TRANSACTION COST FACTORS INFLUENCING CHOICE OF MARKET OUTLETS AMONG SMALLHOLDER PEACH FARMERS IN LESOTHO

LINTLE PATRICIA RAFONEKE

A Thesis Submitted to the Graduate School in Partial Fulfilment of the Requirements for the Master of Science Degree in Agricultural and Applied Economics of Egerton University

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DECLARATION AND RECOMMENDATION

Declaration

I declare that this thesis is entirely my work and to my best knowledge has never been presented for this degree in this university and any other institution of higher learning for any award.

Signature……. Date…….

Lintle P. Rafoneke

KM17/11832/16

Recommendation

This thesis has been submitted with our approval as the university supervisors.

Signature……. Date……

Prof. Patience Mshenga, PhD

Department of Agricultural Economics and Agi-Business Management, Egerton University.

Signature……. Date……

Prof. George Owuor, PhD

Department of Agricultural Economics and Agi-Business Management, Egerton University.

Signature……. Date……

Dr Montoeli Rantlo, PhD

Department of Agricultural Economics and Extension, National University of Lesotho.

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DEDICATION

This work is dedicated to my late father and, my father, Lekeme Peter Rafoneke, grandparents; Putsoa Augustinus Rafoneke, Mathope Celestina Rafoneke, Tseko Paul Tlaba and ‘Maneneu Cresensia Tlaba.

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ABSTRACT

Most peach farmers in Lesotho fail to reap the benefits that are in line with peach commercialization due to high transaction costs. These costs vary along different marketing outlets. This study was geared towards bridging the knowledge gap on the influence of transaction costs along the different marketing outlets of peaches. The study sought to contribute towards improved incomes of smallholder peach farmers in Lesotho through proper selection of marketing outlets. Specifically, the study intended to characterize the transaction costs incurred by smallholder peach farmers, determine how transaction costs factors influence the choice of marketing outlets as well as to assess the marketing margins of different peach marketing outlets in Lesotho. A multistage sampling technique was used to select 90 respondents in the study. Cross-sectional data were then collected from peach farmers in Leribe district of Lesotho using the semi-structured interview schedule. Data were processed using Ms. Excel, Statistical Package for Social Sciences (SPSS), and STATA packages. Data were analyzed using descriptive and inferential statistics, multivariate probit as well as the price spread analysis. The households which sold at the farm gate and export market had about 4 acres of land while those who sold at the local market had roughly 3 acres. Farmers who sold at export market outlets had attained tertiary education. Extension services were limited for all farmers in the study. Market fees, contractual arrangement fees, storage and transportation costs, communication costs, sorting and grading costs as well as negotiating hours were transaction costs incurred by peach farmers in Lesotho. The study revealed that communication costs positively influenced the choice of the farm gate outlet. Sorting, grading, and communication costs negatively impacted the local market choice while household size influenced farmers' export market outlet choice negatively. Gross Marketing Margin increased with the level of marketing outlet: from 0.03 $/kg of farm gate, and 0.05 $/kg of the local market then 0.80 $/kg of the export market outlet. In terms of transaction costs incurred, farmers sold at farm gate incurred more on communication costs relative to farmers who sold in other outlets. Evidence from the results, suggests the need for improvement of roads and communication infrastructure. Access to market information regarding both distance and the time taken to reach each of the outlets should also be improved. There is need to implement collective instruments such as collective marketing as a key to increase margins.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS AND ACRONYMS

AERC	**African Economic Research Consortium**
ANOVA	Analysis Of Variance
Exp	Export marketing outlet
FG	Farm gate Marketing outlet
GM	Gross Margin
LM	Local Marketing outlet
LSL	Lesotho Loti
MMA	Marketing Margin Analysis
Mm	Middlemen marketing outlet
NCP	Neoclassical Profit Maximization
NGDP	National Gross Domestic Product
NIE	New Institutional Economics
NMM	Net Marketing Margin
PGMM	Producer Gross Marketing margin
SCP	Structure Conduct Performance
TCE	Transaction Cost Economics
TGMM	Total Gross Marketing Margin
UNCTAD	United Nations Conference on Trade and Development
WFP	World Food Programme
WTO	World Trade Organization

CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

Majority of the people living in rural areas in Sub-Saharan Africa depend on agriculture and other natural resources for their livelihood and Lesotho is no exception. The country is landlocked entirely surrounded by South-Africa, with four agro-ecological regions. These regions comprise of the lowlands, the highlands, the Senqu River Valley, and the foothills. It has a population of about 2 million of which approximately 85% live in rural areas and depend on agriculture (Sekoai & Rantlo, 2016). Between 2002/2003 and 2017/2018, Lesotho's overall national poverty and extreme poverty headcount ratios declined from 56.6 percent to 49.7 percent and from 34.1 to 24.1 percent hence, the share of the population living below the national poverty line is estimated at 57.1% with rural areas affected more compared to urban areas (Toeba, 2018; Mashinini, 2019).

The agricultural sector in Lesotho contributes 7.4% to the National Gross Domestic Product (NGDP) (World Food Programme (WFP), 2017). The country's agricultural production is predominantly rain-fed and subsistence-based. As such, the productivity of the sector is limited, especially in arid and semi-arid regions which makes agricultural production more susceptible to weather-related hazards particularly drought and floods (Famine Early System Network (FEWS NET), 2013). In these areas, households supplement the production of traditional crops with fruit trees such as peaches (Matsoai *et al.*, 2010).

Peach production started in China as early as 2000 B.C, and there are now thousands of cultivars in China. According to Janick (2005), the peach was grown in Greece by 332 BCE, it was introduced by the Spanish to America soon after the conquests of Cortez and became naturalized in Mexico and the south-eastern United States and several selections were subsequently made. In the contemporary world, peaches are produced commercially in most parts of the world, (Adshead, 2016). The world peach produce was estimated at around 24.67 million metric tons in 2017/18 year of agricultural production. Although there is no literature behind continental peach production in Africa, South-Africa as one of the African countries appears amongst the top ten leading peach producers in the world with 170 000 metric tons (Perez *et al.*, 2017). Peach production in Lesotho is approximately 23, 000 metric tonnes as per sales in the year 2017/18 (WFP, 2018).

World peach production volume was projected to be approximately 19.9 million metric tonnes in 2018, from 21 million metric tonnes recorded in 2014. The decline was as a result of adverse weather conditions impact on output in top producers namely: China and the European Union (Ntombela *et al.*, 2014; Foreign Agricultural Service, 2018). From 2013 to date, China still stands to be the leading producer of peaches worldwide accounting for about 56% of the world peach production, followed by European Union, United States, Turkey, South Africa, Chile, Japan, Australia and Russia (Foreign Agricultural Service, 2018).

In Lesotho, the production of peaches has been practiced since the arrival of the first missionaries, around 1833. Currently, every home grows several trees in their gardens and in the farms mainly for consumption (Showers, 2010). The high productivity of peaches in Lesotho is a result of suitable climate and soil conditions (Showers, 2010; Sekoai & Rantlo, 2016). Due to the country's elevation, good soils, and abundance of water, the quality of the produce is good, and the fruits ripen earlier than in other countries in the southern hemisphere, offering an opportunity to supply the regional market early in the season.

The national demand for peaches in Lesotho is served by almost 75% of the local peach production sold as both fresh produce and processed in the informal and formal markets (FAO, 2013; Lesotho Bureau of Statistics, 2014; Rafoneke & Rantlo, 2016). As such, peaches are considered the most important deciduous fruits for income generation among smallholder farmers. Peach production and marketing also creates employment as well as development of linkages with the associated agro-based industries.

The Geneva-based International Trade Centre (ITC) which is the joint technical cooperation agency of the United Nations Conference on Trade and Development (UNCTAD) and the World Trade Organization (WTO), has accelerated the growth of a brand-new horticultural market centre in Maseru, seeking to increase peach marketing efficiency in Lesotho with youth involved and prioritized in agro-processing industry. The centre has facilitated a brand-new market outlet in Maseru to allow smallholder farmers producing vegetables and fruits (peaches) to better preserve their products. This venture facilitates some of marketing functions such as physical and facilitating functions like processing and market intelligence respectively thus reducing transaction costs (Kenny, 2016).

Nevertheless, the majority of smallholder peach farmers in the country are located in remote areas with poor infrastructure and they often fail to participate in markets due to the high transaction costs involved due to lack of guaranteed market with any agribusiness outlet (Sekoai & Rantlo, 2016; Rafoneke & Rantlo, 2016).

1.2 Statement of the Problem

Peach production is a major agro-economic activity in Lesotho. However, most small-scale peach farmers market their peaches in informal markets as fresh produce with minimal value addition. This leads to high economic losses and low prices despite the fact that the farmers have an option of marketing their peach produce in other markets for better incomes. If smallholder peach farmers are to get better incomes, then it is important for them to make a good choice of the market outlet to use in marketing of peaches. This is because farmers incur different transaction costs in different market outlets. High transaction costs restrict the potential gains from current opportunities that are in line with commercialization of peaches. The issue of how farmers come to the decision on choice of market outlet in light of transaction costs as well as margins received from selling of peaches in the different outlets has received little attention in Lesotho. Therefore, this study seeks to characterize transaction costs incurred by smallholder peach farmers, and how these transaction costs affect the farmer's decision with regard to peach marketing outlet choices in Lesotho.

1.3 Objectives

The study was guided by the following objectives:

1.3.1 General Objective

To contribute towards improved smallholder peach farmers' income through proper selection of marketing outlets.

1.3.2 Specific Objectives

(i) To determine transaction costs incurred by smallholder peach farmers in Lesotho

(ii) To determine the influence of transaction costs on choice of marketing outlets of peaches in Lesotho

(iii) To assess the marketing margins in the different peach marketing outlets in Lesotho.

1.4 Research questions

(i) Which transaction costs are incurred by smallholder peach farmers along different marketing outlets?

(ii) What is the influence of transaction costs on the farmer's decision on marketing outlet?

(iii) What are the marketing margins in the different marketing outlets of peaches in Lesotho?

1.5 Justification of the Study

Through the recently launched joint technical cooperation agency of the United Nations Conference on Trade and Development (UNCTAD) and the World Trade Organization (WTO), the trade liberalization in Lesotho has opened doors for smallholder peach farmers to access the formal markets for their produce hence the opportunities prevailing for smallholder peach farmers to be able to efficiently and effectively market their produce need to be confined by assessing the peach marketing margins along the different market outlets to handle transaction cost and asymmetric information problem via identifying transaction costs incurred by smallholder peach farmers.

Over the past decade, Lesotho has developed new exports such as dried fruit/rosehip as well as plants used for pharmaceutical purposes to demanding markets in several product categories; though up to date, these exports have been small and all of them are related to agribusiness particularly peach sector exporting mostly dried fruits which implies that peaches have a potential to compete in niche agribusiness markets in a highly demanding markets both domestically and internationally (WFP, 2017). Henceforth, assessing the transaction costs along different marketing outlets of peaches will help in identifying the areas and activities that need to be scaled up to, so as to reduce cost associated with search of such markets, hence a noticeable impact on the economy in the long-run.

Analysing transaction costs factors influencing the choice of market outlet will contribute towards the realization of the country's long term vision 2020 pillar of seven pillars which would ascertain that the country experience a full state of food security and ultimately, commercialized agriculture. Effective and efficient marketing outlets are needed for peach farmers to upgrade their livelihoods.

Through identification of marketing outlets and determination of marketing margins in each outlet, the policy makers can get information that can help them to formulate marketing policies which are at the interests of smallholder peach farmers and the entire peach sector. Therefore, this study might generate important information useful to formulate peach marketing development programs and guidelines for interventions that would improve efficiency of the peach marketing system.

1.6 Scope and Limitations of the Study

This study focused on the smallholder peach farmers having sixty to hundred fifty peach trees in their farm land to cater for heterogeneity. Though the study outcomes aimed at impacting on peach farmers involved in value chain of peaches in Lesotho the study was only restricted to two agro-ecological zones of Lesotho (lowlands and foothills) with one district targeted, namely Leribe; due to its topography, soil and water resources which facilitate high productivity of peaches. The study used cross sectional data and envisions constraint due to failure of the respondents in provision of precise information regarding their enterprises.

1.7 Operational Definition Terms

Basotho: People living customarily in Lesotho

Institutional factors: are formal and informal rules that govern transaction activities between individual or among groups of individuals, they explain costs of acting in different ways in economic contexts (Toroyan & Anayiotos, 2009).

Maloti: is Lesotho currency in plural form; loti is a singular.

Market factors: according to Dragnić (2014), market factors are any external and internal factors that affect the demand for or the price of a good or service.

Market Outlets: are sets of interdependence organizations involved in the process of marketing a product or service available for use or consumption (Kotler, 2007).

Market Outlets choice: a critical farm household-specific decision to sell their produce in different market outlets with an aim of profit maximization.

Market Participation: entails decision marking towards selling of peaches in any market outlet.

Marketing efficiency: Is a condition upon which both sellers and buyers of peaches have enough information to allow the effective exchange with minimal transaction costs (Gu & Hitt, 2001).

Marketing margins: is the difference between the producer price and the consumer price along the distribution channel

Operational efficiency: is measured in terms of marketing costs and marketing margins.

Price spread: the costs of performing marketing functions required to get a fresh peach from the producer to the consumer, it is a measure of the gross returns to packers, processors, transportation firms and retailers within peach value chain (Carambas, 2005).

Smallholder farmers – are peach farmers with threshold size of 2 acres but less than 10 acres and with peach trees ranging between sixty and a hundred and fifty.

Transaction Costs: are observable and unobservable cost associated with enforcing and transferring the property rights from one person to another (Ngigi, 2002).

Transaction cost factors: are "institutions"; which determine cost of transacting. That is, they facilitate how low or high will cost of exchange be.

CHAPTER TWO

LITERATURE REVIEW

2.1 Importance of Peach Enterprise in Lesotho

According to World Food Programme (WFP) (2017), commercial vegetable and fruit cultivation (peaches inclusive), can generate about 1.3% jobs per hectare which imply that potentially possible that more than half a million jobs could be created in Lesotho if fruits and vegetables were commercially grown on the entire area suitable for horticultural crops. Commercial peach production is a new agricultural subsector in Lesotho, for this reason, its contribution to the National Gross Domestic Product (NGDP) is not documented (Showers, 2010: WFP, 2017).

In Lesotho, the production of peaches dates to early 1800 upon the arrival of the missionaries. The peach sector has contributed approximately 43.77% ($71,429) to the total gross value of all deciduous fruits ($285,714) in Lesotho (WFP, 2017). According to Sekoai & Rantlo (2016); most of the smallholder peach farmers generate income through sales of dried peaches in both domestic and foreign (South African) markets. The other farmers, as well as farmers' associations, were earlier reported to sell both processed and raw peaches in informal and formal markets. This shows that Lesotho is one of those developing countries that still perform marketing functions traditionally. Moreover, marketing plays a significant role in transforming smallholder farmers into commercial producers as the availability of markets serves as an incentive for farmers to increase their production.

Some individual farmers and groups produce peach seedlings for sale to improve their livelihoods through income accumulation with their biggest potential customers as the government through the Ministry of Forestry and Land Reclamation (Gender Links for Equality and Justice, 2015). Furthermore, the mass generated from pruning of trees is used as firewood to cook, in cases where the farmer or association does not use the bio-mass in their home they sell to those who use it. Henceforth, peach production in Lesotho aid in mitigating the climate change. Since most of production activities are done in rural areas both production and marketing of peaches create job for communities surrounding smallholder orchards.

2.1.1 Categories of Transaction Costs

According to Kent (2006), there are three categories of transaction costs; search and information costs, bargaining and negotiation costs and monitoring and enforcement costs. These costs are more than monetary price of exchange in the markets. When consumers search for market and price of commodities, they incur costs. In order to satisfy consumers' needs and wants or the information they search for, smallholder peach farmers may also incur are search and information costs (Miao, 2017). Smallholder farmers incur bargaining and negotiating costs in market outlets; these costs usually trade-off in terms of time of deliveries, value of products and quantity as well as price; the transaction costs involved are (Kent, 2006). The costs incurred during search and negotiations need to be monitored and enforced; which involved cost of coordination transactions and taking agreement (Dyer, 1997; Bech & Pedersen, 2005).

2.2 Impact of Transaction Costs on Smallholder Peach Farmers

Transaction costs include amongst other factors information and search costs that are associated with finding price, quality, quantity and durability of product, negotiation and contracting legal fees, communication fees, as well as monitoring and enforcement costs (John & Reve, 2010). Obsebeyo & Aye (2014), classified transaction cost into observable transaction costs like (transportation, handling, packaging, storage, spoilage) which are visible during exchange and unobservable are invisible during exchange such include (search, screening and bargaining, monitoring and enforcement and so fourth) transaction costs.

