how to achieve this? Synthesis report prepared for the African agricultural markets programme policy symposium, alliance for commodity trade in Eastern and Southern Africa. Kigali, Rwanda

Jicha, K.A. (2011). Individual-Level Predictors of Social Capital & Participation in Collective Action on the Island of Carriacou, Grenada. PhD dissertation, North Carolina State University, North Carolina.

Jochun, V., Pattern, B., & Wilding, K. (2005). Civil renewal and active citizenship: A guide to the debate, National Council for Voluntary Organizations, London.

Jones, N., Tafere, Y., & Tassew Woldehanna (2010). *Gendered risks, poverty and vulnerability in Ethiopia: To what extent is the Productive Safety Net Programme (PSNP) making a difference?* London: Overseas Development Institute.

Jones, V. & Woolcock, M., (2007). Using mixed methods to assess social capital in low income countries: A practical guide. Brooks World Poverty Institute Working Paper Series 1207, The University of Manchester, Manchester.

Kaasa, A. & Parts, E. (2008). Individual-level determinants of social capital in Europe. Acta Sociologica, 51 (2), 145-168.

Karhina, K., Ng, N., Ghazinour, M., & Eriksson, M. (2016). Gender differences in the association between cognitive social capital, self‐rated health, & depressive symptoms: a comparative analysis of Sweden & Ukraine. International Journal of Mental Health Systems, 10(37).

Katungi, E., Emeades, S., & Smale, M. (2006). *Gender, social capital and information exchange in rural Uganda*. CAPRi Working Paper 59. IFPRI , Washington, D.C.

Katungi, E., Machethe, C., & Smale, M. (2007). Determinants of Social Capital Formation In Rural Uganda: Implications For Group-Based Agricultural Extension Approaches. *AfJARE*, 1(2), 167-190.

Kim, S-M., & Sherraden, M. (2014). The impact of gender and social networks on microenterprise business performance. *The Journal of Sociology & Social Welfare*: 41(3), 4.

Kiwanuka, L. R., & Machethe, C. (2016). Determinants of Smallholder Farmers' Participation in Zambian Dairy Sector's Interlocked Contractual Arrangements. *Journal of Sustainable Development*, 9(2).

Knack, S., & Keefer, P. (1997). Does social capital have an economic payoff? A Cross-country investigation.' *Quarterly Journal of Economics*, 112(4), 1251–1288.

Kodama, Y. (2007). New role of cooperatives in Ethiopia: The case of Ethiopian coffee farmers' cooperatives. *African Study Monographs*, 35 (3), 87–108.

Kormelinck, A.G. (2010). Women's bargaining position and trust in Ethiopian coffee cooperatives. MSc thesis, Radboud University Nijmegen, Nijmegen.

Kothari, C.R., 2004. *Research Methodology: Methods and Techniques*. Second Revised Edition. New Age International (P) Ltd., Publishers

Krejcie, R.V. & Morgan, D.W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement,* 30, 607–610.

Kumar, N. & Quisumbing, A.R. (2012). *Policy Reform toward Gender Equality in Ethiopia. Little by Little the Egg Begins to Walk*. ESSP Working Paper 45. Addis Ababa, Ethiopia: IFPRI / Ethiopia Strategy Support Program II.

Land O'Lakes (2010). *The Next Stage in Dairy Development for Ethiopia*, Land O'Lakes Inc., Addis Ababa

Larsen, L., Harlan, S.L., Bolin, B., Hackett, J., Hope, D., Kirby, A., Nelson, A., Rex, T.R., & Wolf, S. (2004). Bonding and Bridging: Understanding the Relationship between Social Capital and Civic Action. *Journal of Planning Education and Research*, 24, 64-77.

Leana C.R. & Pil F.K. (2006). Social Capital and Organizational Performance: Evidence from Urban Public Schools organization Science, 17(3).

Lenjiso Berhanu (2013). Is money a magic bullet for empowerment? The impact of market-oriented dairying on the socio-economic position of women farmers in selale area, Oromia national regional state, Ethiopia. In: M. Prah (ed.) *Insights into Gender Equity, Equality & Power Relations in SSA*. Addis Ababa, Ethiopia: OSSREA & Fountain Publishers, 157–171.

Levinthal, D. A. & March, J.G. (1993). The Myopia of Learning. *Strategic Management Journal*, 14, 95-112.

Liang, Q., Huangb, Z., Luc, H., & Wangd, X. (2015). Social capital, member participation, and cooperative performance: evidence from China's Zhejiang. *International Food & Agribusiness Management Review*, 18 (1).

Liebrand, C.B. (2012). *Dairy Cooperatives in the 21st Century—The First Decade*. RBS Research Report No. 225, Rural Business-Cooperative Service, U.S. Department of Agriculture.

Lin, N. (2001). *Social Capital: a Theory of Social Structure and Action*. Cambridge: Cambridge University Press.

Lin, N. & Erickson, B.H. (2008). Theory, Measurement, and the Research Enterprise on Social Capital, in N. Lin and B.H., Erickson, eds., Social Capital: *An International Research Program.* Oxford University Press, Oxford.

Lindstrand, A., Melen, S., & Nordman, E.R. (2011). Turning social capital into business: A study of the internationalization of biotech SMEs. *International Business Review*, 20; 194–212.

Ling, K. C. (2006). *Measuring Performance of Dairy Cooperatives*. RBS Research Report No. 212, Rural Business-Cooperative Service, U.S. Department of Agriculture.

Ling, K. C. (2014). *Performance of the Top 18 Dairy Co-ops, 1992-2012*. RBS Research Report No. 232, Rural Business-Cooperative Service, U.S. Department of Agriculture.

Lowndes, V. (2004). Getting on or getting by? Women, social capital and political participation', *The British Journal of Political and International Relations*, 6 (1): 47-56.

Makoni, N., Mwai, R., Redda, T., van der Zijpp, A., & van der Lee, J. (2014). *White gold: Opportunities for dairy sector development collaboration in East Africa*.

Maluccio, J., Haddad, L., & May, J. (2003). Social capital and gender in South Africa, 1993–1998. In *Household decisions, gender, and development: A synthesis of recent research*, ed. A. R. Quisumbing, IFPRI, Washington, D.C.

Markelova, H., Meinzen-Dick, R., Hellin, J., & Dohrn, S. (2009). Collective action for smallholder market access. *Food Policy,* 34, 1–7.

Marshall, G. (1998). A dictionary of sociology. Oxford university press, New York.

Martey, E., Al-Hassan, R.M., & Kuwornu, J.K. (2012). Commercialization of smallholder agriculture in Ghana: A Tobit regression analysis. *African Journal of Agricultural Research, 7*(14), 2131-2141.

Mayer, R. C., Davis, J.H, & Schoorman, F. D., 1995. An integrative model of organizational trust. *Academy of Management Review,* 20, 709-734.

McDoom, O. (2013). It's Who You Know: Social Networks, Interpersonal Connections, and Participation in Collective Violence. HiCN Working Paper 140. The Institute of Development Studies - at the University of Sussex - Falmer – Brighton

Meier zu Selhausen, F. (2016). What determines women's participation in collective action? Evidence from Ugandan coffee cooperative. *Journal Feminist Economics,* 22(1), 130-157.

Meinzen-Dick, R., Di Gregorio, M., & McCarthy. N. (2004). Methods for studying collective action in rural development. CAPRi Working paper No.33, IFPRI, Washington, D.C.

