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FACTORS INFLUENCING FARMER PARTICIPATION IN AUCTION TOBACCO MARKETING IN WEDZA DISTRICT, ZIMBABWE

BY

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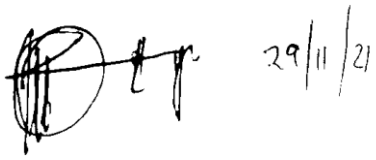
Abstract

The purpose of this study was to assess factors that influence farmer participation in tobacco auction markets in Wedza district using data from a random sample of 193 farmers who were interviewed using telephone interviews due to the Covid pandemic. A Probit regression model was used to analyze the data to identify the factors affecting auction tobacco market participation. The estimated coefficients (values), the standard errors and the marginal effects of the independent variables in the model were derived. Findings from the study pointed out that the contract and auction markets are both active in the study area though contract growers dominated as compared to auction growers with a ratio of 70: 30. Factors found to significantly impact participation of growers in auction are gender, household size and employment. Also, access to United States Dollar payments, hectares and distance to floors have an impact on grower's participation in the auction markets. A grower's ability to sell with all markets, the overall costs of selling in a market and the number of buyers participating in a market are the other factors identified to impact grower participation in auction tobacco markets. Variables that did not to affect auction participation significantly are farming experience, non-agriculture income, number of extension visits and ownership of transport. The key conclusion from study is that utility deriving through cheaper avenues drives farmer participation in auction markets and the key recommendation for auction market participation is through reduction of cost related in market participation. Grower participation in auction markets is sensitive to the grower yielding maximum benefits and very minimal losses which policy makers should remember when coming up with policy for the farmers in the tobacco sector.

Keywords: Auction, Market Participation, Probit

Declaration

I declare that this dissertation is my original work except where sources have been cited and acknowledged. The work has never been submitted, nor will it ever be submitted to another university for the award of a degree.

Teya Jeffry 

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Dedication

I dedicate this work to my late father – Noah Teya and Junior Jeff Teya.

List of Acronyms and Abbreviations

AUREC	Africa University Research Ethics Committee
FLRP	Fast track Land reform Programme
GDP	Gross Domestic Product
GOZ	Government of Zimbabwe
LRP	Land Reform Programme
TIMB	Tobacco Industry and Marketing Board

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CHAPTER 1 INTRODUCTION

1.1 Introduction

Auction floors are among the oldest commodity exchange marketing institutions. The oldest form of trade can be traced back to auctioning. The word "auction" originates from Latin word "*Auctio*" that means lifting. First auctions were organized in Ancient Rome. (Nedeljko Prdić1, 2018). The aim of auctions was the protection of interests of the absent and incapable, whose property was being sold. Later, this selling manner was used for sale of debtor's property, by court decision, to pay debtor's obligations. (Acin-Sigulinski, 2008). Auction is a specialized market institution where the goods are sold by public sale – the bidding. The first price is determined by salesman, and the buyer who offers the highest price becomes the owner. The price is formed by bidding of potential buyers. The owner of goods is the buyer who offers the most, so they have the right to buy wanted quantity at the offered price. Auction markets have been prevalent among agro commodities.

Among its agro commodities, Zimbabwe is the largest grower of tobacco in Africa, and the 6th largest grower in the world. Three types of tobacco have traditionally been grown in the country: Virginia flue-cured, burley and oriental tobacco. Over 95% of Zimbabwe's tobacco consists of flue-cured tobacco, which is renowned for its flavor. Tobacco has primarily been going for sale under 2 models that is the auction marketing model and the contract model.

1.2 Background to the Study

The selling of tobacco in Zimbabwe began in 1936 through the documentation of the Tobacco Marketing and Levy Act which was regulated under the Tobacco Marketing Board which initially controlled the selling of tobacco through the

Auction Floors and, later, Contract floors from 2004. In 1994 the Board was reconstituted to cater for the interests of all classes of different types of tobacco growers (Virginia, Burley, Oriental and Dark-Air Cured), buyers and other stakeholders. In the same year, indigenous buyers started participating for the first time in competition with traditional buyers.