Moreover, Jagwe (2011), noted that, whether observable or not, these factors are associated with the exchange of goods or services and are often the embodiment of access barriers to market participation of smallholder farmers amongst African farming communities. Unobservable transaction costs such as bargaining costs which include amongst others activities such as; co-ordination failures, private information concerning preferences as well as management costs are considered to be contributing the most towards transaction cost augmentation, this is due to the failure between the negotiating parties which in turn replicate the effort and resource wasting following further bargaining (Ngigi, 2002).

In spite of heterogeneity, most agrarian economies in Africa still experience complications with regard to market access. This is due to a number of constraints and barriers prevailing in the market place, transaction costs inclusive (Jagwe, 2011). According to Okoye *et al.* (2016),

in many developing agrarian countries the efficient and effective functioning of food markets is hindered by high costs of market exchange with a relative magnitude of these costs relating to farmers' access to infrastructure facilities, particularly roads which when they are in bad condition limits timely access to inputs and delivery of products thereby increasing exchange costs.

Following the nature of African farming communities, most farming activities take place in remote rural areas featured by the poor infrastructure, which makes formal markets to be inaccessible (Key, 2000). As a result, farmers are left with no choice but to sell their produce at farm-gate as a way of minimizing the costs of transporting the produce to the markets. According to Jagwe (2011), in most developing agrarian countries smallholder farmers' marketing decisions are confined to transaction costs.

According to Bach *et al.* (2016), the transaction costs increase with the level of vertical integration. Whinston (2003), stipulated that an adequate reduction in the efficiency of the trading relationship can motivate one of the contracting parties to make the transaction clearer; which will in turn mitigate hazards, thus leading to coordinated to investment and trading decisions "(although possibly with increased bureaucratic costs)".

Another study by Ogilo (2017), sought to determine the influence of transaction costs on the market performance. A multiple regression model was used to analyse the independent variables and their effect on market performance, Analysis Of Variance (ANOVA) test at five percent level of significance was also employed to determine the relationship between variables. The results showed that, transaction costs amongst other variables had an influence on market performance.

2.3 Factors influencing Marketing Outlet Choice amongst Small-Scale Farmers

Makhura (2001), conducted a study on the transaction costs barriers to market participation of smallholder farmers. The selectivity models which involved two-step elimination which is similar to Heckman's two-stage procedure was used for analysis. The results of the study showed that access to market information in combination with certain farmers' characteristics are critical determinants of market outlet choice decision of farmers. Not only that, but ownership of large arable land was also found to be contributing towards economies of production which in turn reduced the transaction costs per unit of output sold by farmers.

A study conducted on the determinants of smallholder vegetable producers' decision on market outlets in Lake Tana basin in Ethiopia Adugna *et al.* (2019), gave a rationale on the transportation costs and other transaction costs involved upon the choice of the market outlets process in terms of efficiencies. The study used a multivariate probit model to explain factors influencing the market outlet choice decision of farmers. The results reflected that the buyers' visit and age of the household head simultaneously determined the choice of all market outlets. For example, most farmers visited by buyers at farms or villages were more likely to choose a farm gate market outlet over any other outlets.

Jagwe *et al.* (2010), analysed the way transaction costs affect smallholder farming households' participation in banana markets and extent to which they participate in market outlets in the Great Lake region of central Africa using the Heckman procedure. The results indicated that fixed costs greatly drive farmers' decision with regard to market participation while the extent at which farmers participate in markets was found to have been influenced by proportional transaction costs, access to market information, size of the household, ownership means of transport and geographical location of farmers. However, the study only focused on how market exchange variables affect farmers' choice to sell. Hence, this study seeks to analyse how these variables detect farmers' decision not only on selling but where to sell their products.

Obeseyo and Aye (2014), used logit model to analyse the impact of transaction costs, other socio-economic and institutional factors on farmers' marketing decisions in Nigeria. The findings indicated that transaction costs such as market information and distance to the market influenced farmers' decision on market outlets significantly. Moreover, access to market information and education were found to be influencing these farmers' choice positively while transaction costs, distance to the market and dependency ratio were found to be decreasing the likelihoods of farmers deciding to sell in the markets.

Okoye *et al.* (2016), analysed the effects of transaction costs on market participation amongst smallholder cassava farmers in Central Madagascar. The Heckman Selectivity model was used to determine the determine the quantity sold at both off and on-farm while linear probit model was used to assess the factors influencing farmers' choice towards marketing outlets. The results of the study reflected that, a farmer who had better road conditions and was a member of a certain association had higher chances of selling at market outlets.

The smallholder producers have access to alternative market outlets. Therefore, the expectation is that they would choose the outlets that will bring in better income by deciding on the appropriate combination of market outlets that are efficient and effective towards fulfilment of their objective, which is, profit maximization (Amos, 2018; Pranda & Sreekumar, 2012).

2.4 Market Performance and Marketing Margin Analysis

According to Hussain *et al.* (2013), marketing margin is a commonly used measure of the performance of the value chain which is useful statistic reflecting how the consumers' expenditure is divided among market participants at different levels of the value chain. It is calculated as the difference between what individual consumer pays and the price that is obtained from producers, or as the cost of a collection of middlemen services in the value chain, which is the outcome of the demand for and supply of product. It is also calculated as the percentage share received by each marketing intermediary involved in supply chain (Ayel *et al.,* 2017).

Over and above that, the marketing margin is a commonly used measure of the performance of a marketing system. It can be a useful descriptive statistic if used appropriately to show how the consumers' expenditure is distributed among market participants at different levels of the marketing outlets (Tadesse, 2011). As a method of analysis, the Structure Conduct Performance (SCP) paradigm postulates, there is a causal relationship between the three levels as such, the performance of a certain market or industry depends on the conduct of its sellers and buyers which, in turn, is strongly influenced by the structure of the relevant markets (Ngigi, 2002).

Market performance can be evaluated by analysing the costs and margins of marketing agents in different marketing outlets. A commonly used measure of system performance is the marketing margin or price spread. The marketing margin can be a useful descriptive statistic to show how the consumer's food price is divided among participants at different levels of marketing outlets (Sickles *et al.*, 2002).

A study by Magogo *et al.,* (2015), employed a multinomial logistic regression model to find the determinants of choice of marketing outlets for African Indigenous Vegetables among agro-pastoralists. The results revealed that an increase in costs of marketing and off-firm

income increased the likelihood of a farmer selling at farm gate while additional year in education and farming experience decreased the chances of choosing farm gate as outlet. The choice of local market outlet was influenced positively by gender, increase in level of education, experience and household size. The results showed that marketing costs and off-firm income had a negative influence towards the choice of local market outlet. The choice of brokers was determined by household size, distance to the market as well as marketing costs. The study did not consider the transaction cost factors as determinants of market outlet choice.

On the other hand, Panda and Sreekumar, (2012) conducted a study on the marketing channel choice and marketing efficiency assessment in agribusiness. The multinomial logistic regression model was used. This model was chosen because it allows analysis of data where participants are faced with more than two choices. The results indicated that the spoilage in the marketing of vegetables and fruits affected the marketing margins as well as marketing efficiency. The marketing efficiency was found to be higher when estimated without accounting for marketing loss. Gross Margin analysis was used to determine the returns realized by the farmers, traders and processors as it provides insights into marketing characteristics to assess the contribution of Jatropha marketing to the income of the respondents. The results showed the gross margins of the farmers as the lowest in relation to other actors in the trade chain.

Sexton *et al.* (2005), argued that even though variations in the margin over time might be attributable to marginal marketing costs (which includes transaction costs) under perfect competition, additional factors such as seasonality, technological changes, and sales volume may also explain the variations in the margin. In analysing factors explaining variations in the margin, some authors used the observed margin as a dependent variable while others used the expected margin as a dependent variable. However, the observed margin does not take expectations with respect to both the mean and variance of the output price. The explanatory variables used to explain the variations in the margin may include marketing costs, total volume traded, time trend, seasonality, lagged margin and so forth (Haji, 2008).

Under competitive market conditions, the size of marketing margins would be the outcome of the supply and demand for marketing services, and they would be equal to the minimum costs of service provision plus “normal” profit. Therefore, analysing market margins is an

important means of assessing the efficiency of price formation in and transmission through the marketing system. There are three methods generally used in estimating marketing margins. First, a detailed analysis of the accounts of trading firms at each stage of the marketing channel; second, a computation of share of the consumer's price obtained by producers and traders at each stage of the marketing chain; and last a concurrent method which is a comparison of prices at different levels of marketing over the same period of time (Zegerba, 2010). Literature points out three important marketing margins that can actually be used to measure the marketing efficiency in respective market outlets, namely: Total Gross Marketing Margin (TGMM), Producer Gross Marketing Margin (PGMM) and the Net Marketing Margin (NMM).

$$TGMM = \frac{C_p - F_p}{C_p} \quad \text{.....} \quad (1)$$

$$PGMM = \frac{C_p - MGM}{C_p} \times 100 = 1 - TGMM \quad \text{.....} \quad (2)$$

$$NMM = \frac{GM - MC}{C_p} \quad \text{.....} \quad (3)$$

Where C_P and F_p are consumers' and farmers' price; *MGM, GM* and *MC* are marketing gross margins, gross margin and marketing cost respectively. Producer's share (P_r) is therefore calculated as price ratio of producer price (P_x)and retail price (P_r) which is equal to 1 minus marketing margin (*MM*) divided by retail price (P_r).

$$P_s = \frac{P_X}{P_r} = 1 - \frac{MM}{P_r} \quad \text{.....} \quad (4)$$

2.5 Theoretical Framework

This study will be grounded on Transaction Cost Economics and Profit Maximization theory.

2.5.1 Transaction Cost Economics

Literature points out that the theory of transaction cost is concerned with transactions thus looking into the extent to which the products involved in exchange are transaction specific, how changes from outside exchange environment and within transaction environment can affect the transaction and how often do transactions recur which in turn has a likelihood of influencing the way contracts are formulated and enforced as well as economic activities between market participants (Grover and Malhotra, 2003). According to Rogath (2010), the early development of TCE by Oliver Williamson around 1975 was basically established on

the basis of small number of actors contracting under conditions of imperfect and asymmetrically distributed information between transacting parties.

The theory revolves around two main assumptions with regard to human behavior: those include bounded rationality and opportunism (Rogath, 2010). According to Alene *at el.*, (2007), these assumptions are the embodiment of barriers to market participation especially to resource-poor smallholder farmers who are often located in remote areas which are normally far away from markets and major consumers of farm products. In this study, bounded rationality will be used to study the behavior of peach farmers when they make post-production and marketing decisions as farmers are assumed to be having same level of information or knowledge of the future as well as the market outlets which they choose from with a sole objective of maximizing their utility which is reflected by benefits (profit) at a given budget constraint.

2.5.2 Bounded Rationality

The concept states that human beings: smallholder peach farmers in this case, have constraints on their cognitive capabilities and restrictions on their rationality. As such they frequently act rational given the problem at hand with their intentions limited to their ability to process information and communication (Rogath, 2010). In agricultural marketing the rationality of farmers is limited to some extent. Therefore, when parties transact there is always bounded rationality on terms of exchange especially in presence of contracts. This kind of condition makes it hard for marketing participants to specify the conditions surrounding the transaction thus prompting economic problem, which brings forth the problem of opportunism due to the presence of incomplete information in lined with the contractual arrangement!

2.5.3 Opportunism

Opportunism is considered as the interplay of dispositional opportunism tempered by a psychological state that depends on the interaction of two transacting parties and factors surrounding their environment such as personal beliefs, attitudes and post experience in variety of context all of which can abruptly or slowly change over time in response to changes in environment and within individual as they begin to understand the other party better (Moore & Bruine, 2004). Since opportunism is dynamic in nature, it shall be used in this study to identify the transaction costs in different market outlets of peaches as farmers

are influenced by certain factors ranging from those which constitute opportunism to those involved in a transaction. These two concepts have a price attached to them hence making it easier to determine transaction costs along the chain.

2.5.4 Profit Maximization Theory

With regard to the framework of the study, it is assumed that economic agents including smallholder peach farmers participate in marketing only when the net benefit from using a certain marketing outlet will be significantly greater than would be the case without selling peaches at all. In economics, farmers as producers have a sole objective of maximizing their profits via cost minimization which reflects their welfare. Therefore, the decision peach farmers make with regard to selling or not selling their peaches in the marketing outlets is considered under the general framework of profit maximization (Deressa *et al.*, 2008;Yirga and Hassan, 2008).

Following the Neoclassical Profit Maximization (NCP) theory, farmers seek to minimize costs while maximizing revenues through market outlets access. Under New Institutional Economics (NIE) theory, peach farmers are considered as individuals who are rational in their decision making as such, they try to maximize their utility with an attempt to get a welfare increased through proper selection of marketing channels. Maximizing revenue often means access to markets, indicated by population size or density and incomes. Human capital or household size can also be a source of increased revenue, measured by unemployment and educational attainment levels (Sheridan, 2018).

According to Song *et al.* (2018), the profit function can be defined as:

$$\pi = p.y - w.X = p.y - \sum_{i=1}^{m} w_i - X_i \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (5)$$

From equation (5), it can be seen that profit is a function of price of products, peaches in this case, as well as price of input factors such that

$$\pi = P, w, X \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (6)$$

Therefore, to get the profit maximizing marketing outlet, one has to determine the factors that maximize benefits in an outlet of their choice, that is X*>0, which implies that $\pi = (P, w, X^*) > \pi = P, w, X$ for all $X > 0,\ w > 0, P > 0$.

2.6 Conceptual Framework

The framework is developed on the foundation of peach farmers' response to the costs they incur during exchange as well as rational behaviour behind the choice of profit maximizing marketing outlet amongst the alternatives. The conceptual framework presented in Figure 1 gives the interrelationship between market factors (distance to the market and price information), Farmer's attributes (age, gender, household size, educational level, income level, own-transport, farm size) and Institutional factors (access to credit, contracts, collective action, condition of roads, trust, access to extension) which have exchange cost attached to them. All of these factors are believed to have a conditioning effect on marketing outlet choice as they translate in transaction costs as shown in Figure 1. Together they influence peach farmers' rationality on the decisions they make with regard to whether sell at farm gate or transport to the nearest marketing. In this study, the proper choice of marketing outlet is anticipated to reduce transaction costs hence increase farmer's economic benefits and marketing margins which will in turn improve their livelihoods. The choice of marketing outlets was influenced by demographic characteristics of farmers and market characteristics (Soe *et al.,* 2015; Dlamini-Mazibuko *et al.,* 2019). Both institutional and technical factors within the marketing environment which covers the informal and formal market outlet rules, which in turn reduce the transaction costs in marketing (Jari, 2009; Mzyece, 2011). The marketing outlet choice was based on the above-mentioned factors, the smallholder peach farmers decided to sell their products in different outlets with a goal of profit maximization.