Mensah, E.R., Karantininis, K., Adégbidi, A., & Okell, J.J. (2012). Determinants of Commitment to Agricultural Cooperatives: Cashew Nuts Farmers in Benin. *Selected Paper prepared for presentation at the International Association of Agricultural Economists Triennial Conference, Foz do Iguaçu, Brazil.*

Milagrosa, A. and Slangen H.G. (2006). Measuring Social Capital among Indigenous Agricultural People of the Cordirellas in Northern Philippines. *Selected paper for presentation at the American Agricultural Economics AssociationAnnual Meeting, Long Beach California.*

Miller, E. & Buys, L. (2008). The impact of social capital on residential water-affecting behaviors in a drought-prone Australian community. *Society & Natural Resources, 21*, 244-257.

Ministry of Finance and Economic Development (2002). Ethiopia: Sustainable Development and Poverty Reduction Program. Addis Ababa, Ethiopia.

Ministry of Finance and Economic Development (2005). Ethiopia: Building on Progress: A Plan for Accelerated and Sustained Development to End Poverty. Addis Ababa, Ethiopia.

Ministry of Finance and Economic Development (2014). Growth and Transformation Plan Annual Progress Report for F.Y. 2012/13. Addis Ababa, Ethiopia.

Mohamed Ahmed, Ehui, S., & Yemesrach Assefa (2004). Dairy Development in Ethiopia. EPTD Discussion Paper 123, IFPRI, Washington, D.C.

Molinas, J. R. (1998). The impact of inequality, gender, external assistance and social capital on local level cooperation. *World Development,* 26(3), 413-431.

Molyneux, M. (2002). Gender and the silences of social capital: Lessons from Latin America. *Development and Change* 33(2): 167-88.

Moore, G. (1990). Structural determinants of men´s and women's personal networks. *American Sociological Review* 55(5): 726-35.

Morgan, D.L. (1996). Focus groups. *Annual Review of Sociology*, 129-52.

Mujawamariya, G., D'Haese, M., Speelman, S. (2013). Exploring double side-selling in cooperatives, case study of four coffee cooperatives in Rwanda. *Food Policy* 39: 72–83.

Munasib, B.A. & Jordan, J.L. (2011). The effect of social capital on the choice to use sustainable agricultural practices. *Journal of Agricultural and Applied Economics*, 43 (2), pp. 213--27.

Muñoz-Goy, C. (2013). Social capital in Spain: Are there gender inequalities? *European Journal of Government and Economics*, 2(1).

Mushtaq, S., Dawe, D., Lin, H., & Moya, P. (2007). An assessment for collective action for pond management in Zhange irrigation system (China). *Agricultural Systems* 92:140–156.

Nahapiet, J. & Ghoshal, S. (1998). Social Capital, Intellectual Capital, and the Organizational Advantage. *Academy of Management Review,* 23, 242–66.

Nardo M., Saisana M., Saltelli A., & Tarantola S. (2005). Tools for composite indicators buildings. *Report EUR 21682 EN*. European Commission-Joint Research Centre, Ispra.

Nardone, G., Sisto, R., & Lopolito, A. (2010). Social Capital in the LEADER Initiative: a methodological approach. *Journal of Rural Studies,* 26(1), 63-72.

National Planning Commission (2016). Growth and Transformation Plan II (2015/16-2019/20). Ethiopia, Addis Ababa.

Nilsson, L. (2010). Cooperatives in transition: Studies of Ownership during a merger. Licentiate Thesis, Swedish University of Agricultural Sciences, Uppsala.

Nilsson, J., Svendsen, G.L.H., & Svendsen, G.T. (2012). Are large and complex agricultural cooperatives losing their social capital? *Agribusiness* 28 (2): 187–204.

Nga, B.T., Cuong, T.H., Ha, L.T., & Lebailly, P. (2012). Milk production and marketing in small dairy holders in Northern area of Vietnam: A case study in PHu Dong. *Vietnam's Socio-Economic Development*, a quarterly review.

Organization for Economic Co-operation and Development (2008). *Handbook on Constructing Composite Indicators: Methodology and User Guide*. Paris.

Oromia Bureau of Finance and Economic Development (2011). Physical and socio economic profile of West shewa zone and districts. Addis Ababa.

Ortmann, G. & King, R. (2007). Agricultural Cooperatives I: History, Theory and Problems. *Agrekon*, 46(1), 18-46.

Österberg, P. & Nilsson, J. (2009). Members' Perception of their participation in the governance of cooperatives: The key to trust & commitment in agricultural cooperatives. *Agribusiness,* 25 (2): 181–197.

Ostrom, E. (2003). How Types of Goods and Property Rights jointly affect Collective Action. *Journal of Theoretical Politics*, 15(3), 239-270.

Ostrom, E. & Ahn, T. (2007). The meaning of social capital and its link to collective action. *SSRN eLibrary* Retrieved May 25, 2014 from http://ssrn.com/abstract=1304823.

Ouma, E. & Abdulai, A. (2009). Contributions of social capital theory in predicting collective action behavior among livestock keeping communities in Kenya. IAAE Conference, Beijing.

Oxfam International (2013). *Women's Collective Action: Unlocking the Potential of Agricultural Markets.* Oxfam Interna-tional Research Report. Oxford, UK: Oxfam International.

Padmaja, R., Bantilan, C., Parthasarathy, D., & Gandhi, V. (2006). Gender and social capital mediated technology adoption. Impact Series 12. Patancheru, India: International Crops Research Institute for the Semi-Arid Tropics.

Paliszkiewicz, J. (2013). The importance of building and rebuilding trust in organizations. Proceedings of 2013 international conference on technology innovation and industrial management Phuket, Thailand.

Parts, E. (2008). Indicators of social capital in the European Union. Working Paper IAREG 2008/02. Tartu: Tartu University Press

Parts, E. (2013). The dynamics and determinants of social capital in the European Union and Neighboring Countries. Working Paper WP5/01. Tartu University Press, Tartu.

Pingali, P., Khwaja, Y., & Meijer, M. (2005). Commercializing Small Farms: Reducing Transaction Costs. ESA Working Paper No. 05-08. FAO. Rome

Plaisier, C. (2010). Willingness to invest, engagement & trust of coffee farmers in the context of weak & strong coffee cooperatives in Ethiopia. MSc thesis, Radboud University Nijmegen, Nijmegen.

Portes, A. (1998). Social capital: Its origins and applications in modern sociology. *Annual Review of Sociology*, 24: 1–25.

Poteete, A. & Ostrom, E. (2004). In pursuit of comparable concepts and data about collective action. *Agricultural Systems*, 82, 215-232.

Pratt, B. and Loizos, P. (2003). *Choosing Research Methods: Data Collection for Development Workers*. Oxford: Oxfam.

Putnam, R. (1993). *Making democracy work: civic traditions in modern Italy*. Princeton University Press, *Princeton NJ*.

Putnam, R. (1995). Bowling alone: America's declining social capital. *Journal of Democracy*, 6(1), 65-78.

Putnam, R. (2000). *Bowling Alone: The Collapse & Revival of American Community*, Simon & Schuster, New York.

Qin, X., Shen, J., & Meng, X. (2011). Group-based trust, trustworthiness & voluntary cooperation: Evidence from experimental & survey data in China. *Journal of Socio-Economics*, 40, 356-363.

Quibria, M. G. (2003). The puzzle of social capital: A critical review. *Asian Development Review*, 20(2), 19–39.