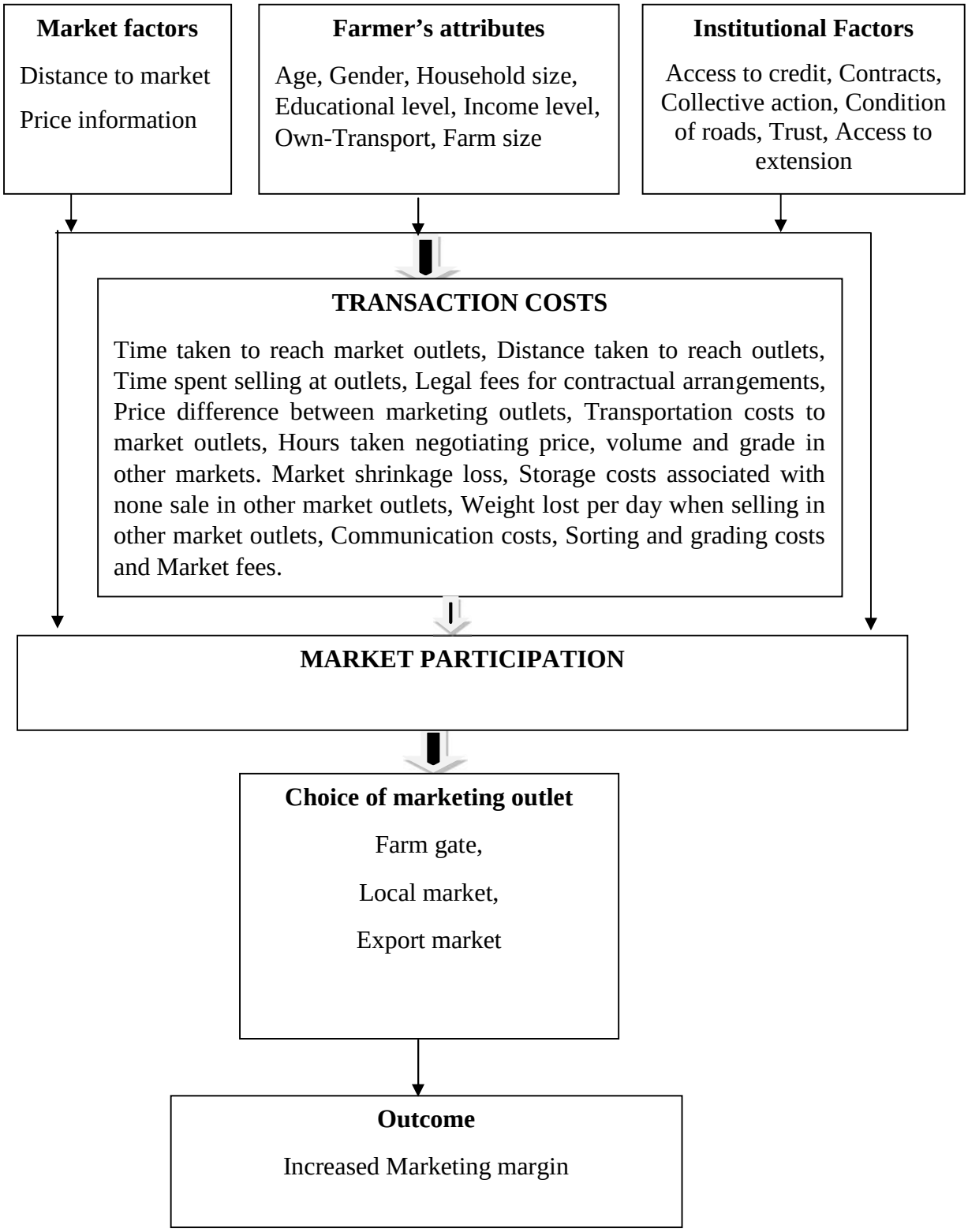

Figure 1: Transaction Costs factors influencing choice of marketing outlets

CHAPTER THREE

METHODOLOGY

3.1 Study Area

The study was conducted in Leribe district, Lesotho, which covers an area approximated to 2,828 km² of 30, 355 Km2 surface area of the entire country, located on longitude 28° 53' 0" South and latitude 28° 3' 0" East. Of the four agro-ecological zones of the country, the district is comprised of three, namely: 42% of Lowlands, 30% of Highlands, and 28% of Foothills of the country. Leribe district is the biggest district of all ten districts with 15.86% of the population of Lesotho. The district has two camp towns, Hlotse and Maputsoe which are two of the thirteen constituencies which are: Malima-Mats'o, Mphosong, Thaba-Phatsoa, Mahobong, Pela-Tsoeu, Matlakeng, Leribe, Hlotse, Tsikoane, Maputsoe, Likhetlane, Peka, and Kolonyama. The district borders with the Free State Province of South Africa on the Westside; locally borders with Botha-Bothe in the North, Mokhotlong district in the east, Thaba-Tseka district in the Southeast and Berea district in the Southwest (Local Governance & Non-state actors Support Programme (LGNSP), 2009).

In 2015, the district had almost 58% of economically active people who most of them use non-farm incomes to finance subsistence agriculture and purchase the basic needs of their families (Matsoso, 2015). According to Rantšo (2016), multiple incomes are commonly found in Leribe. The rural non-farm sector is the main source in this framework as such, the majority of the residents are engaged in economic activities such as beer brewing, brick making, the construction of houses, thatching and weaving hats, rearing of livestock (piggery, poultry, wool and mohair production through the rearing of sheep and goats).

The climate in this district is classified as temperate and is marginally suitable for both crop and fruit farming due to erratic and spatially variable rainfall. Most of the rainfall occurs from October to April, which has also been recognized as peach season, as peaches bloom around September. Rainfall season peaks between December and February, when most of the country records over 100 mm per month, Leribe records 65 mm (Fobo, 2012). This is the most critical period for most peach varieties since they need more water around this time because rainwater for none-irrigating farmers helps in maintaining fruit water balance (Ripoll *et al.,* 2014). Peaches are grown throughout the country, with every home state having at least several countable trees in its compound (Rafoneke & Rantlo, 2016). In most of the

rural areas of Lesotho, canned peaches are usually consumed with papa (maize meal porridge) as vegetables substitute due to their high content of vitamins (Noble, 2010; Ranneileng, 2013).

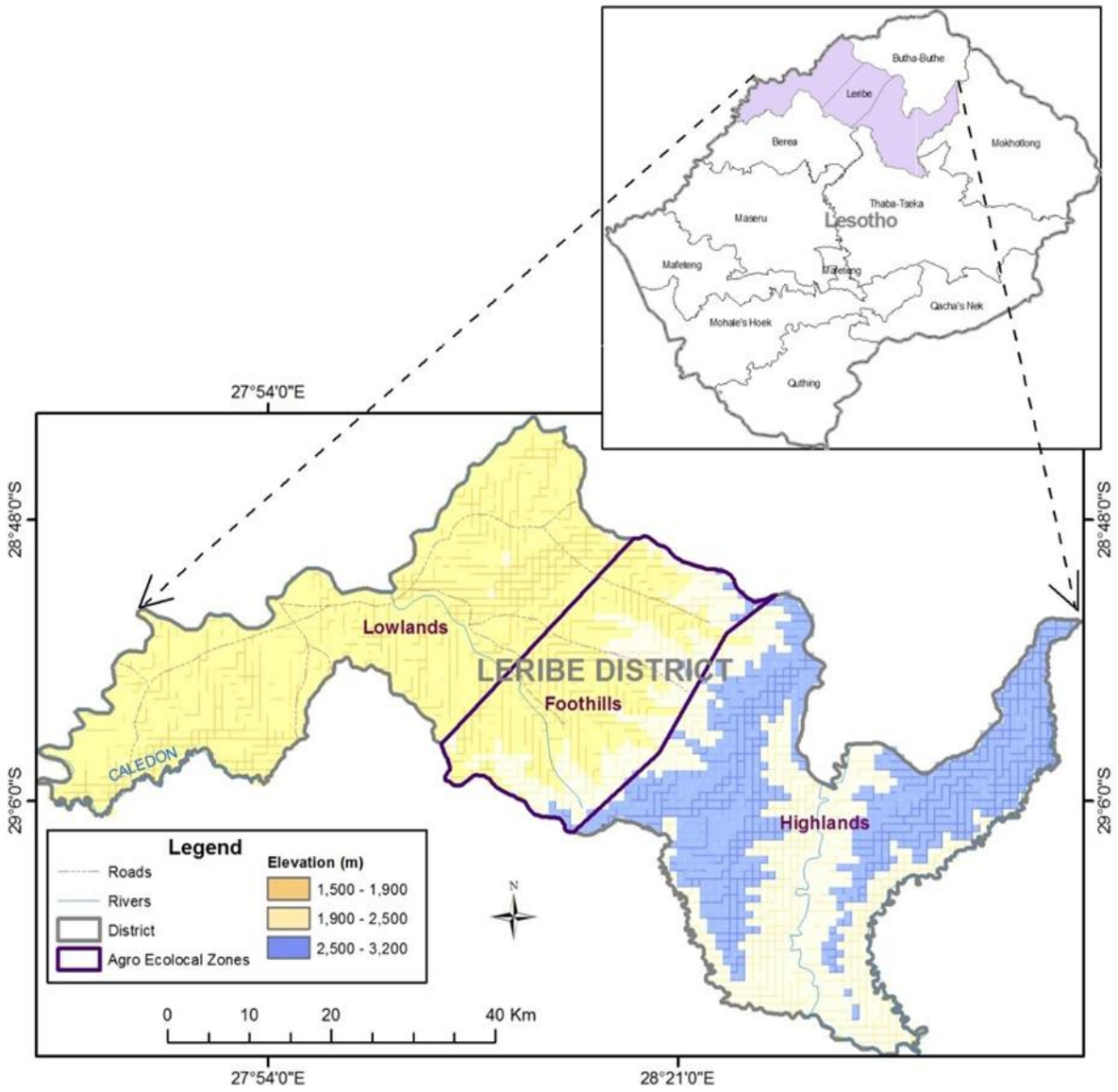

Figure 3: Map of Leribe district of Lesotho

Source: Environmental Science Department, Egerton University-Njoro

3.2 Research Design

The cross-sectional survey was used as the research design because it is normally done at a single point in time, thus allowing a researcher to efficiently and effectively employ the economic resources. Besides, this study design took a representative sample (cross-section) from the population to generalise the findings for the study population. It also made it possible to determine the prevalence of an outcome, or risk factor in the study (Omair, 2015). From the population of smallholder peach farmers in Leribe, a sample was drawn and farmers were interviewed to obtain the cross-sectional data.

3.3 Population of the Study

The population of the study was comprised of smallholder peach farmers with sixty to one hundred fifty peach trees and had been selling peaches in at least passed two years in five constituencies of Leribe district.

3.4 Sampling Procedure and Population of the Study

Multistage sampling technique was used to select the sample. In the first stage, purposive sampling of two agro-ecological zones that is; lowlands and foothills of Leribe district was done based on the climatic condition and elevation which allows early ripening of peaches. In the second stage, five constituencies (Pela-Tsoeu, Leribe, Hlotse, Tsikoane and Kolonyama) out of thirteen constituencies were purposively selected as they have a large number of peach farmers with at least hundred peach trees per farm, besides being endowed with rich soils for production of fruit and vegetables, peaches in particular (Moeletsi & Walker, 2012). In the third stage, a list of all peach farmers in the five constituencies producing fruits was obtained from the department of horticulture under the Ministry of Agriculture and Food Security. From the list of farmers, only semi-commercial peach producers who had sixty to one hundred fifty peach trees and had been selling peaches in the past two years were selected. These made a total of 90 farmers. Thus a census survey of the 90 farmers was conducted.

3.5 Data Collection and Data Collection Instruments

A semi-structured interview schedule was designed as a data collection tool to achieve the objectives of the study. Data on both qualitative and quantitative attributes, and marketing costs and other marketing-related factors, as well as marketing channels, were captured by personally administrating the questionnaire to the sampled peach farmers. The validity of the data collection tool was tested using construct validity, which involved interviewing two

different groups of farmers (those living in urban areas and those living in rural areas); (Parmenter & Wordle, 2000). Reliability on the other side was achieved by conducting test-retest correlation (on 10 peach farmers) between scores at time 1 and time 2 when the same respondents completed the survey at two different points in time and correlation coefficient (*r*) was more than 70%, the instrument was considered reliable (Balarinwa, 2015).

3.6 Data Analysis

The data from the survey was edited, coded, cleaned to allow consistency. They were later entered into Statistical Package for Social Science Scientist (SPSS version 22) and STATA version 14.0. The qualitative and quantitative analyses were used throughout the study hence, descriptive and econometric analyses were used to analyse data collected from the field. Data on farmers' prices were entered in an Excel spreadsheet, cleaned, and then worked out to indicate prices per kilogram of peaches.

3.6.1 Analytical Framework

Objective 1: To characterize transaction costs incurred by smallholder peach farmers in Lesotho.

This objective was analysed using descriptive statistics in which percentages, frequency distribution, and central tendencies, were used to analyse the data on the socio-economic characteristics of respondents and characterize the transaction costs they incurred. The data was then presented on bar charts, graphs, and tables for discussions.

Objective 2: To determine the influence of transaction costs on choice of marketing outlets of peaches in Lesotho.

To determine the influence of the transaction costs on the choice of marketing outlet of peaches in the Leribe district of Lesotho, the Multivariate Logit model was used. The model was chosen because it works best when the dependent variable - which in this case was marketing outlet choice, is discrete; meaning it is a categorical variable with three levels (Farmgate, Local market, and Exporting (selling to other districts and South Africa) while independent variables are continuous or dummy variables. Also, because only the farmer's choice on a particular market outlet type was observed, the following latent structure univariate logit model for choice of each market outlet type can be specified (Greene, 2012; Adugna *et al.*, 2019).

$$y_i^* = \boldsymbol{X\beta} + \mu_i \quad \text{..... (8)}$$

$$y_i = \{1 \; if \; y_i^* = \boldsymbol{X\beta} + \mu_i > 0; 0 \; if \; y_i^* \leq 0\} \quad \text{..... (9)}$$

where

y_i^* was a binary latent (unobserved variable) for marketing outlet choice which was observed when $y_i^* > 1, 0 \; otherwise$

$\boldsymbol{X}$ was regarded as a vector of transaction costs influencing peach farmers' choice on marketing outlets. However, peach farmers chose one and, in some instances, more market outlets at the same time, which depended on the expected benefits and risks associated with each market outlets (Adugna *et al.*, 2019; Geoffrey *et al.*, 2014). The potential for simultaneous correlation across different market outlets suggests that a model addressing correlated choices is appropriate. In the presence of correlation among unobserved factors across choices, the simple probit or logit model produced biased estimates of choice probabilities as well as incorrect standard error for and inferences based on those for determining critical factors (transaction costs), determining choices, which led to inconsistent results (Washington *et al.*, 2010).

Most of the studies from the empirical review had used a multinomial logit model, which assumed that errors are extreme value or gamble. Over and above that, they assumed Independence of Irrelevant Alternatives (IIA), which often leads to misspecification and inconsistent outcomes due to assumption violation. Hence, the study used the multivariate logit model, as it has the independence assumption and minimizes the heteroscedasticity (Greene, 2012). Bel and Paap (2014), have also postulated that the multinomial models are designed to describe single multinomial choice whereas, in practice, scientists and researchers are often dealing with multiple correlated multinomial decisions as such answers from survey questions which consist of two or more possible choice possibilities: which was the case in this study and were likely to be correlated.

Multivariate probit modelling techniques were appropriate for correcting such biases generated from correlation across choices (Train, 2009; Washington *et al.*, 2010) because they allow for possible simultaneous correlation across alternative choices. Multivariate probit estimates M-equation probit models, by the method of maximum simulated likelihood (Cappellari & Jenkins, 2003). Therefore, this study adopted a multivariate probit econometric technique to simultaneously model the influence of the set of independent variables on each

of the different marketing outlet choice decisions, while allowing the unobserved (error terms) to be freely correlated (Mokhtarian & Tang, 2011; Arinloye *et al*., 2012, 2015).

The variance-covariance matrix of the cross-equation error terms had values of 1 on the leading diagonal, and the off-diagonal elements were correlations to be estimated $\rho jk = \rho kj$, and $\rho jk = 1\ for\ j = k, for\ all\ j, k = 1 \dots, M$. In this study, the marketing outlet decision was considered as a system of a multiple-choice equation respective to each type of marketing channel.

$Farmgate_i^* = X_1\beta_1 + \varepsilon_{1i}$ .... (10)

$Local\ market_i^* = X_2\beta_2 + \varepsilon_{2i}$ .... (11)

$Exporter_i^* = X_3\beta_3 + \varepsilon_{3i}$ .... (12)

The multivariate logit was an extension of the probit model which was used to estimate several correlated binary outcomes jointly. Generally, the multivariate logit model was written as:

$y_{im} = \beta_{im}X_{im} + \varepsilon_{im}$ .... (13)

Where: y_{im} with $(m = 1 \dots k)$ = dependent variable of peach market outlet selected by i^{th} farmer. The variable is of polychotomous in nature).

$X_{im}\ is\ 1 \times k$ matrix reflecting independent variables that affect marketing outlet choice.

$\beta_{im}\ is\ k \times 1$ vector of unknown parameters to be estimated.

$\varepsilon_{im}, m = 1 \dots m$ were error terms distributed as multivariate normal, each with a mean of zero and Covariance *V*, with values of one in the leading diagonal and correlation.

Hence this became a system of equations:

$y_{1i}^* = X_1\beta_1 + \varepsilon_{1i}$ .... (14)

$y_{2i}^* = X_2\beta_2 + \varepsilon_{2i}$ .... (15)

$y_{3i}^* = X_3\beta_3 + \varepsilon_{3i}$ .... (16)

Since the dependent variable; market outlets choice (MrkOutChc) are those pathways where agricultural products pass through to reach consumers; that is, the actual buyers or the ultimate user of the peach producer; the choice was observed through the decision to participate in peach marketing outlets or not, such that:

$$y_{im} = \begin{cases} 1 \\ 0 \end{cases} \; if\, y_k^* > 0 \quad k = 1, 2, 3;\ 0\ otherwise \quad \ldots \ldots (17)$$

Therefore, six joint probabilities were corresponding to six possible combinations of choosing and not choosing each of the three marketing outlets. The chances that all of the outlets; were chosen: were outlined as follows:

$$\Pr(y_{1i} = 1, y_{2i} = 1, y_{3i} = 1, y_{4i} = 1) = \Pr(\varepsilon_{1i} \leq \beta_1 X_{1i}, \varepsilon_{2i} \leq \beta_2 X_{2i}, \varepsilon_{3i} \leq \beta_3 X_{3i}, \varepsilon_{4i} \leq \beta_4 X_{4i}) \quad \ldots \ldots (18)$$

$$Pr(y_{1i} = 1, y_{2i} = 1, y_{3i} = 1, y_{4i} = 1) = Pr(\varepsilon_{2i} \leq \beta_2 X_{2i}, \varepsilon_{3i} \leq \beta_3 X_{3i}, \varepsilon_{4i} \leq \beta_4 X_{4i}, \varepsilon_{1i} \leq \beta_1 X_{1i}) \quad \ldots \ldots (19)$$

$$Pr(y_{1i} = 1, y_{2i} = 1, y_{3i} = 1, y_{4i} = 1) = Pr(\varepsilon_{4i} \leq \beta_4 X_{4i}, \varepsilon_{4i} \leq \beta_3 X_{3i}, \varepsilon_{2i} \leq \beta_2 X_{2i}, \varepsilon_{1i} \leq \beta_1 X_{1i}) \ldots \ldots (20)$$

where, E(ε**X)** = 0, Var(ε**X)** = 1, Cov(ε**X)** = ρ and $Farmgate_i$(FG),$Local\ market_i$ (LM), and $Exporter_i$(Exp) were binary variables taking the value 1 when farmer *i* selected farm gate and Exporting market outlet, respectively and otherwise 0; $\mathbf{X_1}$to $\mathbf{X_3}$ were vectors of explanatory variables (transaction costs) which influenced the respective outlet choice variables; β's were vectors of Simulated Maximum Likelihood (SML) parameters to be estimated; ε_1 to ε_3 were correlated error terms in a seemingly unrelated multivariate probit model; and ρ's were tetrachoric correlations between endogenous variables. The explanatory variables are presented in Table 1.