Reda Tsehay (2001). Small scale milk marketing and processing in Ethiopia. In: D. Rangnekar and W. Thorpe (eds), smallholder dairy production and marketing-opportunities and constraints. Proceedings of a South–South workshop held at NDDB, Anand, India.

Ruben, R. & Heras, J. (2012). Social capital, governance and performance of Ethiopian coffee cooperatives. *Annals of public and cooperative economics, 83(4), 463–484*

Rupasingha, A., Goetz, J., & Freshwater, D. (2006). The Production of Social Capital in US Counties. *Journal of Socio-Economics*, 35, 83–101

Sahin, I. (2007). Organizational Social Capital and Perceived Performance of Drug Law Enforcement Departments: A Case Study in Turkey. PhD dissertation, University of Central Florida.

Sandler, T. (1992). Collective Action: Theory & Applications. University of Michigan Press, Ann Arbor, MI.

Sanginga, P.C., Abenakyo, A., Kamugisha, R., Martin, A.M., & Muzira, R. (2010). Tracking outcomes of social capital and institutional innovations in natural resources management: Methodological issues and empirical evidence from participatory bylaw reform in Uganda. *Society and Natural Resources* 25(8):711-725.

Sapienza, P., Toldra-Simats, A., & Zingales, L. (2013). Understanding trust. *Economic Journal*, 12(3), 1313–1332.

Seligman, A. B. (1998). Trust and Sociability: On the Limits of Confidence and Role Expectations. *American Journal of Economics and Sociology* 57(4), 391-404.

Sintayehu Yigrem, Fekadu Beyene, Azage Tegegne, Berhanu Gebremedhin, 2008. Dairy production, processing and marketing systems of Shashemene–Dilla area, South Ethiopia. IPMS, Working Paper 9. ILRI, Nairobi, Kenya.

Six, F.E. (2007). Building interpersonal trust within organizations: a relational signaling Perspective. *Manage Governance,* 11: 285–309.

SNV (Netherlands Development Organization) (2008). Study on Dairy Investment Opportunities in Ethiopia. Addis Ababa

Staal, S.J. (1995). Peri urban Dairying and Public Policies in Ethiopia and Kenya: A comparative Economic and Institutional Analysis. Ph.D Dissertation, University of Florida, Florida.

Staal, S.J., Baltenweck, I., Njoroge, L., Patil,B.R., Ibrahim, M., & Kariuki, E. (2006). Smallholder dairy farmer access to alternative milk market channels in Gujarat. IAAE Conference, Brisbane, Australia.

Staal, S.J., Pratt, A., & Jabbar, M. (2008). Dairy development for the resource poor Part 2: Kenya & Ethiopia dairy development case studies. *ILRI/FAO, PPLPI Working Paper No. 44-2. Nairobi*

Szabo, G.G. (2010). The importance and role of trust in agricultural marketing cooperatives. *Studies in Agricultural Economics*, 112.

Tesfaye Lemma. (2008). Growth without structure: The cooperative movement in Ethiopia. In *Cooperating out of poverty: The renaissance of the African cooperative movement,*ed. Develtere, P., Pollet, I., and Wanyama, F. Geneva: International Labor Office and World Bank Institute.

Thomas Woldu, Fanaye Tadesse, & Waller, M. (2013). Women's Participation in Agricultural Cooperatives in Ethiopia. ESSP, Working Paper 57, IFPRI. Addis Ababa,

Tsai, W., & Ghoshal, S. (1998). Social Capital and Value Creation: The Role of Intrafirm Networks.' *Academy of Management Journal*, 41(4), 464–476.

Tremblay, M., Sire, B., & Balkin, B. (2002). The role of organizational justice in pay & employee benefit satisfaction, & its effects on work attitudes. *Group & Organization Management*, 25 (3), 269–290.

Turner, J. (2011). Social Capital: Measurement, Dimensional Interactions, and Performance Implications. Ph.D. dissertation, Clemson University.

Uphoff, N., & Wijayaratna, C. (2000). Demonstrated Benefits from Social Capital: The Productivity of Farmer Organizations in Gal Oya, Sri Lanka. *World Development,* 28, 1875–90.

United States Agency for International Development. (2013). Agricultural Growth Project - Livestock Market Development. Value Chain Analysis for Ethiopia.

Valentinov V. (2003). Social capital, transition in agriculture, and economic organisation: a theoretical perspective. Discussion paper No 53. Institute of Agricultural Development in Central and Eastern Europe, Halle.

Valentinov, V. (2004). Toward a social capital theory of cooperative organization. *Journal of Cooperative Studies*, 37, 5-20.

Van Oorschot, W., Arts, W. (2005). Social Capital of European Welfare States: the Crowding Out Hypothesis Revisited. *Journal of European Social Policy*, 15 (5), 5–26.

Van Rijn, F., Bulte, E., & Adekunle, A. (2012). Social capital and agricultural innovation in Sub-Saharan Africa. *Agricultural Systems*, 108, 112–122.

Warshawsky, D. (2014). The potential for mixed methods: Results from the field in Urban South Africa. *The Professional Geographer*, 66(1), 160-168.

West Shoa Zone Cooperative Promotion Office, 2015. Annual report on cooperatives in the zone. Ambo.

Westermann, O., Ashby, J., & Pretty, J. (2005). Gender and social capital: The importance of gender differences for the maturity and effectiveness of natural resource management groups. *World Development* 33:1783–1799.

Willy D. & Holm-Müller, K. (2013). Social influence and collective action effects on farm level soil conservation effort in rural Kenya. *Ecological Economics,* 90, 94–103.

Woldemichael Somano (2008). Dairy marketing chains analysis: the case of shashemane, Hawassa and Dale district's milk shed, southern Ethiopia. MSc Thesis, Haramaya University.

Wolz, A. Fritzsch, J., Buchenrieder, G., Nedoborovskyy, A., & Zinovchuk, V. (2008). Farm income among household plot farmers in Ukraine – the impact of social capital. *Paper prepared for presentation at the 48th annual conference of the German Association of Agricultural Economists, Bonn*

Women Thrive Worldwide, Undated. Women and Agriculture: Growing More than Just Food. Washington D.C.

Woolcock, M. (2001). Microenterprise and social capital: A framework for theory, research, and policy. *Journal of Socio-Economics, 30*(2), 193–198.

Woolcock, M., & Narayan, D. (2000). Social capital: Implications for development theory, research, and policy. *The World Bank Research Observer*, *15*(2), 225–249.

Wooldridge, J. (2002). *Econometric Analysis of Cross-Section and Panel Data*. Massachusetts: The MIT Press.

World Bank (2008). World development report 2008: Agriculture for Development. The World Bank, Washington, DC

_____(2011). W*orld Development Report 2012: Gender Equality and Development*. The World Bank, Washington, DC.

_____(2017). World Development Indicators. The World Bank., Washington, DC.

World Bank, FAO, & IFAD (2009). *Gender in Agriculture Sourcebook. Agriculture and Rural Development Series*. World Bank, Washington DC.

Yang, K. (2007). Individual Social Capital and Its Measurement in Social Surveys. *European Survey Research Association*, 1(1), 19-27

Zamasiya, B., Mango, N., Nyikahadzoi, K., & Siziba, S. (2014). Determinants of soybean market participation by smallholder farmers in Zimbabwe. *Journal of Development and Agricultural Economics*, 6(2), 49-58.