3.6.1.1 Justification of Variables used in the Multivariate Probit Model

Farm size, Gender, Age, Education, Household size, and income level of farmers were variables adopted from Osebeyo & Aye, (2014). These variables were expected to have either a positive or negative influence on the farmers' choice of peach marketing outlet. Farm size (Fsize), was expected to have a positive influence on farmers' decisions in selling at farm gate, partnering with middlemen, or exporting. Economics of production did influence the farmer to export or sell at the local outlet. Gender (coded as gender) was captured as a dummy, which was measured by assigning one if the farmer is male and zero for females. It was expected to influence the market outlet choice positively or negatively; different genders negotiated differently in different markets, male negotiated better thus, reducing costs in certain markets resulting in an outcome of male farmers participating in that outlet.

Age (coded as age) of the farmers was measured in a continuous means, in terms of the number of years the farmer has. It was expected that when the farmers' age increase with the level of output. For this reason, a farmer may decide to sell to higher-value markets such as export outlets due to a high marketable surplus. Education (Edu), was captured as a proxy for the level of peach marketing skills of the farmer, such that it was anticipated that as the level of education increases, the higher probability of monitoring and enforcing the decisions, which resulted in a high chance of partnering with middlemen. Household size (Hsize), was captured as a continuous variable; indicating the number of heads per household. In this way, the outcome was that the family with more heads was more likely to sell in the local market since the members could help in carrying the peaches to the market. Also, families with a high level of income (Incom), were able to be sold in almost all of the markets, as income served as an investment in this case.

Market Information (MrkInf) was captured as a dummy where there was access; it was coded one, otherwise zero. It was expected to have an influence on the market outlet choice positively in that: when farmers have access to market information, they were able to make more informed decisions, at the minimal of transaction costs. Transport costs (TnsCst), was coded in monetary terms. Therefore, one Lesotho loti increase in the transaction costs was expected to increase the chance of the farmer to choose farm gate over other outlets, that is, it was expected to have a positive influence at farm gate but a negative effect on other market outlets. Distance to market (MrkDc), was captured in the number of minutes taken to reach the market outlet. Access to extension was coded as (ExtSer), which was captured as the number of visits made to the office per month, which influenced the choice positively. Condition of roads (Qroad), was coded as a dummy variable which took 1 when the quality of roads was good, otherwise 0. The condition of the road was classified into three categories, A for paved, B for gravelled, and C when un-gravelled. From the literature, good quality roads increase the likelihood of farmers to sell in local markets and export markets (Maina *et al.*, 2015).

Own transport (O-Tns) influenced the farmer's decision in using other market outlets more than the farm gate because having means of transport reduced the transaction costs in line with marketing outlet choice. Farmer group membership (CllAct), was captured as a dummy, where a farmer was assigned one if he/she has a membership with a group, otherwise zero. This was expected to have influenced the farmer to sell in higher market outlets or private

markets as it strengthened the farmers' bargaining power, economies of scale as well as access to information (Rafoneke & Rantlo, 2016).

Trust (Trust), was coded as a dummy variable, which takes 1 if the level of trust is high otherwise 0. It influenced the marketing outlet choice positively, especially when the trade was between middlemen and farmers. Negotiations (Negtxn) on one hand, were captured by the number of hours a farmer had spent negotiating on selling price, quality, and quantity. It was, therefore, anticipated to affect the marketing decision either negatively or positively. Credit (Credit) on the other hand; influenced the peach farmer's decision, concerning marketing outlets, either negatively or positively. Therefore, was coded as a dummy; 1 if accessible, otherwise 0. Besides, the availability of marketing contracts (Cntrcts): coded as a dummy - 1 if available, otherwise 0, influenced the farmer's choice between the local markets, Middlemen, and export markets positively, which were adopted from Maina, (2015). Time taken to reach outlets (TimRoutlts), was captured as a continuous variable in terms of hours taken to reach marketing outlets from the farm gate. Market shrinkage loss (LsTw), was captured as a continuous variable reflecting the number of peaches in kilograms lost through theft and vendor fraud as such, was anticipated to encourage farmers to sell at farm gate than other outlets. The distance taken to reach outlets (MrkDc), was recorded in terms of kilometres travelled between the farm gate and the market hence was expected to have a negative influence on the farmers' decision to sell at the market (Sigei *et al.*, 2014).

Time spent selling in the outlet (TimMrk); was captured as the number of hours a farmer spent selling in other outlets. It was expected to influence the choice either positively or negatively. Legal fees for contractual arrangements (LfCArr), on the other side, was recorded as the amount of money paid to arrange contracts between farmers and agents. Since contract arrangement guarantees the farmers a ready market, it was expected to influence the choice either positively or negatively (Sigei *et al.*, 2014). The price difference between outlets (PrDff), which was captured as the difference in prices between the outlets in maloti. It was expected to influence the choice positively given that the price increases with the level of the market. Transportation costs to other outlets (TrnCosts), was recorded as money paid in maloti per load delivery to the market, it was expected to have a negative impact on the choice of outlets.

Table 1: Variables used in the multivariate model

Code	Measurement	Expected signs		
Dependent variable		**FG**	**LM**	**Exp**
MrkOutChc	1 if Farm gate; 2 if Local market; 3 if Middlemen; 4 if Exporter	+	+	+
Fsize	Number of acres per farm land	+	+	+
Gender	Dummy (1=Male, 0=Female)	+	+	+
Age	Continuous (Years)			
Edu	Category (0=No; Formaledu, 1=Primary, 2=Secondary, 3=High school; 4=Tertiary)	+	+	+
Hsize	Continuous (number of heads/family)	+	+	+
Incom	Total annual income earned in maloti (M)	+	+	+
O-Tns	Dummy (1 if yes, Otherwise 0)	-	+	+
MrkInf	Hours spend looking for buyers in other outlets	+	+	+
TnsCst	Maloti spend on the per load to other market outlets	+	-	-
MrkDc	Time taken in min to reach other marketing outlets	+	+	-
Qroad	Quality of roads leading to other markets (1=Good, 0 Otherwise)	-	-	+
CllAct	Group membership Dummy,1=Yes,0= Otherwise	-	+	+
ExtSer	Number of extension contacts made, continuous	+	+	+
Trust	Dummy (1=High, 0 otherwise)	+/-	+	+
Cntrcts	Dummy (1=Available, 0 otherwise)	+	+	+
Credit	Dummy (1=Access, 0 otherwise)	+	+	+
Negtxn	Hours spend negotiating price, volume and gardens	+	-	-
Tm_ROutlets	Time taken in hours to reach other outlets	+	-	-
TimMrk	Time in hours spent selling at the marketing outlet	-	-	-
LsTw	Volume in Kgs lost in the store room	+	-	-
LfCArr	Money paid on arranging contracts	+	+/-	+/-
P_rDff	Price difference between market outlets	-	+	+
VolLos	Kgs lost due to spoilage while selling in other outlets	+	-	-
StrCosts	Peach volume lost (Kgs) due to none sale in other outlets	+	+	+
ComCst	Amount of airtime spend on the communication	+	-	-
SrtGrdC	Money paid per head/Kg	+	+	-
MfCst	Fees in Maloti paid for marketing	+	-	-

Quality of the roads leading to outlets (Qroads), was captured as a dummy variable, coded 1 if the roads were good 0 otherwise, it was, therefore, expected to have a negative influence on the choice because bad roads render to heavy transportation cost (Osebeyo and Aye, 2014). The volume of peaches lost due to spoilage and theft (VolLos), was captured as the number of kilograms lost during the selling season, it was expected to have a negative influence on the choice of market outlet (Wosene *et al.*, 2018). Storage costs associated with none sale in other markets (StrCosts), were captured by the amount of money (1 LSL) paid upon storing peach none sale and was anticipated to affect the farm gate positively over other outlets. Communication costs (ComCst), was recorded as the amount spent on phone calls per month. It was expected to affect the choice either positively or negatively. Costs for sorting and grading (SrtGrdCst), was also captured in monetary terms hence expected to influence the choice of farm gate positively but negatively influence the choice of other market outlets. Market fees (MfCost), were captured in monetary terms as well and expected to have a negative influence on the choice of outlets (Ogada *et al.*, 2018).

Objective 3. To assess the marketing margins of the different peach marketing outlets in Lesotho.

To analyse the marketing margins of the different peach marketing outlets, Marketing Margin Analysis (MMA) was used. The peach farmer's share in retail price was determined using the following formula which is also known as the producer's gross margin:

$$\text{Farmer's share in retail price} = \frac{Farm\ gate\ price}{Retail\ Price} \times 100 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (24)$$

Table 2: Description of independent variables used in the analysis of margins

Variables	Description and unit of measurement
Labour	Number of employees in the farm: head/maloti
Gasoline	Cost on petrol/diesel per month
Loading	Maloti spend per truck
Unloading	Maloti spend per truck
Propagating expert	Salary per month
Enforcing contracts	Price spend on getting paperwork
Wages paid to the driver	Price in Maloti
Cost per Kg for warehouse storage	Price in maloti
Maintenance at warehouse	Cost in Maloti
Processing costs	Cost/can of peaches, jam or a pack of dried fruits
Packaging	Price per tray packed
Transportation costs	In Maloti per load
Negotiating costs	Hours spend on negotiating
Storage costs	Maloti per month
Communication costs	Amount of Airtime used
Cost of sorting and grading	Amount of money paid per head per Kg
Market fees	Amount paid per day in Maloti

Since a farmer is a trader, the net marketing margin was calculated: at each level of an outlet using the following formula:

$$NMM = \frac{GMM - MC}{RP} \times 100 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (25)$$

Where, *GMM* = Gross Marketing Margin, *MC* = Marketing Costs, *RP* = Retail Price. However, Gross Marketing Margin was considered over Net Marketing margin for reporting findings (Scott, 1995; Adugna, 2009; Gaspar, 2012).

$$GMM = S_P - P_P \times 100 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (26)$$

Where, S_P was Sale price and P_P was purchase price.

CHAPTER FOUR
RESULTS AND DISCUSSION

This chapter presents the results and discussion on the transaction cost factors influencing the choice of peach marketing outlets. The chapter gives the descriptive results; on the socio-economic factors concerning the different marketing outlets as well as characterizing the transaction costs incurred by peach smallholder farmers. It also presents empirical results of the multivariate probit model providing the significant transaction cost factors and their impact on the choice of marketing outlets amongst smallholder peach farmers. The last section of the chapter discusses the marketing margins of respective outlets used by the respondents.

4.1 Socio-Economic Characteristics of Smallholder Peach Farmers

Results shown in Table 3 indicate that most of the respondents were males whereas about 43.33 per cent were females. Lesotho farming households are normally headed by males and the head of the household was regarded as a respondent in the study. The implication from the results is that peach farming is male-dominated. This is due to the laborious nature of both production and marketing of peaches. These results are in line with Koirala *et al.* (2014), who found out that female-headed farms often have lower levels of physical and human capital compared to male-headed farms due to institutional, legal, and social disparities between male and female.

The study respondents had diverse sources of income. From the results in Table 3, most of the respondents' main source of income was from agricultural activities (Other on-farm activities). About 35.55 per cent generated their income from off-farm employment. Only 10 per cent of the interviewed peach farmers had a larger proportion of their income generated from peach production, a few of the respondents equally had a pension and other means of income creation as their main sources of income. The implication from the results is that most of the respondents were mostly engaged in agricultural activities as their major source of livelihood. The findings are in line with Sekoai & Rantlo (2016) as well as Rantšo (2016), who found out that most of the smallholder farmers in Lesotho live in rural areas where most agricultural activities take place. As such, they mostly depend on agriculture as their main source of livelihood.

In terms of the occupation of the respondents, the results (Table 3) indicate that almost a quarter of smallholder peach farmers was self-employed (24.44 per cent) and 22.22 per cent were full-time farmers and civil servants respectively. A few peach farmers were found to be unemployed while 11.11 per cent were civil servants. The results on the occupational status show that most of the respondents were not full-time farmers of peaches. This implies that most of the farmers had off-farm jobs due to the seasonality nature of peach production which could be a possible explanation in this case. Seasonality in the production of peaches does not only influences farmers' decisions about when to sow and harvest but can ultimately lead to seasonal unemployment (deBeurs & Brown, 2013; Naftanaila *et al*, 2016).

Table 3: Results on Gender, main occupation and income of peach farmers (n=90)

Variables	**Total**
Gender	
Female	43.33
Male	56.67
Main Source of Income	
Peach Production	10
Other on farm	45.56
Off-farm employment	35.55
Pension	4.44
Other	4.44
Main occupation	
Farmer	24.44
Civil Servant	22.22
Unemployment	15.56
Private Sector	11.11
Self-employed	26.67

4.1.1 Farm Size and Ownership of Peach Farm Land by Smallholder Peach Farmers

Results in Table 4 show that almost half of the respondents owned farmland between 3 and 4 acres, while more than a quarter of the respondents cultivated more than 5 acres of land. In Lesotho, subsistence farmers cultivate less than an acre of arable farmland, small scale semi-commercial farmers cultivate not more than ten acres of land (Matarira *et al.*, 2013). The

implication, as shown by the results on the farmers' land-holding size, is that most of the peach farmers in Lesotho are small scale semi-commercialized farmers as they cultivated less than ten hectares of land (Tegegn *et al.*, 2018). Large farm size increases the capability of the farmers choosing to sell their marketable surplus in market outlets over farm gate as a way of avoiding post-harvest losses (Abate *et al.*, 2019; Zivenge & Karavina, 2012).

Concerning the type of land ownership, the results in Table 4 indicate that more than half of respondents cultivated their land while a minority (1.11 per cent) used group owned land to produce peaches. About 14 per cent, 12 per cent and 9 per cent of farmers cultivated family-owned, rented land as well as leased land. The results suggest that land ownership in Lesotho is characterized by farmers who own their farmlands. The literature points out that most of Basotho who have rights to arable land have inherited it from their forefathers hence, do not often rent land for farming purposes (Motsoari, 2012).

Table 4: Results on farm land ownership and acreage under peaches

Variables	**Frequency**	**Percentage**
Farm size		
Less than 2 acres	20	22.22
Between 2 and 4 acres	41	45.56
Over 5 acres	29	32.22
Total	**90**	**100**
Land ownership		
Self	57	63.33
Family	13	14.44
Rented	11	12.22
Group	1	1.11
L	8	8.89
Total	**90**	**100**

4.1.2 Age, Household Size, Experience and Level of Income Status of the Households

The results in Table 5 indicate that the average age of respondents was 52 years, which implies that most of the peach farmers in Lesotho are older. Most of the respondents in the area were above 45 years of age, which attests that a lot of them grew up before the

implementation of 'The Free and Compulsory Primary Education policy' in 2000. That being the case, they couldn't afford their school fees (Lekhetho, 2013). The elderly has a lower innovation adoption, which in turn affects household productivity and livelihood strategies, which can be reflected by their ability to choose high-value market outlets over farm gate (Melese *et al.,* 2018; Rantšo & Seboka, 2019).

Concerning peach production, results in Table 5 show that on average, a peach farmer had 13 years of experience in both production and marketing of peaches. Marketing experience captures elements associated with social networks accrued over time which then links marketing players in the market environment. The existence of such linkages reduces transaction costs related to search, contracting, negotiation as well as enforcement within the farm enterprise (Sigei *et al.* 2014). Tegegn (2018), noted that farmers who have more years in the farming business sector are more informed and knowledgeable with regard to the marketing environment. The accumulated knowledge and skills help farmers maximize the efficient use of agricultural inputs (both fixed and variable) leading to high productivity which may in turn increase possibilities of commercialization (Jagwe, 2011; Guo *et al.,* 2015; Mugi-Ngenga *et al.,* 2016).

In relation to household size, the results indicate that the average household size was found to be 6 members per household. The range of household size of surveyed households was between 1 and 17 household members. This reflects that there are small and large families in Lesotho. However, the variation as portrayed by standard deviation was relatively low. Household size indicates the human resource endowment of the household. As such, the results imply that peach growing households differ in terms of human resources endowment. Households with larger families possess an added advantage over others. According to Kelebe *et al.* (2017), large families have adequate labour which can be used in operating day-to-day peach farming activities.

With regard to the income status of the respondents, results given in Table 5 show that on average, peach farmers earned more than 200 USD per month. The minimum income earned in a month by an average peach farmer was found to be 32 USD while the maximum was 714 USD per month. The implication could be that the farmers who accrued more income were more commercialized than the minimum income earners.

The maximum income earned by farmers was high, hence farmers stand a better chance of reinvesting in peach production and marketing. Higher incomes do not only enhance the welfare of families' but it also ensures enterprise productiveness as well as performance through capital reinvestment (Weidner *et al.*, 2010).

Table 5: Results on age, household size, farming experience and income level of households

Variables	Mean	SD	Min	Max
Age	51.77	10.59	29	75
Household size	6.01	3.19	1	17
Farming experience	13.6	8.61	4	45
Income	2968.30	2424.52	450	10000.00

Note: According to Cangoz *et al.,* (2019) during data collection 1USD was equivalent to 14.00 LSL

4.1.3 Educational Level of Respondents

The results given in Figure 3 reflect that less than half (43 per cent) of farmers attained tertiary education, followed by high school, primary level followed by secondary, and those who did not have formal education were the least (4 per cent) amongst all of the categories. The implication from the results could be that, there was a high level of education amongst smallholder peach farmers since the majority (96 per cent) of the peach farming community in Lesotho had formal education. According to Matsane and Oyekale (2014), literate farmers are more likely to adopt new marketing strategies than illiterate farmers, for that, they stand a better chance to have higher marketing efficiency as well as farm returns. Due to the extensive rural orientation to the semi-urbanized nature of the study area, some farmers were found to have had no formal education at all.

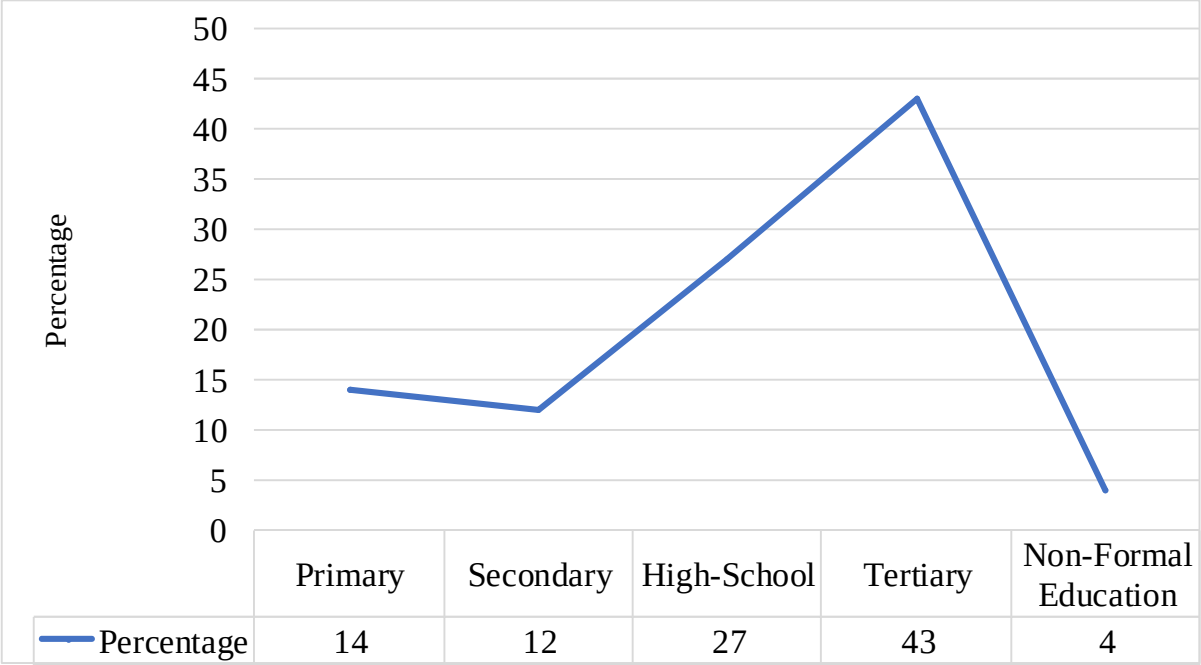

Figure 4: Educational level of the respondents

4.1.4 Marital Status of Household Heads

The results from Figure 4 show that half of the respondents were married while a quarter (24.44 per cent actual) of respondents were widowed; a minority (12 per cent) were single. The implication from the results is that almost half of the participants did not have spousal support as shown by the proportion of single, widowed, and divorced added all together. Matsoso (2015), who conducted a study in Lesotho on the effects of marital status on labour market participation, reported that married and cohabiting men were more likely to be active participants in the labour force than divorced, separated, or single men. A high percentage of married farmers play a part in the provision of family labour (Moobi & Oladele, 2012). Most widowed people do not have a helping hand for maintenance of the farm and households; on this account, they consider farming as the main source of making a living (Rantšo & Seboka, 2019).

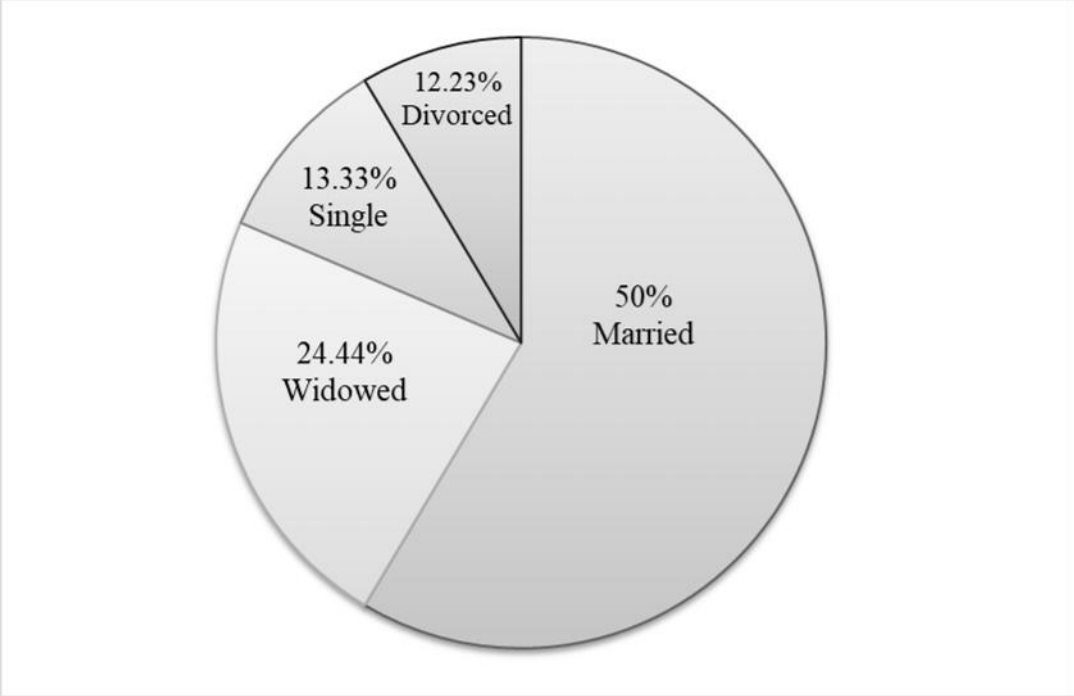

Figure 5: Marital status of smallholder peach farmers in Lesotho

4.2 Peach Marketing Outlets used by Smallholder Farmers

The results on the percentage of respondents who sold through the different market outlets (Table 6) indicate that majority of peach farmers sold through an export market outlet. Only a few (15.55 per cent) sold at the farm gate while about 21 per cent chose to sell at the local market. This indicates the dominant role of export outlet in the peach market. This is probably not only because of economies of scale, pricing power, and good infrastructure that links farmers to the export market as well as product differentiation but also better prices the marketing outlets offer relative to farm prices. Bobojonov *et al.* (2016), indicated that infrastructure may become more important than farm endowments in more commercially oriented farming systems such as an export outlet. These results are similar to results from Ochieng *et al.* (2017) and Rampai & Rantlo (2016), who found that most smallholder farmers decide to sell most of their products to supermarkets.

Table 6: Percentage of respondents who sold through the different market outlets

Market outlets	Percentage
Farm gate	15.55
Local market	21.11
Export market	86.67

4.2.1 Distance and Price Differential between Peach Marketing Outlets

The average distance travelled by the farmers to the market was found to be 17.21 kilometres and 34.11 kilometres for those who sold peaches at the farm gate and in other markets (local and export) outlets respectively. The overall distance a farmer had to cover to reach the furthest market outlets was 590 kilometres away from the farm while the nearest market was just 0 kilometres, which was supposedly at peach farmer's farm. The results suggest that the outlets used by the respondents were relatively further apart from the farm gate. This means that the farmers who sold in other outlets were not better off from those who sold their produce at the farm gate. However, the standard deviation for farmers who sold in local and export market outlets (67.41) indicates that there was variation between farmers who sold in the local market and those who sold in the export market; as such, they incurred different transaction costs. The results are supported by Sigei *et al.* (2014), who reported that a greater distance to the market increases transportation costs and marketing costs which in turn hamper the extent at which farmers utilize higher market outlets.

The results in Table 7 show the average price difference between outlets. The results further show that the maximum price difference between the marketing outlets was 0.43 USD while the minimum price difference between farm gate and other outlets was found to be 0 USD, which is believed to be for farmers who sold their produce along the roadside near their farms. However, the mean price differential between outlets for farmers who sold at the farm gate and in local and export market outlets was found to be 1.54 USD and 2.22USD per kilogram respectively. This is because the high-value market outlets normally offer better prices as grades and standards increase with the level of outlets (Rafoneke & Rantlo, 2016). These results are in line with Matiza & Oni (2014) results, who found the higher prices for commodities given at retail outlets, influence the choice of the outlet over the farm gate.

Table 7: Distance and price differential between farm gate and other market outlets

Variables	Mean	SD
Distance		
Selling at farm gate	17.21	12.93
Selling in other outlets	34.11	67.41
Minimum		0
Maximum		590
Price difference		
Selling at farm gate	1.54	1.45
Selling in other outlets	2.22	1.20
Minimum		0
Maximum		6

4.2.2 Ownership of Transportation Means

The results in Figure 5 indicate that majority of peach farmers had their own means of transport (family car, donkeys, business van) while a minority (30 per cent) did not. The results further reflect that among all of the farmers who had their own means of transport, the greater part (94 per cent) sold their produce at other outlets (local market and export market outlets) while the few sold at the farm gate. In the study, farmers who had no vehicles had to rely on other means of transport such as a hired vehicle (which imposes a high cost of exchange), carrying on the head as both are common practices among the rural poor in Lesotho (International Fund for Agricultural Development (IFAD), 2014). This implies that the availability of household assets such as family-owned vehicles did not only ease the market access but has also made it cheaper for smallholder farmers to access the markets. As reported by Muthini (2015), farmers' own vehicles allow them to move freely and without relying on others to participate in formal markets, which are located far off from the farm.

The results are sustained by Moono (2015), who reported that ownership of transportation assets influenced the decision to participate in the market among maize producers in Zambia and Panda and Sreekumar (2012) among Indian vegetable farmers.

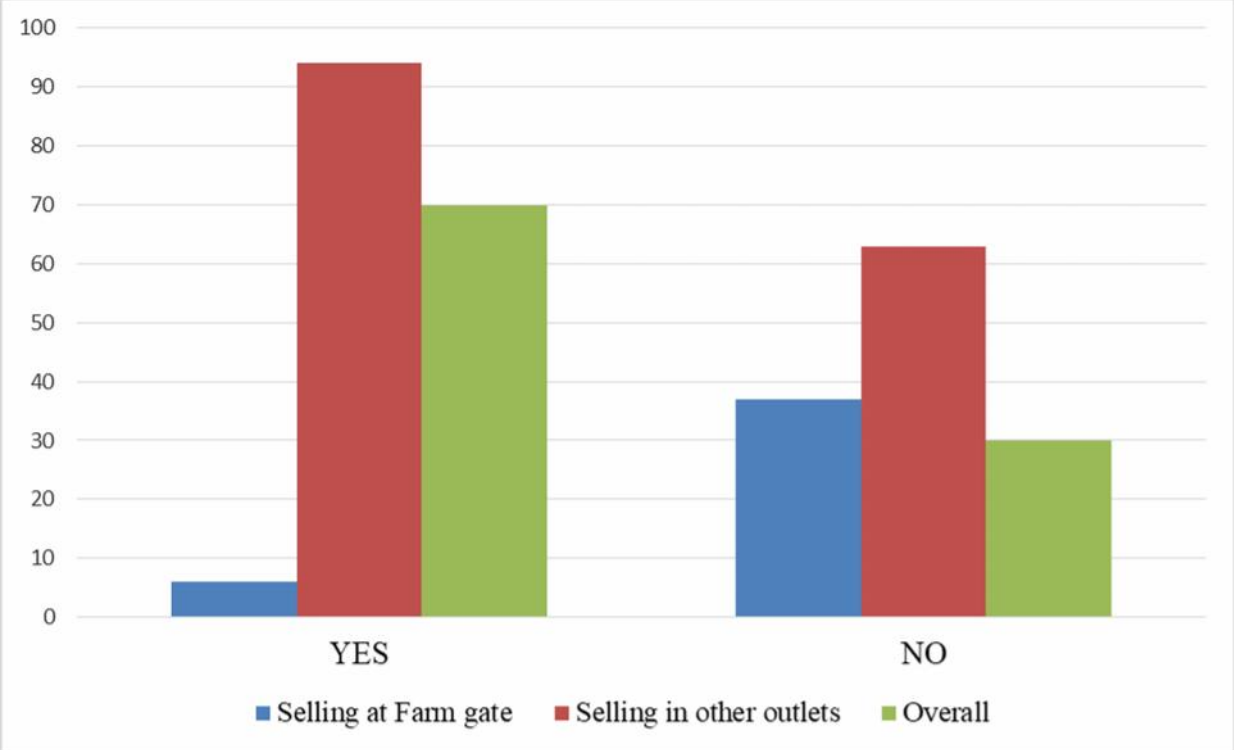

Figure 6: Vehicle ownership among the respondents

4.3 Institutional Factors in Relation to Marketing Outlets used by Participants

4.3.1 Contact with Extension Service, Level of Trust and Quality of Road

Concerning the results presented in Table 8, extension services were relatively infrequent amongst smallholder peach farmers in Lesotho. The majority (78.57 per cent) of farmers who sold their produce at the farm gate did not receive any information from extension offices. Of all the farmers who sold their produce in other markets, more than a half did not receive extension services, about a quarter received the services at least three times quarterly, the minority (3 per cent and 1 per cent) of the respondents received extension services at least three times in a week and three times per month respectively. Extension education in the farming community is very crucial as it makes it easy for farmers to acquire market information which enables farmers to improve their production technology thus leading to more output which in turn increases their ability to choose the best market outlet for their produce (Wosene *et al*., 2018). In Lesotho, the ratio of extension staff to farmers is at a ratio of 1 extension officer to 750 farmers (1:750). For this reason, the extension workers have large areas of administration, each with a narrow range of activities hence, they are less effective in disseminating the information to the farmers (Kiptot & Franzel, 2015; Mojaki & Keregero, 2019).

Results given in Table 8 show the level of trust between peach farmers and potential buyers. From the results, few farmers (12.35 per cent) trusted their agents at the farm gate while 44.44 per cent had untrustworthy agents. Amongst the farmers who sold their produce in other market outlets, a lion share (88 per cent) had very trustworthy customers while more than half of farmers had contact with untrustworthy agents in the market. In general, these results show that most farmers who sold their peaches in other market outlets had their choice of market outlets influenced by a high level of trust in their potential customers.