Zelalem Yilma, Guernebleich, E., Amha Sebsibe (2011). A Review of the Ethiopian Dairy Sector. FAO of the United Nations, Sub Regional Office for Eastern Africa

APPENDICES

Appendix A. List of indicators used to measure farmers' dimensions of social capital

Dimension	Subdimensions	Variable label	Description	Possible responses
Structural	**Bonding**	Bonding1	In the past 12 month, how often have you met with your close friends in the cooperative?	1 to 5[a]
		Bonding2	In the past 12 month, how often have you talked to your close friends about the cooperative issues?	1 to 5 [a]
		Bonding3	In the past 12 month, how satisfied are you with the relationship you have with close friends in the cooperative?	1 to 5 [a]
		Bonding4	In the past 12 month, how often have you met with your neighbors in the cooperative?	1 to 5 [a]
		Bonding5	In the past 12 month, how often have you talked to your neighbors about the cooperative issues?	1 to 5 [a]
		Bonding6	In the past 12 month, how satisfied are you with the relationship you have with neighbors in the cooperative?	1 to 5 [a]
	Bridging	Bridging1	In the past 12 month, how often have you met with other members in the cooperative?	1 to 5 [a]
		Bridging2	In the past 12 month, how often have you talked to other members about the cooperative issues?	1 to 5 [a]
		Bridging3	In the past 12 month, how satisfied are you with the relationship you have with other members of the cooperative?	1 to 5 [a]
		Bridging4	In the past 12 month, how often have you met with board members in the cooperative?	1 to 5 [a]
		Bridging5	In the past 12 month, how often have you talked to board members about the cooperative issues?	1 to 5 [a]
		Bridging6	In the past 12 month, how satisfied are you with the relationship you have with board members of the cooperative?	1 to 5 [a]
		Bridging7	In the past 12 month, how often have you met with extension workers?	1 to 5 [a]
		Bridging8	In the past 12 month, how often have you talked to extension workers about the cooperative issues?	1 to 5 [a]
		Bridging9	In the past 12 month, how satisfied are you with the relationship you have with extension workers?	1 to 5 [a]
Relational	**Trust**	Trust1	To what extent do you trust your neighbors in the cooperative?	1 to 5 [a]
		Trust2	To what extent do you trust the other the members in the cooperative?	1 to 5 [a]
		Trust3	To what extent do you trust the board members in the cooperative?	1 to 5 [a]
		Trust4	To what extent do you trust your kebele?	1 to 5 [a]
		Trust5	To what extent do you trust farmers training center (FTC)?	1 to 5 [a]
	Reciprocity	Recipro1	If I help a member in the cooperative, that person will help me in the future.	1 to 5 [a]
		Recipro2	When a member makes me a favour, I feel committed to repay him/her	1 to 5 [a]
		Recipro3	If I share important information with a member, that person will do the same for me	1 to 5 [a]
	Norm	Norm1	Selling milk to other buyers if they offer you better price than the cooperative.	1 to 5 [a]
		Norm2	Cheating on membership fee if there is a chance.	1 to 5 [a]
Cognitive	**Cohesiveness**	Cohes1	If there is an urgent problem in the cooperative, the members would get together and solve it.	1 to 5 [a]
		Cohes2	Members have a common understanding on the importance of the cooperative.	1 to 5 [a]
		Cohes3	Members are active and involve in cooperative issues and activities.	1 to 5 [a]
	Civicness	Civic1	How much do you feel that you can influence things that are happening in your cooperative?	1 to 4[b]
		Civic2	How often you attend meetings in the cooperative?	1 to 4[b]
		Civic3	In the past 12 months, how often you are informed about your cooperative affairs?	1 to 5 [a]

[a]5 represents the highest level [b]4 represents the highest level

Source: Survey data (2015)

Appendix B. Reliability analysis for the dimensions of social capital

Dimensions	Subdimensions and Indicators[a]	**Mean**	**Std. Dev.**	Cronbach's alpha (α)	Overall Cronbach's alpha (α)
Structural	**Bonding**				**0.804**
	Bonding1	3.9610	0.5703	0.807	
	Bonding2	3.1299	0.7471	0.788	
	Bonding3	4.8507	0.3754	0.816	
	Bonding4	4.6429	0.6829	0.811	
	Bonding5	3.1623	0.8891	0.788	
	Bonding6	4.2403	0.7843	0.801	
	Bridging				
	Bridging1	2.8961	0.7512	0.806	
	Bridging2	2.5000	0.7343	0.797	
	Bridging3	3.7273	0.7345	0.791	
	Bridging4	3.0325	0.7269	0.779	
	Bridging5	2.9416	0.7941	0.776	
	Bridging6	3.8961	0.9087	0.793	
	Bridging7	2.9546	0.8955	0.780	
	Bridging8	2.7013	0.9012	0.777	
	Bridging9	3.7922	1.0077	0.778	
Relational	**Trust**				**0.695**
	Trust1	3.4481	1.2631	0.628	
	Trust2	2.7662	1.0466	0.656	
	Trust3	3.5974	1.2288	0.637	
	Trust4	3.8182	1.1287	0.632	
	Trust5	3.5974	1.0757	0.651	
	Reciprocity				
	Recipro1	3.5390	0.9910	0.654	
	Recipro2	4.2078	0.7469	0.714	
	Recipro3	3.4675	1.0237	0.677	
	Norm				
	Norm1	2.2078	1.5746	0.727	
	Norm2	1.7987	1.2334	0.713	
Cognitive	**Cohesiveness**				**0.726**
	Cohes1	3.6688	1.1885	0.637	
	Cohes2	3.2922	1.0536	0.678	
	Cohes3	3.6623	0.9162	0.726	
	Civicness				
	Civic1	2.5909	1.0007	0.708	
	Civic2	3.0325	0.8198	0.677	
	Civic3	2.7857	0.8553	0.697	

[a] Full details of observable variables used in the analysis are reported in annex 1.
Source: Survey data (2015)

Appendix C. Summary statistics of farmers' dimensions of social capital

Dimensions of social capital	**N**	**Min**	**Max**	**Mean**	**Std. Dev.**
Structural social capital	154	0.3295	0.7868	0.5326	0.0992
Relational social capital	154	0.2186	0.7924	0.4381	0.1299
Cognitive social capital	154	0.1837	0.7703	0.5040	0.1395

Source: Survey data (2015)

Appendix D. List of indicators used to measure farmers' trust

Variable label	Description	Possible responses [a]
Trust in close friends	To what extent do you trust your close friends in the cooperative?	1 to 5
Trust in neighbors	To what extent do you trust your neighbors in the cooperative?	1 to 5
Trust in other members	To what extent do you trust the other members in the cooperative?	1 to 5
Trust in board of directors	To what extent do you trust the board members in the cooperative?	1 to 5
Trust in chairperson	To what extent do you trust the chairperson in the cooperative?	1 to 5
Trust in committee members	To what extent do you trust the committee members in the cooperative?	1 to 5
Trust in coop extension worker	To what extent do you trust the coop extension worker in the cooperative?	1 to 5

[a]1. To a very small extent 2. To a small extent 3. Neither small nor great extent 4. To a great extent 5. To a very great extent

Source: Survey data (2015)