Table 8: Results on contact with extension service, level of trust and quality of road

Institutional Factors	**Selling at farm gate**	**Selling in other outlets**	**χ**
Contact with Extension services			
Three times per week	7.14	1.32	0.049
Three times per month	0	2.63	
Three times quarterly	14.29	34.21	
Never	78.57	61.84	
Level of trust			
High	12.35	87.65	0.005
Low	44.44	66.66	
Road condition			
Good	9.86	90.14	0.004
Poor	36.84	63.16	

According to Pascucci *et al. (*2015), a higher level of trust between the transacting parties reduces exchange costs associated with time taken to organize what the consumers need; particularly, before the transaction. After the transaction, trust can help reduce the bargaining cost of unnecessary resource waste in the transaction process. The results are in line with Tarekegn *et al.* (2017), who noted that the households who had some level of trust regarding the buyers of their products were more likely to deliver products to the outlet than sell at farm gate since a good reputation and trustworthiness of traders/consumers increase producers' commitment in the market due to reduced opportunistic behaviour.

The results in Table 8 show that majority (90.14 per cent) of respondents who had good quality roads leading the market outlets sold their produce in other market outlets (local and export market outlets) while the minority sold at the farm gate. More than half of farmers who had poor quality roads sold their peaches in other market outlets while only 37 per cent of them sold at the farm gate. The implication from the results is that most of the market outlets used by the peach farmer are based in semi-urban to urban areas in Lesotho. Good quality roads are a key to productivity enhancement especially in remote areas consequently increase farmers' ability to choose higher-value outlets over farm gate (Gollin & Rogerson, 2014; Osebeyo & Aye, 2014; Kiprono & Matsumoto, 2018).

4.3.2 Access to Credit Services

Figure 6 gives results on access to credit. From the results, the majority (96 per cent) of smallholder peach farmers did not have access to credit. In Lesotho, loans are given to those people who have collateral and are regarded as economically active poor; the features which are rare to spot among the smallholder farmers in the country. The implication from overall results on credit access is that farmers who did not borrow from the bank or any other financial institution were basically producing at a subsistence level with the main incentive of consuming and selling the surplus, while the minority who had access to credit produced mainly for selling. Credits are not only important for the modernization of small-scale agriculture, but also for commercialization of the agriculture in the rural economy (Hosseyni *et al.*, 2012). This reflects on how much access to credit is very important towards capital accumulation and transformation of farming orientation among smallholder farmers (Kiplimo *et al.*, 2015; Motsoari, 2012; Fowowe, 2017). According to Dessie *et al.* (2018), farmers who do not have access to credit services are less likely to participate in marketing.

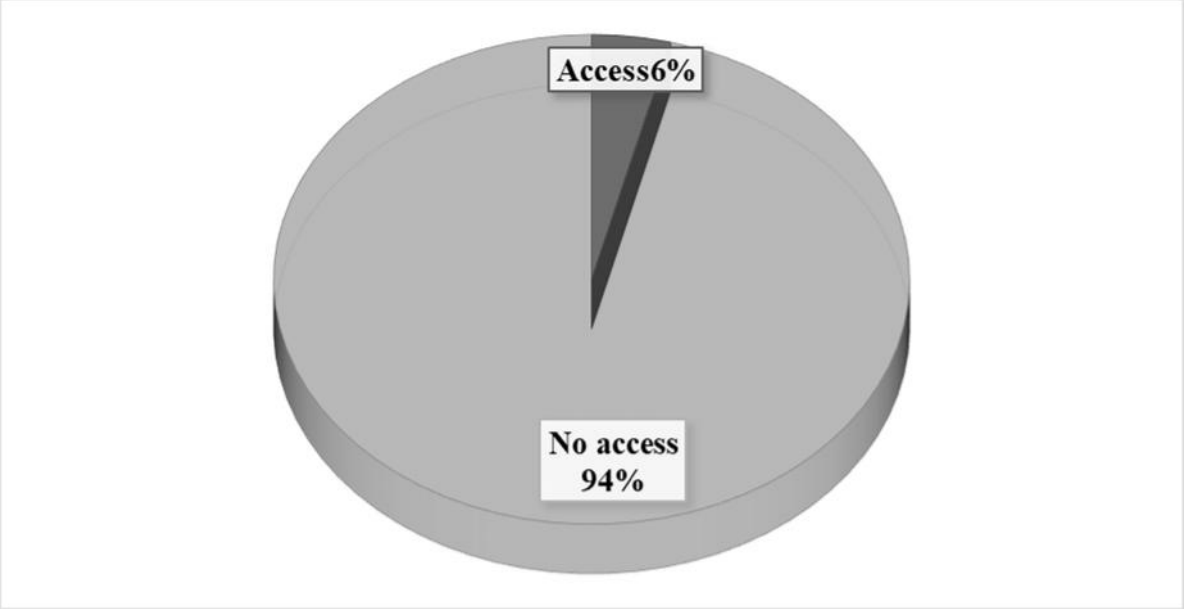

Figure 7: Access to credit services among market participants

4.3.3 Contractual Arrangements available to Peach Farmers

The results on the contract availability amongst the respondents are shown in Figure 7. The results indicate that most smallholder peach farmers in Lesotho did not have guaranteed markets while the few had a contractual arrangement. The results suggest that most of the smallholder peach farmers in Lesotho lack access to profitable and guaranteed value-added markets. Over and above that, the results show that it was quite difficult for smallholder Basotho farmers to contract with supermarkets and other high-value market outlets as many were faced with the risk of non-compliance. In Sub-Saharan agrarian countries, most smallholder farmers face a ray of challenges and lack of market is no exception (Dillon & Barrett, 2014). Due to a lack of contractual arrangements, farmers are not able to reach markets that are more remunerative since contract farming is only convenient to the better-off segment of the farming population (large scale and wealthy farmers) in Sub-Saharan countries (Ton *et al.*, 2017).

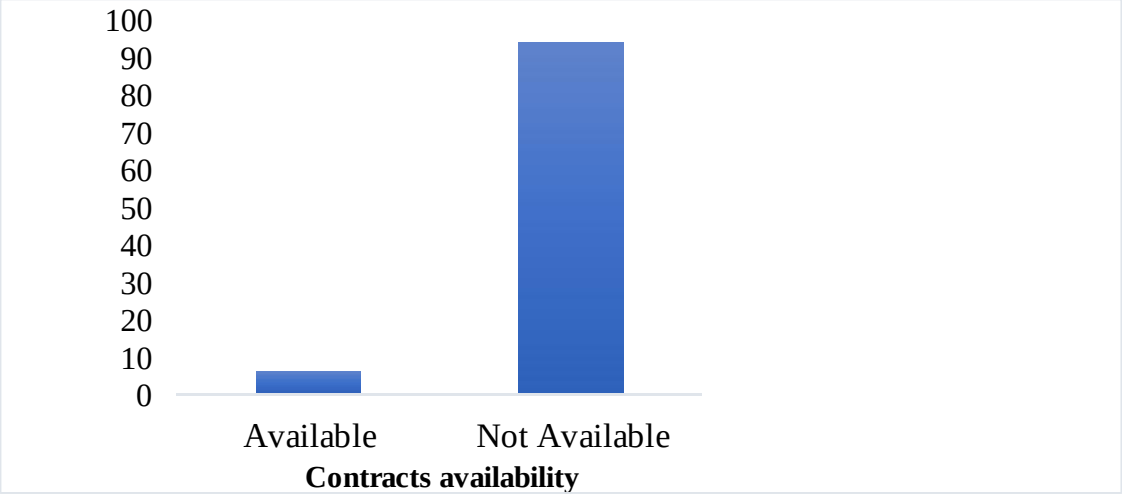

Figure 8: Contract availability among peach farmers

4.3.4 Collective Action amongst the Respondents

Figure 8 gives the results on group membership of peach farmers. The results indicate that majority (90 per cent) of the respondents were not members of farmer association while only a few (10 per cent) were members of farmer associations. The results show that most smallholder peach farmers in Lesotho were not involved in collective marketing. Collective marketing reduces transaction costs of taking produce to the market (Nyikahadzoi *et al.*, 2011). A producer association enhances collective bargaining power and gives a bigger voice to farmers (Ekepu *et al.*, 2017). However, more often than not, smallholder farmers have low bargaining power which rips them off the ability to structure a crucial mass of producers which in most cases allows them to negotiate a better contract with other actors (Torero, 2011).

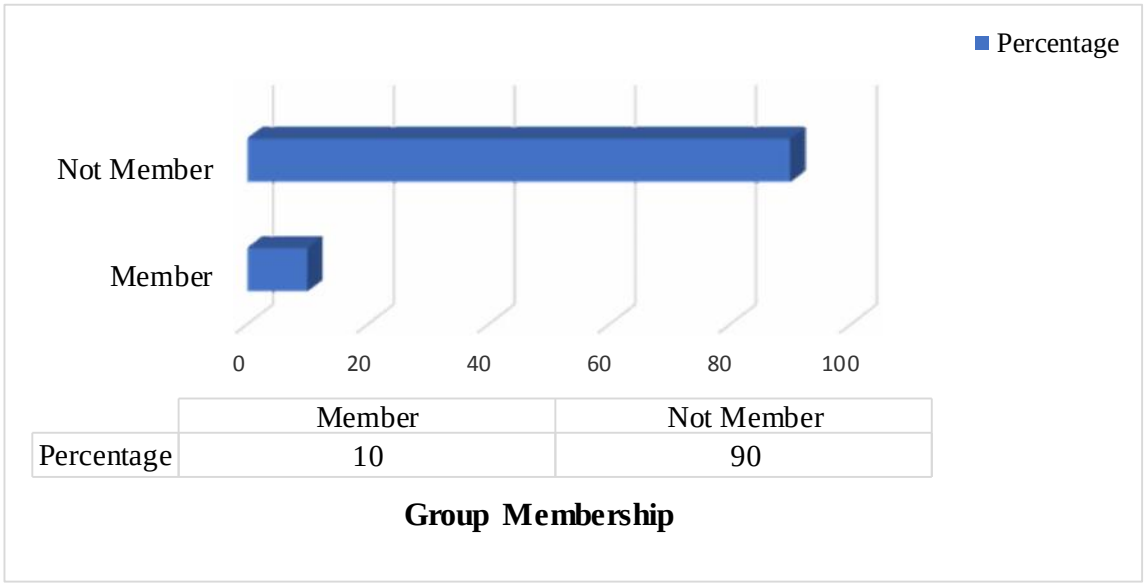

Figure 9: Group membership

The research findings on the decision to sell at the farm gate or other market outlets in the light of transaction costs reflect that minority sold their peaches at the farm gate while the majority of the respondents decided to transport their produce to other market outlets (local market outlet and export market outlet). This is probably because farmers normally receive better prices at the markets than at the farm gate. These results are similar to results from Ochieng *et al.* (2017) and Rampai and Rantlo (2016), who found that most of the smallholder farmers decide to sell the most shares of their vegetables to supermarkets as they offer security and convenience payments.

4.4 Transaction Costs incurred by Peach Farmers

The results in Table 9 indicate the transaction costs incurred by peach farmers in respective outlets they chose to market their produce. The farmers' decision on the choice of the outlet was not mutually exclusive. As such, among the respondents, some farmers used a combination of outlets while 14 farmers sold their produce at farm gate, 19 sold in the local market while 73 decided to sell in the export market.

The results show that almost one-fifth of the farmers who sold peaches in the local market relative to other outlets were members of farmers' association. On average, farmers who sold their produce in the local market spend relatively fewer costs (3 USD) on communication compared to those who sold at the farm gate and export market. The results inform those farm gate participants had spent more on communication costs relative to other participants. Hence, they had high information costs relative to the farmers who sold in other outlets which are, local and export market outlets. Farmers who sold at both the local market and export market outlets incurred equal cost on market fees (0.01 USD) while farmers who sold at the farm gate did not incur any market fees.Moreover, farmers who sold peaches in export marketing outlets spend more hours negotiating the quantity and quality of peaches while those who chose the farm gate as an outlet spent one hour and fifty-one minutes. Participants who used farm gate and export as their marketing outlets incurred roughly equal costs on sorting and grading. Following these results, the implication is that farmers who sold at the farm gate and export market incurred more on bargaining and negotiating transaction costs owing to not only negotiating hours but also sorting and grading costs. This could be probably because most of these farmers did not belong to any cooperative or farmers' association. The literature points out that farmers who join farmers' groups are likely to gain more as they can spread their fixed costs over larger sales volumes and offer better prices as

well. Consequently, smallholder farmers often generate higher income and derive maximum satisfaction by choosing to sell their products in market outlets which offer higher prices to offset the costs incurred (Nucera *et al.*, 2016; Jebesa, 2019).

Majority of farmers had indicated that they trusted their buyers irrespective of the outlets they used to sell their peaches. This may imply that most of the buyers were endemic to the farmers and had developed a sense of relationship over the years. According to Tarekegn *et al.* (2017) and Dyer and Chu (2003), the households who trust in their buyers are more likely to deliver products to a market outlet than sell at the farm gate in the absence of contractual arrangement fees. Therefore, the trustworthiness of traders and/or consumers, in this case, reduce the transaction costs associated with an opportunistic behavior that is very likely to arise between market participants.

Over and above that, farmers who sold at farm gate had an average of 12 years experience in both production and marketing of peaches which was one to two years smaller than the experience the farmers who sold peaches in local and export market outlets had. This implies that farmers with more experience incurred less cost on the search and information-related transaction costs. The results are inconsistent with Ba *at el.* (2019) and Pingali *et al.* (2005), who documented that older or more experienced farmers are faced with lower negotiation costs as farming experience, makes certain informational and search costs easier and thus cheaper. Only 5 per cent of farmers who sold at farm gate had contracts; spending an average of 1.28 USD on contractual arrangement fees which were found to be three times more expensive than what proportion of farmers who had contracts in export market outlet spent on contractual arrangement fees. These results suggest that these farmers were practicing contract farming.

Farmers who sold peaches at the export market incurred more costs on storage (0.33 USD) than farmers who sold in the local market had spent. This could be because the farmers who sold at the local market took a smaller proportion of peaches to the market while those traveling to further away market outlets such as export had to deliver larger quantities that require more costs to preserve and maintain fruits fresh. Peaches like any other highly perishable product in agriculture require sophisticated storage technology, like cooling systems in a van and at the market to maintain freshness which is normally expensive (Huka *et al.*, 2014; Moyo, 2014).

The farmers who sold at the farm gate and those who sold peaches in the export market incurred relatively equal transportation costs (26 USD) per month. This may be probably because some of them used a combination of the two outlets. Since most farmers were rural dwellers the average distance to the nearest market was found to be 20 Km and 33 Km was the furthest from the farm. This could be because of the orientation of farms in Lesotho, most farmers have their orchards away from the markets as such it takes a distance to deliver the products to the outlets.

The results further show that farmers who had their means of transport and sold their produce at the farm gate were roughly equal to the proportion of farmers who sold in the export market outlet. These farmers spent 25.46 USD and 26.23 USD on transportation costs respectively. This implies that these farmers use the combination of these outlets at the go since they correlate to some degree.

Table 9: Transaction costs incurred by smallholder peach farmers as per market participation

Variable	Farm gate	Local market	Export market
NO. of observations	14	19	73
Information and search transaction costs			
Collective action (in per cent)	14.29	15.78	10.95
Communication costs (USD)	14* (9.8)	3* (5.1)	10* (8.8)
Market fees (USD)	0	0.1* (0.2)	0.01* (0.09)
Bargaining and Negotiating transaction costs			
Age (in years)	48** (11)	53** (12)	51** (10)
Farming experience (in years)	12.3** (8.4)	14.8** (11.9)	13.1** (7.9)
Male farmers (in per cent)	21.56	23.53	82.35
Negotiation (Hours)	1.51** (0.99)	1.1** (1.08)	1.59** (3.11)
Sorting and grading costs	11.4* (12.57)	2.82* (6.02)	10.91* (15.04)
Monitoring and enforcement transaction costs			
Trusted buyers (in per cent)	85.71	78.94	89.04
Contract availability (in per cent)	0	5.26	5.47
Credit (in per cent)	7.14	5.26	4.17
Contractual arrangement fees (USD)	1.28** (2.44)	0	0.4** (1.98)
Storage costs (USD)	0	0.15** (0.57)	0.33** (1.62)
Proportional transaction costs			
Transport costs (USD)	25.46**(13.25)	16.72**(21.58)	26.23**(19.52)
Personal means of transport (in per cent)	71.42	31.16	68.49

Variables marked with *, ** and () are percentages, means and standard deviations respectively.

4.5 Model Diagonistic Tests

4.5.1 Multicollinearity

Multicollinearity test was conducted on the predator variable to detect the problem of correlation between explanatory variables. Multicollinearity is a condition upon which some predictors in the regression equation are correlated with others. The presence of multicollinearity can lead to inflated standard errors thus, hindering the potential of significance in some predictor variables (Akinwande *et al.*, 2015). The Variable Inflation Factor (VIF) was conducted on the variables to be used in the model to check whether there

is a correlation or not. According to Yoo *et al.* (2014), a VIF value greater than 10 shows indicate the presence of a correlation between the explanatory variables. Concerning the VIF presented in Table 10, the VIF results for all variables appear to be less than 5, therefore the study concluded that there is no multicollinearity amongst the variables.