Appendix E. Household members responsible for different dairy farm operations

Dairy farm operations	Responsible person/s (%)						
	Wife	Husband	Children	Wife & Husband	Wife & children	Wife, husband & children	Other
Milking cows	84.4	-	-	5.2	4.6	0.7	5.1
Cleaning milk containers	79.2	-	3.9	0.7	9.7	1.3	5.2
Milk storing & preserving	88.2	-	-	0.7	4.6	0.7	5.8
Barn cleaning	52.6	5.8	2.6	8.4	14.3	5.2	16.3
Milk selling to coop	27.9	13.1	21.3	5.7	9.0	4.9	23
Milk processing	68.3	2.1	2.8	2.1	20.4	-	4.3
Butter selling	82.1	1.6	1.6	0.8	9.8	-	4.1
Feeding dairy cattle	11.0	12.3	4.6	19.5	9.7	13.6	29.3
Health management	9.1	37.0	2.6	20.8	4.6	9.1	16.8

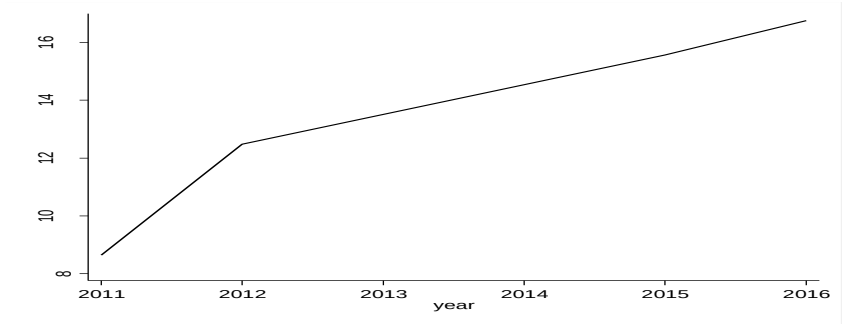
Source: Survey data (2015)

Appendix F. Average monthly price of fresh milk

Month	Milk price/liter (birr)			
	2011	**2012**	**2015**	**2016**
September	9.84	13.18	15.48	17.25
October	8.66	13.47	15.67	17.52
November	-	13.87	15.94	17.52
December	-	14.08	15.86	17.16
January	7.89	10.98	-	16.08
February	8.09	10.98	-	16.56
March	9.32	11.77	-	16.64
April	8.15	11.26	-	16.49
May	8.03	12.00	-	16.85
June	8.50	12.07	-	16.99
July	8.48	12.72	15.22	15.51
August	9.48	13.33	15.19	16.46

Source: CSA

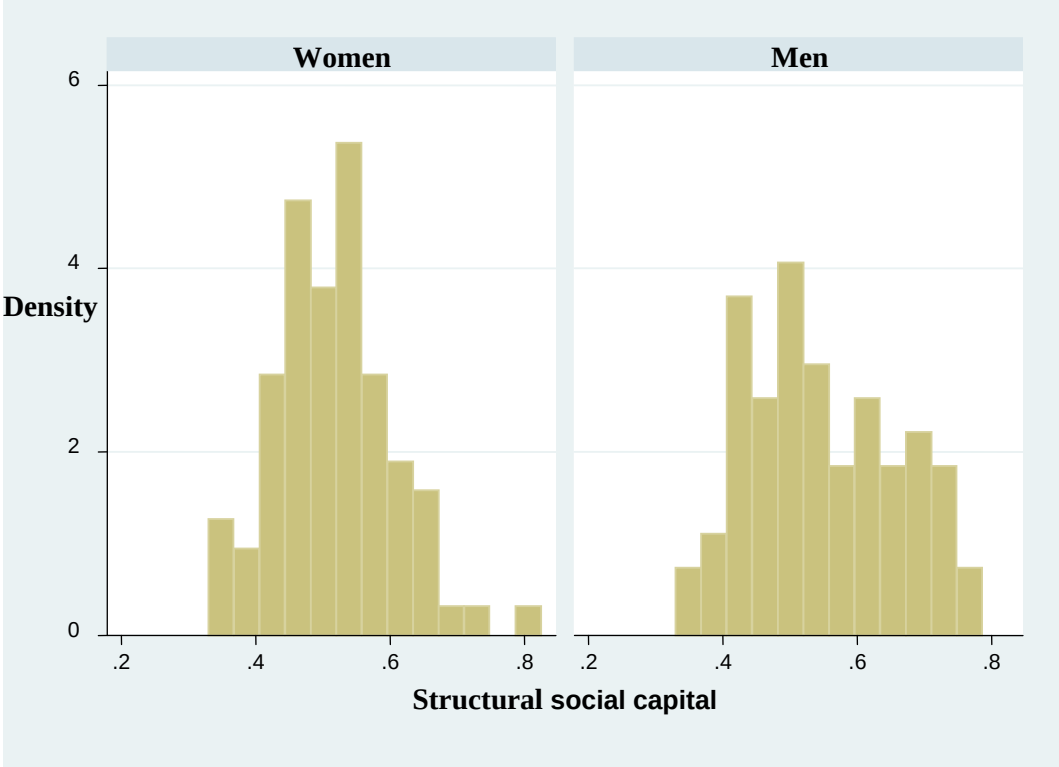
Appendix G. Trend of average monthly price of fresh milk (2011-2016)



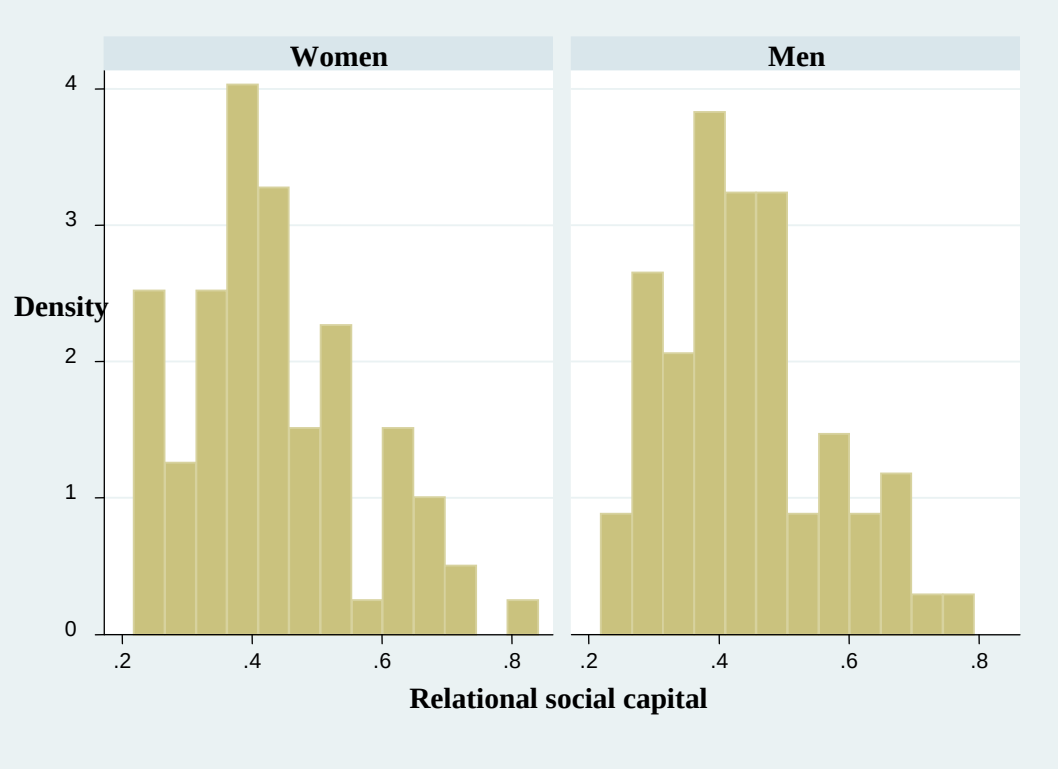
Source: CSA

Appendix H. The distribution of dimensions of social capital according to gender

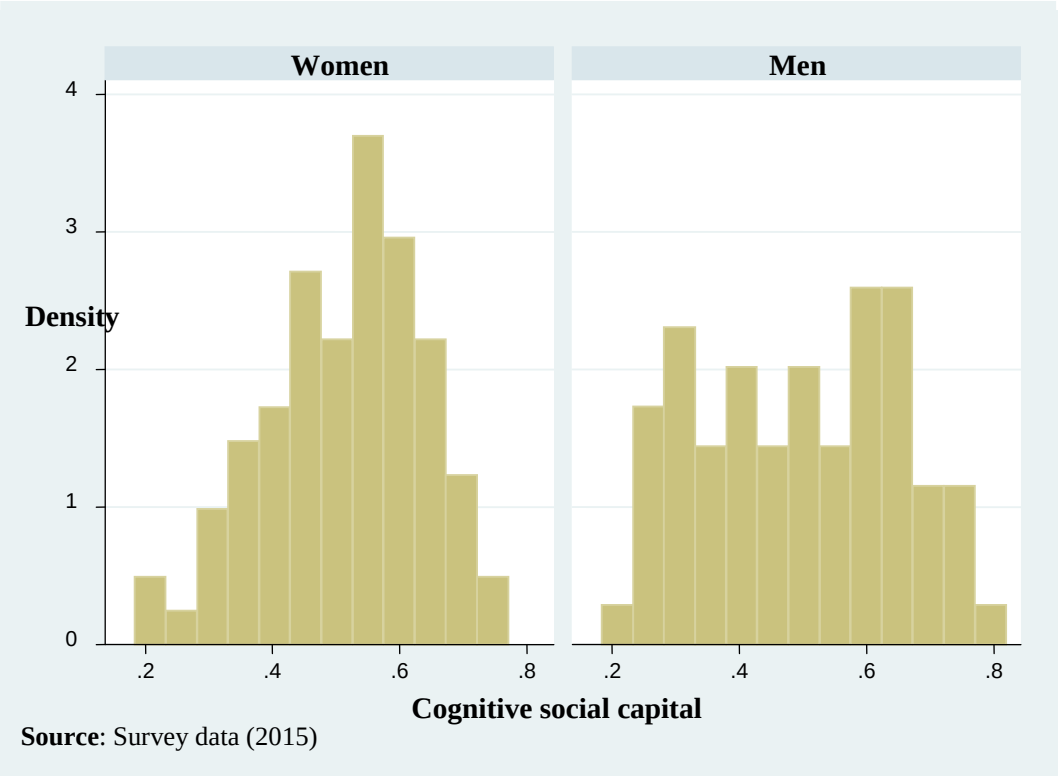
a. **Structural social capital according to gender**



b. **Relational social capital according to gender**



c. **Cognitive social capital according to gender**



Source: Survey data (2015)

Appendix I. Survey Questionnaire

Social Capital and Smallholder Farmers' Collective Action: the Case of Primary Dairy Cooperatives in West Shoa Zone of Oromia, Ethiopia

Identification Number _____

General information

Name of the cooperative _____

Name of the member _____

Date of interview _____

Part I. Basic Household Information

1. Age_____ (years)

2. Gender 1. Male 2. Female

3. Martial status 1. Married 2. Single 3. Divorced 4. Separated 5. Widowed

4. Educational level

1. Illiterate/Read and Write 2. Primary school, _____Grade

3. Secondary school, _____Grade 4. Technical school 5. Other/Specify _____

5. Religion 1. Orthodox 2. Protestant 3. Muslim 4. Traditional 5. Other/specify_____

6. Ethnicity 1. Oromo 2. Amhara 3. Other/specify_____

7. How long have you lived in this area? _____ Year/s

8. Household composition

	Name	**Age**	**Sex**	**Relation to the respondent** 1. Husband 2. Wife 3. Son 4. Daughter 5. Servant 6. Other/specify	**Education level** 1. Illitrate/read & write 2. Primary 3. Secondary 4.Technical 5. Other/specify	**Employment status** 1.Work on own farm 2.Gov't employee 3. Non-gov't employee 4. Self employed (not in farm) 5. Casual labour 6. Not employed 7. Other/specify
1						
2						
3						
4						
5						

9. Which of the following items are available for use by you?

	Item	**1. Yes 2. No**
1	Radio	
2	Mobile phone	

10. Access to infrastructure

From household to (nearest)…….	Local market	District market	Cooperative	FTC
Distance (walking hr)				

11. Land holding

	Land use	**Area (ha)**			
		Own (ha)	**Rented in (ha)**	**Shared in (ha)**	**Other/specify (ha)**
1	Arable land				
2	Pasture land				
3	Forest land				
4	Other/specify				

12. Crop production (2006 E.C)

	Crops	**Area (ha)**	**Yield (Qts)**
1	Teff		
2	Maize		
3	Sorghum		
4	Wheat		
5	Others/specify		

13. Livestock keeping

A. Dairy cattle

	Type of animals	**Number**	
		Local breed	**Cross breed**
1	Lactating (milking) cow		
2	Dry cow		
3	Heifer		
4	Bull		
5	Calve		

B. Other livestock, poultry and beekeeping

	Type of animals	**Number**
1	Ox	
2	Sheep	
3	Goat	
4	Horse	
5	Donkey	
6	Mule	
7	Poultry	
8	Beehive	

14. Livelihood sources

	Income sources of the household	**Annual estimated income (br)**	**Rank**
1	Crop production		
2	Dairy production		
3	Other livestock production such as poultry, beef fattening		
4	Income from employment in GO, private and other organization		
5	Income from self employment (not in farm)		
6	Other/specify		

Part II. Dairy Production and Marketing

1. Production performance

Type of animals	**Ave. lactation period (months)**	**Milk Production**	
		Rainy season (litres/cow per day)	**Dry season (litres/cow per day)**
Local breed			
Cross breed			

2. Who regularly performs the following activities on your dairy farm?

Activities		**Responsible person/s** 1. Husband 2. Wife 3. Daughter 4. Son 5. Laborer 6. Other/specify
Dairy farm	Milking cows	

operations	Cleaning of milk containers	
	Milk storing and preserving	
	Milk quality control	
	Barn cleaning	
	Milk marketing	
	Milk processing	
	Butter marketing	
Herd management	Feeding dairy cattle	
	Watering	
	Health management	
	Pasture management	

4. Milk production (average quantity (litres) of milk produced on a daily basis in the past 12months).

Cows	Number	No of lactating cows	Ave. lactation period	Ave. milk yield/day (lt)	Ave. milk sold/day (lt)	Ave. milk consumed/day lts)	Ave. milk processed /day (lt)
Local							
Crossbred							

5. Which of the following are the constraints in your dairy farm operation? (Multiple choices possible).

	Constraints	**1. Yes 2. No**
1	Availability and costs of feeds	
2	Shortage of water	
3	Shortage of land	
4	Lack of capital	
5	Shortage of labor	
6	High price variability	
7	Shortage of supply of improved dairy animals	
8	Diseases and parasites	
9	Lack of extension service	

6. Which of the following dairy products you sold in the past 12 months? (Multiple choices possible)

	Item	**1.Yes 2. No**	**Market outlets** 1. Farm gate 2. Village market 3. Town market 4. District market 5. Cooperative 6. Private milk group
1	Milk (fresh)		
2	Butter		
3	Cottage cheese (*ayib*)		
4	Fermented milk (ergo)		