Table 10: Variance Inflation Factor for predictors

Variable	VIF	1/VIF
Average monthly income	1.47	0.680008
Time taken to reach the outlets	1.47	0.680833
Communication costs	1.44	0.696197
Farm size	1.39	0.718027
Sorting and grading costs	1.39	0.721994
Age	1.37	0.727930
Contractual arrangement fees	1.37	0.732041
Household size	1.36	0.736131
Money loss per Kilo of spoiled peaches	1.10	0.911832
Gender	1.07	0.933843
Negotiating hours	1.03	0.973135
Mean VIF	**1.31**	

4.5.2 Heteroskedastisity Tests

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of LocalMarket

chi2(1) = 21.01

Prob > chi2 = 0.0000

To test for heteroskedasticity in the regression equation, Breusch-Pagan / Cook-Weisberg test for heteroskedasticity was conducted. The test results show the Prob > chi2 = 0.0000 for the OLS model which indicated the presence of heteroskedasticity. Therefore, the study rejects the null hypothesis at both 90% and 95% significance level and concludes that residuals are not homogeneous. Due to the non-homogeneity of residuals, the Robust Standard Errors were used to deal with the problem of heteroskedasticity (Stock and Watson, 2008).

4.5.3 The Influence of Transaction Cost Factors on the Choice of Marketing Outlets of Peaches in Lesotho

The multivariate probit model was used to determine the influence of transaction costs on the choice of market outlet. The results are given in Table 11. The likelihood ratio test (Rho-values), of ρ21 = ρ31 = ρ32 = 0 are statistically significant at 10%. As such, the null hypothesis which, postulates that all ρ (Rho) values are jointly equal to 0, is rejected: implying the goodness-of-fit of the model or indicating that the decisions to choose these market outlet choices are interdependent. Therefore, the use of a multivariate probit model in this study is justified to determine transaction cost factors influencing the choice of marketing outlets.

Table 11: Multivariate probit results on transaction cost factors influencing choice of marketing outlets

Variables	**Farm gate**		**Local market**		**Export market**	
	Far β	**RSE**	**Loc** β	**RSE**	**Exp** β	**RSE**
Gender of household head	.791***	.422	.23	.349	-.102	.339
Household size	.018	.068	.096	.067	-.131**	.055
Age in years of respondents	-.036	.026	-.020	.0178	.011	.016
Farm size (acres)	.064	.123	-.101	.142	-.119	.141
Time taken to reach other outlets (Min)	-.014**	.007	.005	.010	.001	.008
Log yield loss via spoilage (M/Kg)	3.88	12.4	17.6	16.2	-.870	15.02
Sorting and grading costs (M)	.0004	.001	-.006*	.002	.001	.001
Average Monthly income (M)	-.0003*	.0001	.0002***	.0001	.00001	.0001
Communication Costs (M)	.005*	.002	-.010*	.002	-.0004	.002
Negotiating (Hours)	-.039	.067	-.036	.048	-.025	.029
Contractual arrangement fees (M)	.004	.004	.003	.006	.001	.004
Constant	-3.63	12.5	-17.13	16.4	2.48	15.2
Number of obs						**90**
Log likelihood						**-91.03**
Wald $\chi2(30)$						**110.75**
Prob > $\chi2$						**0.0000*** **
Likelihood ratio test of						**ρ_{21} = ρ_{31} = ρ_{32} = 0**

Note: Variable marked with *are significant at 10%, ** at 5%, ***at 1%, 1USD=14 LSL

The results presented in Table 11, show that gender, time taken to reach other market outlets, average monthly income, and communication costs were significant at the farm gate market outlet at a 10% level of significance. At the Local market outlet, sorting and grading costs, average monthly income, and communication costs were significant at a 10% level of significance while the household size was revealed to have influenced the choice of the export market outlet at a 5% level of significance. Amongst these variables, some are in line with economic hypotheses set in the previous chapter while others are not. The results show a positive relationship between gender and communication costs at the farm gate. Sorting and grading costs as well as average monthly income had a negative impact with regard choice of farm gate as an outlet.

Gender had a significant ($p<0.01$) positive effect on the choice of selling at the farm gate only. All things equal, being a male farmer increases the chances of selling at the farm gate by 79 per cent. This result implies that male farmers in Lesotho are not only the heads of households but also manage and regulate so many other farm enterprise activities hence, they optimized their human resource utilization by selling at the farm gate. This observation also reflects some capital disparities in terms of land between the male and female peach farmers (Abu *et al.*, 2016). The present result is in accordance with Okeoye *et al.* (2016), who found that male farmers are more likely to sell at the farm gate than their female counterparts.

The household size had a significant ($p<0.05$) but a negative impact with respect to the choice of export market outlet. *Ceteris paribus*, a one-member increase in household size generally reduces the probability that a household would choose the export market by 13.1 per cent. The result shows that farmers with large household sizes are less likely to sell their products in the export market due to high consumption levels which attribute to low marketable surplus to meet high-value market outlet demand such as export market outlet demand. The outcome is incongruent with Yonnas *et al.* (2019), who reported that large family size reduces marketable surplus which in turn triggers the farmers to choose nearby market outlets which most smallholder farmers choose when the volume for sale is small.

Time taken to reach other outlets was found to have a significant negative influence with regard to the choice of farm gate at 5 per cent level of significance ($p<0.05$). Holding all things constant, this finding indicates that, a minute increase in the time (traveling time) taken to reach other market outlets resulted in a reduced likelihood of choosing farm gate by 1.4 per

cent. The probable reason behind the negative effect between farm gate and time taken to reach other outlets is that most of the consumers in Lesotho have taken up residence in semi-urban and urban areas where there is a high demand of peaches since most do not have their own land to produce peaches, hence higher prices for peaches which gives a farmer an incentive to choose other outlets regardless of transportation costs that are in line with longer time travel (Vorley & Lançon, 2016; Jebesa, 2019). This goes without saying that the remoteness of the market outlets from the farm renders high returns from the sale of produce in high-value markets which are featured by high prices relative to farm gate prices; hence, longer distance did not override farmers' motives. The present outcome is in agreement with opinions of (Fafchamps & Hill, 2005; Hill & Vigneri, 2014; Mugisha *et al.* 2016), who reported that farmers access to information as well as low transportation costs relative to market outlet prices may lower the chances of farmer selling at the farm gate. Abu *et al.* (2016), in their study, have documented that higher market prices and high access to market and price information retender the choice of market outlets over farm gate since most crops are sold with lower prices at farm gate than in the local market.

The average monthly income negatively and positively impacted the choice of farm gate outlet and local market outlet at 10 per cent and 1 per cent levels of significance respectively. A 1 USD increase in average monthly income decreased the chances of choosing the farm gate as an outlet by 0.03 per cent and increased the likelihood of selling in the local market outlet by 0.02 per cent. The possible reason behind this is that farmers who sell at farm gate normally receive low prices as such their income accumulation is normally small in comparison with income accrued from the sale of peaches in markets offering better prices, for this reason, they would rather sell in the local market than farm gate. Over and above that, the negative relationship between average income and farm gate choice could be explained by the nature of occupation most respondents had. Since most farmers were not full-time farmers, they did not have much time to engage in peach marketing activities. The results are in agreement with past studies by Anteneh *et al.* (2011), Woldeyohanes *et al.* (2017), and Verkaart *et al.* (2018), who noted that most of the smallholder farmers work part-time outside agriculture, as such an increase in off-farm income encourages the choice of off-farm income-generating activities over farm marketing related activities.

The cost of sorting and grading peaches had a significant (p<0.1) negative effect on the choice of local market outlet only. A one-dollar increase in costs of sorting and grading

resulted in the reduced chances of selling in the local market by 0.6 per cent. The finding suggests that the higher the sorting and grading costs of peaches incurred, the less likely the farmers will choose to sell their produce in the local market. The implication is that sorting and grading costs are of less importance in influencing the farmer's decision toward the choice of the local market outlet as the costs can be easily transferred to the buyers (Fafchamps and Hill, 2004). This is probably because there was a slight diminutive difference between local market outlet and farm gate, especially to those farms which were along the roadside, as such local market was just as informal as a farm gate. High transaction costs; sorting and grading costs in this case, associated with any outlet normally restrict market penetration amongst the smallholder farmers. The farmers who supposedly have expertise in sorting and grading costs usually prefer selling their produce in the more paying formal markets, to cover costs associated with acquiring the expertise (Jari & Fraser, 2009).

Moreover, communication costs were found to have positively and negatively influenced the choice of farm gate and local market outlet (p<0.1) respectively. An additional one loti in cost of communication increased the likelihood of choosing farm gate by 0.5 per cent coupled with a reduction in the chances of a farmer selling in local market outlet by 1 per cent, all things equal. The farmers who incurred communication costs were more likely to sell at farm gate and less likely to sell in local market, *ceteris paribus*. This is because farmers who sell at farm gate normally have known potential buyers whom are possibly contacted during the time of harvest as way of monitoring the rate at which fruits spoil.

More precisely, Hamilton *et al.* (2013), noted that the cost incurred on advertisement; communication in this case, could increase the sales rate thus reducing the loss that can accrue to spoilage of the crops. This result is in lined with Melese *et al.* (2018), who reported that communication is used to access information and knowledge which strengthen production and marketing. On contrary, the negative effect between the communication costs and local market outlet choice could probably be because of proximity of farm to the market which is also within vicinity of the buyers. Therefore, there is a strong 'word of mouth' in the community which in turn effectively increases sale of peaches at relatively low costs. Information spreading by word of mouth is also key to the flow of information (Lancaster & Torres, 2019).

4.6 Marketing Margins of different Peach Marketing Outlets

Several conversions were done to get farm gate, local market outlet and export market outlet marketing margins. For example, conversion of prices from local currency to dollars. Upon determination of prices per a kilogram at each outlet, gross margins for each farmer were determined using equation (26) in the previous chapter. Total marketing margins were also determined using these prices. Hence, producer gross marketing margins were also computed as 1- TGMM. The results are presented in Table 12.

Table 12: Farmers' marketing margins in respective outlets

Variables	Outlets		
	Farm gate	**Local Market**	**Export Market**
Average Consumer's price $/1kg	0.12	0.16	0.96
Average Producer's price $/1kg	0.09	0.11	0.16
Gross Marketing Margin ($/kg)	0.03	0.05	0.80
Total Gross Marketing Margin (%)	25	31.35	76.78
Average costs ($/kg)	0.27	0.35	0.70
PGMM (%)	75	68.75	23.22

1 USD ($) = 14 LSL

The results from Table 10 show a total gross marketing margin of 25 per cent, 31.35 per cent and 76.78 per cent at farm gate, local market outlet and export market outlet with farmer participation margin of 75 per cent, 68.65 per cent and 23.22 per cent respectively. Hence, producer gross marketing margin decreased with the type of marketing outlets, from the farm gate through the local market outlet to the export market outlet. The results on the marketing margin reflect farmers were purchasing peaches at an average of 0.09 USD per kilogram and selling at an average of 0.12USD per kilogram. The gross marketing margin of the farmers increased with the type of marketing outlets chosen. Out of 0.03 USD per kilogram of peaches, the marketing costs were 0.27 USD per kilo of peaches which reflects that farmers accrued a net loss upon marketing costs which included; sorting and grading costs, communication costs, labour costs, water bill, gasoline, and contractual arrangement fees.

Owing to marketing costs such as transportation costs, storage costs, contract enforcement costs, sorting and grading costs, communication costs, labour costs, water bill, and gasoline;

farmers who sold at the local market outlet accrued a net loss margin of 0.3 USD per a kilo of peaches sold. The farmers who sold peaches in the export market had incurred the highest costs per kilogram of peaches. This could have been due to the primary packing materials used by the farmers as well as specialized labour for the sorting and grading, packing, cleaning, transporting, loading, and unloading of peaches which is normally expensive in the regional towns. The results show a direct relationship between consumer price and the gross marketing margin as seen from the farm gate to the export market. This is acceptable from the theoretical frame of reference as the marketing margin is a derivative of the difference between consumer price and purchase price (Maimouna & Jing, 2013; Tesfaw & Alemu, 2013).

CHAPTER FIVE
CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

(i) Farmers who sold peaches at the farm gate incurred more costs on communication relative to farmers who sold in the other two outlets. The majority of the export outlet participants spent more time negotiating deals in the market. These are the same farmers who had incurred roughly higher costs on transportation because they drove the longest distance from farm to the outlets.

(ii) The influence of transaction costs towards the market outlets' choice was generally low. However, the respondents in the study area have made their choice of market outlets for their products based on the time taken to reach other outlets, storage, and grading costs, average monthly income, communication costs, gender, and household size.

(iii) The marketing margins increased with an increase in consumer price. Farmers who sold at the farm gate and local market had net loss due to high transaction costs while exporter experienced net gain.

5.2 Recommendations

Improving both communication and road infrastructures would bring in the cost-effective direct deliveries from farmers located in remote rural areas to the consumers, especially those in urban areas. Implementation of effective pricing policy strategies such as fixed bundle pricing and bulk pricing would protect farmers from losses related to bargaining and negotiations. Implementing Information and Communications Technology (ICT) initiatives such as e-extension would make it easier for smallholder peach farmers to access market information, which will in turn reduce the transaction costs and increase production. Increased production of peaches will enhance the chances of a farmer selling in a high-value market outlet. Implementing collective instruments such as collective marketing and supply management would improve marketing margins and net returns of the smallholder peach farmers in Lesotho.

5.3 Further Research

The study focused on transaction costs factors influencing the choice of peach marketing outlets, in order to design agricultural marketing and trade policies; policy makers need more findings on agricultural cash crops in Lesotho, hence more studies need to be conducted.

Attributable to the twist that comes along with transaction costs measurement, the study only focused on transaction cost factors influencing the choice, hence further research can be conducted to quantify transaction costs for better observations and inferences. Moreover, future research needs to be conducted to elicit how transaction costs affect the market surplus of peach farmers may be useful. The study was conducted on only 90 peach farmers, using multivariate probit model as such in one district, hence, a need of conducting the study in other districts with a relatively large sample to avoid biases of results. Moreover, future research needs to be done on the factors influencing the marketing margins of different marketing outlets of peaches.

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APPENDICES

Appendix 1: Household Questionnaire

Dear Respondent,

I am ***Lintle Rafoneke,*** pursuing Master of Science in Agriculture and Applied Economics in Egerton University-Kenya. I am conducting a study on the ***transaction cost factors influencing choice of marketing outlets amongst peach smallholder farmers in Lesotho.*** This study seeks to provide an understanding of transaction costs incurred by most smallholder peach farmers and how they can impact farmers' marketing decisions in Lesotho. This questionnaire is prepared to gather data for the study on the influence of transaction costs along different marketing outlets of peaches in five constituencies of Leribe district in Lesotho.

You are therefore requested to spare some of your time to respond to the questions that follow. The researcher undertakes to keep the information private and confidential. The researcher will protect respondents by making the responses anonymous or assigning personal identification number to each respondent.

Your participation in this interview is voluntary. You can choose not to answer or to skip any of the questions, can ask questions and/or can end the interview at any stage. Thank you in advance for your participation and cooperation in this project.

PART 1: GENERAL INFORMATION

1. PROFILE OF THE STUDY

Name of enumerator	
Name of Household	
Village	
Questionnaire number	
Interview Date/Month	
Respondent's name	
District	

PART 2: FARM AND FARMER'S CHARACTERISTICS

Household head Characteristics

Characteristics	**Coding**	**Response**
Age of household	Numbers in years	
Gender of household	1=Male, 0=Female	
Marital status	1=Single. 2=Married, 3=Divorced, 4=Widowed 5=Other (specify)	
Education level	1= Primary, 2= Secondary, 3= High School, 4=Tertiary, 5=Non-formal	
Household size	Female: Adult: _____ Children: _____ Male: Adult: _____ Children: _____	
Main Occupation	1=Farmer, 2=Civil servant, 3=Unemployed, 4=Private sector, 5=Self-employed, 6=Other (specify)	
Main Source of Income	1=Peach Production 2=Other-on-farm 3=Off-farm employment 4=Pension 5=Other (specify)	
Estimated Income	Annual Income in Maloti	
Farming Experience	Number of years spend in peach production and marketing	
Farm size	Number of acres used for peach farming activities	
Farm land ownership	1=Self 2=Family 3=Rented 4=Group 5=Other (Specify)	
Rent per month for Farm land	Maloti paid per month	

PART 3: INFORMATION RELATED TRANSACTION COSTS

1. What are your main market outlets for peaches? (Indicate by a to d)

   1) Farm gate [ ] **2)** Local market [ ] **3)** Middlemen [ ] **4)** Export market [ ]

   2)

2. How far in kilometres is the marketing outlet away from the farm?

   1) Below 2KM [ ] **2)** 2-5 KM [ ] 3) 5-8KM [ ] **4)** 8-11KM [ ] **5)** Above 11KM [ ]

3. What is your source of marketing information?

   1) Internet [ ] **2)** Radio / TV [ ] **3)** Public baraza [ ] **4)** Newspaper [ ] **5)** Other
   (specify)……..