7. Did of you sell milk to the cooperative in the past 12 months?

1. Yes 2. No

8. If yes, how much quantity of milk you sold?

Quantity sold		**Price received**	
Ave. lt/day	Ave. lt/month	Ave.price/lt (birr)	Ave. money received/ month (birr)

9. If yes to 15, why did you sell milk to the cooperative? (Multiple choices possible)

1. To get better price 2. To get patronage refund 3. To fulfill membership requirement
4. Nearness of the collection center 5. Other/specify _____

10. How far do you live from the cooperative milk collection center? _____hours walking

11. What mode of transport do you normally use when you sell your milk to the cooperative?

1. Go by foot 2. Pack animals 3. Cart 4. Other/ specify_____

12. Which of the following of benefits you obtained from your cooperative in the past 12 months?

		1. Yes 2. No
1	Guaranteed market and payment for milk	
2	Increased milk price	
3	Patronage refund	
4	Veterinary service (such as drugs and vaccine)	
5	Feed	

13. Did you sell milk to other buyer/s in the past 12 months?

1. Yes 2. No

14. If yes, to which buyer/s you sold & how far do you live from the buyer/s? (Multiple choices possible)

	Buyers	**Ave. price/lt (**birr**)**	**Distance (walking hr)**
1	Consumers		
2	Traders		
3	Restaurant and Hotel owners		
4	Others/specify		

15. If yes to 21, why you sold to this/these buyer/s than the cooperative? (Multiple choices possible)

1. Close to production site 2. Offer better price 3. Can get immediate cash
4. The cooperative is bureaucratic 5. Other/specify_____

16. Did you get credit to support your dairy farm in the past 12 months?

1. Yes 2. No

17. If yes, where did you get the credit? (Multiple choices possible)

1. Oromia saving and credit share company 2. Saving & credit cooperatives
3. Relatives/ Close friends 4. Other/ specify _____

18. If No to 25, what was/were your reason/s? (Multiple choices possible)

1. I didn't need 2. High interest rate of loan 3. High value collateral demand 4. Other/ specify___

19. How often did you have contact with dairy extension worker in the past 12 months?

1. Never 2. 1 -3 times 3. 3-5 times 4. 6-10 times 5. More than 10 times

Part III. Social capital

1. How long have you been member of the cooperative? _____ year/s.

2. What is your position in the cooperative?

1. Ordinary member 2. Committee member 3. Board member
4. Chairperson 5. Secretary 6. Other /Specify____

3. Do you have any of the following in your cooperative?

		1. Yes 2. No	**Number**
1	Relative/s		
2	Close friend /s (person/s you feel at ease with, can talk to about private matters, or call on for help)		
3	Neighbor/s		
4	Friends (not relatives or close friends)		

4. Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people?

1. Most people can be trusted 2. Can't be too careful in dealing with people

5. To what extent do you trust each of the following?

		1. To a very small extent 2. To a small extent 3. Neutral 4. To a great extent 5. To a very great extent
1	Relatives in the cooperative	
2	Close friends in the cooperative	

3	Neighbors in the cooperative	
4	Friends (not relatives or close friends) in the cooperative	
5	Cooperative board members	
6	Cooperative chairperson	
7	Cooperative committee members	
8	Extension workers	
9	Other buyers of milk e.g. traders	

6. To what extent do you trust each of the following institutions?

		1. To a very small extent 2. To a small extent 3. Neutral 4. To a great extent 5. To a very great extent
1	Woreda cooperative promotion office	
2	Farmers training centers	
3	Woreda agriculture office	
4	Local governance institutions/kebele or Woreda administrative office	

7. Suppose you lost your (purse/wallet) that contains 200 birr and your address details, and it was found in the premises of the cooperative. How likely is it that it would be returned to you with nothing missing if it was found by:

		1. Very unlikely 2. Somewhat unlikely 3. Neutral 4. Somewhat likely 5. Very likely
1	Relatives in the cooperative	
2	Close friends in the cooperative	
3	Neighbors in the cooperative	
4	Friends (not relatives or close friends) in the cooperative	
5	Board members	
6	Chairperson	
7	Committee members	

8. Do you think the members are willing to contribute money to the cooperative had they not receive any personal benefit from the cooperative?

1. Yes 2. No

9. What is your level of agreement with the following statements:

		1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree
1	I feel a responsibility to make a contribution to the cooperative to improve its performance.	
2	Members look out mainly for the welfare of their own and they are not much concerned with other members' welfare?	
3	If I help a member in the cooperative, that person will help me in the future	
4	When a member makes me a favour, I feel committed to repay him/her	
5	If I share important information with a member, that person will do the same for me	

10. Generally speaking, how much do you feel that you can influence things that are happening in the cooperative?

1. Not at all 2. Very little 3. A moderate amount 4. A great deal

11. Which of the following do you think the problem/s of your cooperative?

		1. Yes 2. No
1	There is no immediate payment when you sell milk	
2	There is corruption prevalent in the cooperative	
3	Members weak loyalty and commitment to the cooperative	
4	Lack of information/incorrect information about the cooperative	

12. Which of the following actions you have taken to solve the problem/s?

		1. Yes 2. No
1	Contacted the leaders	
2	Talked with other members	
3	Attended a protest meeting	
4	Contacted local governance institutions kebele and/or Woreda office	
5	No, I haven't taken any action	

13. What is your level of agreement with the following statements:

		1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree
1	If there is an urgent problem in the cooperative, the members would get together and solve it.	
2	The views of members are taken into account before important decisions are made.	
3	The members are active and involve in cooperative issues and activities.	
4	Members can influence decisions in the cooperative that affect them	
5	Members have a common understanding on the importance of the cooperative	
6	It is better for the community if the cooperative has more female members and leaders	

14. Which of the following statements do you think can be justified, never justified or something in between.

		1. Very unjustified 2. Somewhat unjustified 3. Neutral 4. Somewhat justified 5. Very justified
1	Cheating on membership fee if there is a chance	
2	Giving bribe to an employee in the cooperative to get a benefit that one is not entitled	
3	Selling milk to other buyers if they offer you better price than the cooperative	
4	When a member violates the rules of the cooperative, he/she must be penalized	

15. To which of the following groups or organizations, networks, associations you belong to. If yes, please specify your position and the frequency of participation in the past year.

	Type of Organization/ Association/ Group	**1. Yes 2. No**	**Organization/association/ group position**	**Frequency of participation**

			1. Ordinary member 2. Committee member 3. Leader 4. Other/specify	1. Not in the past year 2. Once or twice a year 3. Once a year 4. A few times a month 5. At least once a week
1	Other cooperative/s			
2	Religious group (Mahaber, Senbete, Mosque group etc.)			
3	Burial society (Idir)			
4	Savings and credit association (iqub)			
5	Debo/Webera /Jigie/ Wonfel (Labor sharing)			
6	Political group			
7	Other/specify			

16. How often you attend meetings in the cooperative?

1. Never 2. Rarely 3. Sometimes 4. Often

17. In general, which of the following factors prevents you from participating in meetings?

		1. Yes 2. No
1	Not interested	
2	Lack of time due to household responsibilities	
3	Lack of information of the convening of meeting	
4	Lack of sense of efficacy (usefulness) of the meeting	
5	Other (specify)	

18. Did you attend the last general meeting in the cooperative?

1. Yes 2. No

19. Did you participate in the current cooperative leaders' elections by voting?

1. Yes 2. No

20. When there is a decision to be made in the cooperative, how does this usually come about?

1. The leader decides & informs the members
2. The leader asks the members what they think and then decides
3. The members hold a discussion and decide together
4. Decision is imposed from outside
5. Other (specify)_____

21. In the past 12 months, which of the following voluntary work you did to the cooperative?

		1. Yes 2. No
1	Lead the group/member of a committee	
2	Organized or helped to run an activity or event	
3	Secretarial or administrative work	
4	Other (specify)	

22. If you did the above voluntary work, how often it was?

1. At least once a year 2. A few times a year 3. At least once a month 4. At least once a week

23. What is your level of agreement with the following statements:

		1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree
1	Members need to be loyal to the cooperative by selling milk through it	

2	Selling milk to other buyers is a violation of the bye-law of the cooperative	
3	There is free-rider problem - some members getting benefit without putting anything back into the cooperative (without bearing the cost)	
4	Members make enquiries and access information about the cooperative operation	
5	Cooperative membership has a positive impact on milk production and productivity	

24. In the past 12 month, on average how often have you met with each of the following?

		1. Never 2. About every other month 3. Once a month 4. About several times each month 5. About several times each week
1	Relatives in the cooperative	
2	Close friends in the cooperative	
3	Neighbors in the cooperative	
4	Friends (not relatives or close friends) in the cooperative	
5	Chairperson of the cooperative	
6	Cooperative board members	
7	Cooperative committee members	
8	Development agents (extension workers)	

25. In the past 12 months, on average how often have you talked to the following about the cooperative issues?

		1. Never 2. About every other month 3. Once a month 4. About several times each month 5. About several times each week
1	Relatives in the cooperative	
2	Close friends in the cooperative	
3	Neighbors in the cooperative	
4	Friends (not relatives or close friends) in the cooperative	
5	Chairperson of the cooperative	
6	Cooperative board members	
7	Cooperative committee members	
8	Development agents (extension workers)	

26.In the past 12 months, how satisfied are you with the relationship you have with following?

		1. Very dissatisfied 2. Dissatisfied 3. Neutral 4. Satisfied 5. Very satisfied
1	Relatives in the cooperative	
2	Close friends in the cooperative	
3	Neighbors in the cooperative	
4	Friends (not relatives or close friends) in the cooperative	
5	Chairperson of the cooperative	
6	Cooperative board members	

7	Cooperative committee members	
8	Development agents (extension workers)	

27. In the past 12 months, on average how often you are informed about your cooperative affairs?
1. Not in the past 12 months
2. A few times a year
3. Once a month
4. A few times a month
5. At least once a week

28.If you suddenly needed a small amount of money for your household expenses (100 birr), how many member/s of the cooperative could you turn to who would be willing to provide this money?_____

29. If any, who would be willing to provide this money to you? (Multiple choices possible)
1. Relatives 2. Close friends 3. Neighbors
4. Friends (not relatives or close friends) 5. Other/specify _____

30. What is your level of agreement with the following statements:

		1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree
1	The leaders are nominated and elected at general assembly of the cooperative	
2	The leaders manage the cooperative activities with loyalty, dedication and sincerity	
3	The leaders present annual performance report of the cooperative to the general assembly	

31.. Did you get training and/or education on cooperative in the past 12 months?
1. Yes 2. No

32. If yes, from where you got the training and/or education? (Multiple choices possible)
1. Cooperative 2. Extension worker 3. NGO 4. Radio/Television 5. Others/specify _____

Appendix J. Focus Group Discussion Guide

Social Capital and Smallholder Farmers' Collective Action: the Case of Primary Dairy Cooperatives in West Shoa Zone of Oromia, Ethiopia

Cooperative name _____
Date of discussion _____

1. What was/were the main factor/s for establishing this cooperative? Who was most responsible for its establishment (e.g., farmers' decision, government decision, etc)?

2. What benefits do members get as a result of belonging to the cooperative? Do you think it is important to cooperate with others for mutual benefit?

3. What are the major problems facing the cooperative? To what extent do members collaborate with one another to solve these problems?

4. Do you think the cooperative properly convene regular meetings (e.g. annual general meeting)? How often meetings are called in the past 12 months? Whenever members are required to take action at a meeting, what method of giving notice is usually used?

5. Do you think the cooperative practice its democratic values (e.g. board of directors are nominated and voted at a meeting, members have equal voting rights etc.)?

6. What is the relationship (a) between leaders and members (b) among members? Do leaders accountable and transparent?

7. How would you characterize the leadership of the cooperative in terms of heterogeneity (age, gender etc)? What factors contribute to leadership (e.g., capacity, loyalty, dedication etc)?

8. How would you characterize a) members' milk market participation in the cooperative (b) members' attendance at meetings?

9. How important is it for you to vote in the meetings e.g. leaders election at annual general meeting?
10. How are decisions made in the cooperative? How would you characterize members' participation in decision-making?

11. Do rules and regulations (e.g. rights and duties of a member, roles and functions of the general assembly etc) of the cooperative are carried out?

12. What are the social sanctions for violating expected norms (e.g. selfish behavior) in the cooperative?

13. Are there conflicts in the cooperative e.g. conflict between members and leaders, among members? What are the causes of the conflict? What are the conflict resolution mechanisms?

14. How would you characterize the cooperative capacity in terms of
(a) Guaranteeing market for members' milk, provision of remunerative price, surplus distribution according to patronage?
(b) Provision of inputs such as feed, veterinary services/drugs
(c) Provision of credit

15. Do leaders keep members informed about the cooperative operations? What are the channels of information for members? Do members exchange information about the cooperative? Do members make enquiries about their cooperative activities?

Appendix K. Cooperative Chairperson Interview Guide

Social Capital and Smallholder Farmers' Collective Action: the Case of Primary Dairy Cooperatives in West Shoa Zone of Oromia, Ethiopia

Cooperative name _____
Name of the chairperson _____
Date of discussion _____
Age _____
Education _____
1. Why was the cooperative started? Give reasons for starting the cooperative?

2. What kind of services do you offer to members (e.g. marketing of milk, dairy input supply, credit, veterinary service, education/training, etc.)?

3. Do you think most members understand the goals of their cooperative i.e. increasing their position through increased market and information?

4. How do you characterize members' milk market participation in the cooperative? How/when do you pay members for their milk? Does surplus distributed among members according to their patronage?

5. How/when does the cooperative fix price for milk? Does the price compete with other buyers in the area?

6. How does the decision making within the cooperative look like? How do you characterize members' involvement in the decision-making process?

7. What is the election process of leadership? What kind of systems does the cooperative use to hold leaders responsible? What is the participation of women in the committees and/or in the board?

8. How often does the cooperative have meetings with the members? How would you characterize the members' attendance in the meetings?

9. Do members access to timely and worthwhile information (e.g. date of special meeting) in the cooperative? What is/are the channel/s of information?

10. Do you think members trust each other? What is the degree of mutual support among members? How do you characterize members' commitment to remain a part (member) of the cooperative?

11. Does the cooperative have any other laws/rules additional to the by-laws specified by the proclamations? How do you characterize the members' knowledge of the rules and regulation of the cooperative?

12. Does the cooperative face problems? What kind of problems? Does the cooperative have any solutions to these problems?

13. Do you receive or seek any form of government support (e.g. technical advice)?