4. How often do you receive information about consumer demand for peaches?

   1) Daily [ ] **2)** Weekly [ ] **3)** Monthly [ ] **4)** Quarterly [ ] **5)** Annually [ ]

5. How much do you normally pay to source out the information on price?

   1) Below M20.00 [ ] **2)** M20.00 – M30.00 **3)** Above M30.00

6. What is the major problem in the marketing?

Problem	**Never**	**Rarely**	**Sometimes**	**Often**	**Always**
Lack of transport					
Poor access to credit					
Lack of contracts					
Poor access to market information					
Lack of formal markets					
Low price					
Payment condition					
Excessiveness of resellers					
Warehousing problem					
Distance from the markets					
Other (Indicate)					

7. Do you have access on price information in other marketing outlets? **1)** Yes [ ] **2)** No [ ]
8. If **YES,** what is the price differential between the current outlet and other outlets? ……LSL
9. At what price do you buy or produce peaches? Indicate ……LSL
10. Indicate in the table below the quantities of peaches produced and consumed on average as well as the marketing outlet used:

Quantities produced	**Quantities consumed**	**Marketing outlets used**	**Quantities Sold**	**Selling price**

PART 4: MONITORING AND ENFORCEMENT TRANSACTION COSTS

1. Do you have your own means of transportation? **1)** Yes [ ] **2)** No [ ]
2. If **YES,** how many litres of gasoline and how much in maloti do you spend on per month? ……. LSL
3. If NO, how much in maloti do you pay per load of truck? …… LSL
4. Do you have access to credit? **1)** Yes [ ] **2)** No [ ]
5. If **YES,** who is your financial provider? ……
6. How do you rank the level of trust between you and your partnering agents? **1)** Very High [ ] **2)** High [ ] **3)** Moderate [ ] **4)** Low [ ] **5)** Very Low
7. How often do you normally get extension visits at your farm enterprise? **1)** 3 times per week [ ] **2)** 3 times per month [ ] **3)** 3 times quarterly [ ] **4)** Never [ ]
8. How are the conditions of roads you use to the marketing outlets from farm? 1) Paved [ ] **2)** Gravelled [ ] **3)** Un-Gravelled [ ]

9. Indicate below the distance in kilometres between farm gate and other market outlets:

1) Farm gate and Local market [……] Km **2)** Farm gate and Middlemen […..] Km **3)** Farm gate and Export market [……] Km

10. Indicate below the time in Minutes/ Hours you can take to reach the following market outlets from the farm gate: **1)** Local market […..] **2)** Middlemen […..] **3)** Export […..]

PART 5: NEGOTIATION AND BARGAINING TRANSACTION COSTS

1. When selling in other marketing outlets, how many hours do you normally spent selling in there? **1)** Local market […..] **2)** Middlemen […..] **3)** Export […..]

2. Are you a member of any farm association? **1)** Yes [ ] **2)** No [ ]

3. If **YES,** what is the name of the group…….

4. What is the main reason behind membership? **1)** Farming [ ] **2)** Marketing [ ] **3)** Welfare [ ] **4)** Advisory [ ]

5. Do you have access to credit? **1)** Yes [ ] **2)** No [ ]

6. If **YES,** who is your financial provider? ……

7. Do you have contractual agreement with any agribusiness entity?

1) Yes [ ] **2)**No [ ]

8. If **YES,** who are you contracting with?

1)Farm gate [ ] **2)** Local market [ ] **3)** Middlemen [ ] **4)** Export market [ ] **5)** Other ……

9. What might be the reason behind contracting?

10. If **NO,** what might be the reasons for not joining association? …….

……

……

11. How many hours do you spend negotiating deals in the markets?

1) Price [___] hrs **2)** Contracts [___]hrs

12. How often does price of peaches change at farm gate?

1) Daily [ ] 2) Weekly [ ] **3)** Fortnight [ ] **4)** Monthly [ ] **5)** Annually [ ]

13. How much of legal fees did you pay for contractual arrangement?

…… LSL

14. How much on average can you spend in Maloti to transport to: **1)** Farm gate […..]

2) Local market [……] **3)** Middlemen […….] **4)** Export market […….]

15. Do you negotiate the price, volume and quality of peaches at marketing outlets?

1) Yes [ ] **2)** No [ ]

16. If **YES,** how many hours do you normally spend negotiating the prices, volume and quality of peaches? …….. hours

17. Do you sell all of your produce when selling through local market outlet? **1)** Yes [ ] **2)** No [ ]

18. If **NO,** how much in Kgs do you normally fail to sell? ……Kg

PART 6: OTHER TRANSACTION COSTS

1. What happens to the peaches not sold at the outlet: **1)** Stored overnight for resale [ ] **2)** Goes to spoilage [ ] **3)** Other (Specify) …….

2. If stored, how is it stored and for how long? ……....

3. How much do you pay per kilo of peaches stored? …… LSL

4. Do you weigh your peaches before and after storing them? **1)** Yes [ ] **2)** No [ ]

5. Do you experience any shrinkage loss in your farm? **1)** Yes [ ] **2)** No [ ]

6. What shrinkage loss do you normally lose in terms of weight, theft and/or spoilage? ……..

7. What is the major source of the loss? **1)** Employee theft [ ] **2)** Community theft [ ] **3)** Administrative error [ ] **4)** Vendor fraud [ ] **5)** Other (specify) ……

8. Rough estimation of peaches lost via shrinkage (weight loss) …… Kgs

9. Do you pay any market fees in a respective marketing outlet? **1)** Yes [ ] **2)** No [ ]

10. If **YES,** how much? ……. LSL

11. If **NO,** what might be the reason behind that? …….

12. How do you rank the level of trust between you and your partnering agents? **1)** Very High [ ] **2)** High [ ] **3)** Moderate [ ] **4)** Low [ ] **5)** Very Low

13. Indicate here the cost of communication in your enterprise: ……. LSL

14. How much do you pay for sorting and grading of peaches per hour? …… LSL

PART 7: COST FARMERS INCURRED IN THEIR ENTERPRISE

1. Do you undertake the following activities in your enterprise?

Activity	**1.Yes [ ] 2. No [ ]**	**If yes, Why? 1=Fetch better prices 2=Required to do so 3=Others, specify**	**Cost per Kg/bag(80 kg)**
Sorting			
Cleaning			
Grading			
Packaging			

2. Please fill in the table of costs incurred in the farm and at the market accordingly:

Variables	**Description**	**Unit and price**
Production costs		
Labour	Number of employees in the farm: head/maloti	
Water	Water bill per maloti in a month	
Gasoline	Cost on petrol/diesel per month	
Insecticides	Price of insecticides per litres per hectare	
Pesticides	Price of pesticides per litres per hectare	
Herbicides	Price of Herbicides per litres per hectare	
Fungicides	Price of fungicides per litres per hectare	
Fertilizer	Price of 50kg bag of fertilizer	
Manure	Price of Manure per 50kg bag	
Loading	Maloti spend per truck	

Unloading	Maloti spend per truck	
Propagating expert	Salary per month	
Exchange Costs		
Enforcing contracts	Price spend on getting paperwork	
Transportation costs	In Maloti per load	
CESS	Amount paid to	
Negotiating costs	Hours spend on negotiating	
Rent	Maloti per month	
Price information	Number of calls made times cost per call	

Appendix 2: Objective 2 Estimates

A. Normality test

```
.mvtest normal Gender Age Hsize Fsize TmROutlets VolLosexplog
StrCosts Incom     ComCst Negtxn LfCAr

Test for multivariate normality

Doornik-Hansen     chi2(22) = 4929.657   Prob>chi2 =  0.0000
```

B. Multivariate probit estimates

```
.mvprobit(Farmgate = Gender Age Hsize Fsize TmROutlets VolLosexplog
StrCosts Incom ComCst Negtxn LfCArr)(LocalMarket = Gender Age Hsize
Fsize TmROutlets VolLosexplog StrCosts Incom ComCst Negtxn
LfCArr)(ExportMarket= Gender Age Hsize Fsize TmROutlets VolLosexplog
StrCosts Incom ComCst Negtxn LfCArr),robust


Multivariate probit (MSL, # draws = 5)          Number of obs = 90
                                                Wald chi2(30) = 110.75
Log pseudolikelihood = -91.025269               Prob > chi2   = 0.0000
```

	Coef.	Std.Err.	z	P>|z|	[95%Conf.	Interval]
Farmgate						
Gender	.7911315	.4216125	1.68	0.092	-.1066151	1.408878
Age	-.035869	.0260984	-1.49	0.137	-.0831009	.0113629
Hsize	.0184357	.068449	0.11	0.911	-.1431615	.1604329
Fsize	.0635132	.1230709	1.30	0.194	-.0935687	.4605951
TmROutlets	-.013636	.0066768	-1.80	0.072	-.0326426	.0013699
VolLosLLog	3.881459	12.40918	0.49	0.622	-18.35608	30.67907
StrGrtC	.0003789	-.001548	-0.99	0.324	-.0456266	.0150688
Incom	-.000255	.0001019	-2.50	0.012	-.0004544	-.000055
	Coef.	Std.Err.	z	P>|z|	[95%Conf.	Interval]
ComCst	.0048087	.0015173	2.48	0.013	.00083890	.0071785
Negtxn	-.039257	.0669015	-0.65	0.514	-.1585231	.0793832
LfCArr	.0036821	.0044888	0.82	0.412	-.0051158	.0124801
_cons	.1091635	1.036297	0.11	0.916	-1.921941	2.140268
LocMarket						
Gender	.2308065	.3487090	0.77	0.444	-.4063082	.9279211
Age	-.019039	.0178381	-0.60	0.551	-.0407427	.0217349
Hsize	.0958174	.0667940	0.92	0.355	-.0681364	.1897713
Fsize	-.100618	.1423922	-0.80	0.424	-.3818615	.1606260
TmROutlets	.0053042	.0104286	0.04	0.972	-.0164115	.0170199
VolLosLog	17.72763	16.17052	0.28	0.777	-27.94598	37.40125
StrGrtC	-.005752	.0019067	-10.5	0.000	-.2238486	-.153656

Incom	.0021417	.0019760	1.45	0.147	-.0000497	.0003330
ComCst	-.010118	.0024111	-3.63	0.000	-.0140401	-.004197
Negtxn	-.036423	.0480381	-0.73	0.466	-.1231964	.0563512
LfCArr	.003414	.0056384	-0.35	0.726	-.0126229	.0087949
_cons	.2646263	.9769194	0.27	0.786	-1.650101	2.179353
ExpMarket						
Gender	-.102992	.3393821	-0.72	0.470	-.8530692	.3932255
Age	.0107976	.0163604	0.47	0.638	-.0246602	.0402553
Hsize	-.130796	.0550515	-2.39	0.017	-.2178956	-.021697
Fsize	-.119225	.1401491	-0.32	0.745	-.2288038	.1637736
TmROutlets	.0070853	.0078399	-0.10	0.924	-.0152899	.0138738
VolLosLog	-.865296	15.01558	0.29	0.772	-28.64142	38.56801
StrGrtC	.0010735	.0012046	-2.40	0.017	-.0183134	-.001832
Incom	.0000365	.0000822	0.44	0.657	-.0001246	.0001976
ComCst	-.000402	.0021351	-0.01	0.993	-.0040057	.0039713
	Coef.	Std.Err.	z	P>|z|	[95%Conf.Interval]	
Negtxn	-.025117	.0288254	-0.90	0.366	-.0987514	.0364177
LfCArr	.0012498	.0039437	0.57	0.568	-.0054797	.0099793
_cons	1.543639	.7395831	2.09	0.037	.09408240	2.993195

Likelihood ratio test of rho21 = rho31 = rho32 = 0:

chi2(3) = 22.0769 Prob > chi2 = 0.0001

C. Other tests performed

```
.estat hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of LocalMarket
         chi2(1)      =    21.01
         Prob > chi2  =   0.0000
```

```
.vif
    Variable |       VIF       1/VIF
-------------+----------------------
       Fsize |      1.39    0.718027
  TmROutlets |      1.47    0.680833
      ComCst |      1.44    0.696197
       Incom |      1.47    0.680008
    StrCosts |      1.39    0.721994
       Hsize |      1.36    0.736131
      LfCArr |      1.37    0.732041
         Age |      1.37    0.727930
VolLosexplog |      1.10    0.911832
      Gender |      1.07    0.933843
      Negtxn |      1.03    0.973135
-------------+----------------------
    Mean VIF |      1.31
```

D. Pairwise correlation test for categorical variables

```
. pwcorr Gender Status OcpTxn SoIncm Edu FlandOnrshp MrkInf CllAct ExtSer Trust Cntrcts Credit
```

	Gender	Status	OcpTxn	SoIncm	Edu	FlandO~p	MrkInf	CllAct	ExtSer	Trust	Cntrcts	Credit
Gender	1.0000											
Status	-0.1468	1.0000										
OcpTxn	-0.1252	0.0599	1.0000									
SoIncm	-0.0591	0.0561	0.0150	1.0000								
Edu	-0.0963	0.0611	0.1020	0.0805	1.0000							
FlOshp	0.0600	-0.0586	0.0560	0.0751	0.1171	1.0000						
MrkInf	-0.0665	0.1442	0.0730	-0.0042	-0.2328	-0.1860	1.0000					
CllAct	0.0075	0.0443	-0.0385	0.0949	-0.0597	-0.1785	0.0177	1.0000				
ExtSer	0.0268	0.0699	-0.1502	0.1219	-0.0102	0.0863	-0.0372	-0.0190	1.0000			
Trust	0.0400	-0.0835	-0.1955	-0.2122	-0.2125	0.0851	0.1789	-0.1552	0.1259	1.0000		
Cntrcts	0.2774	0.0398	-0.0420	-0.0330	-0.0145	0.0346	-0.1371	0.0808	0.2622	0.0767	1.0000	
Credit	0.0290	0.0582	-0.0093	0.1148	0.0257	0.1347	0.0495	-0.0719	0.3251	0.0682	0.4185	1.0000

Appendix 3: Kernel density estimate graph

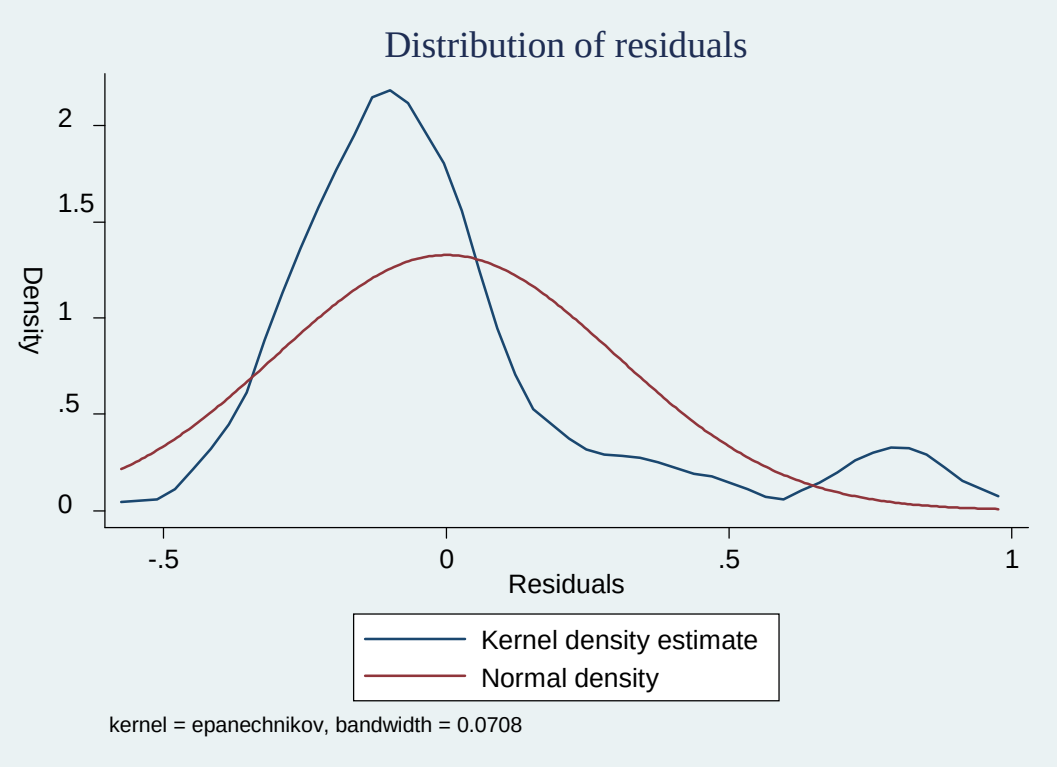

Figure 9: Residual distribution