The traditional marketing model of auction was changed with the introduction of contract tobacco farming in 2004. Tobacco selling in Zimbabwe was done entirely through auctions whereby tobacco producers took their crop to an auction floor of their choice for its marketing. Auction floors at play were Tobacco sales floors and Boka floors.

Historically, before the Zimbabwe's Fast Track Land Reform Program, (FTLRP), tobacco production was dominated by close to 4500 white commercial farmers who produced close to 95% of the country's total output (Cole & Cole, 2006). The tobacco farmers had access to agricultural finance from the country's financial institutions (Mukwereza, 2015). The land reform which started in 2000 resulted in the transformation of the tobacco sector with production now taking place among a far wider group of often small-scale farmers (Scoones *et a*l., 2017). Soon after the FTLRP , tobacco output greatly decreased . The government introduced contract farming in 2004 in order to boost tobacco output through improved access to agricultural finance (Dube & Mugwagwa, 2017). Before FTLRP Zimbabwe, tobacco production and marketing were done through auctions (Goger *et al*., 2014) where tobacco contractors were not directly involved in production and

marketing. The tobacco farmers sold their tobacco to the highest bidder where the same contractors were participating in as buyers.

After 2004, a shift occurred from auction model to the contract model. Tobacco volumes were more aligned towards the contract model whilst auction volumes took a dive. Farmer partition in the auction model was greatly impacted with the birth of contract tobacco production. This is displayed in Figure 1.

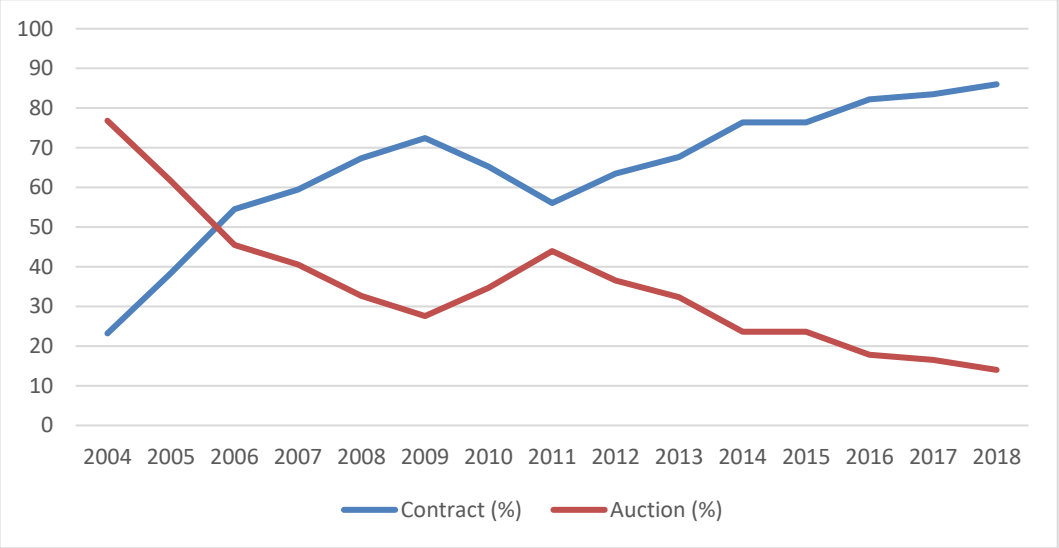

Figure 1 :Contribution of Auction and Contract Sales (2004 to 2018)

Source: TIMB (2018)

Auction tobacco market share has significantly dropped; however, the decline has not gone beyond 10 % an indication that there are farmers who still prefer the auction model. Contract farming schemes insulates farmers from price risk, helps them develop new skills, and opens new markets, nevertheless farming suffers from market failure, (Sharma, 2018).

It is also interesting to note that the number of contracted growers has gone significantly higher from 2016 up to date. The movement in grower database for the auction farmers has had a negative effect. This is demonstrated in figure 2 below .

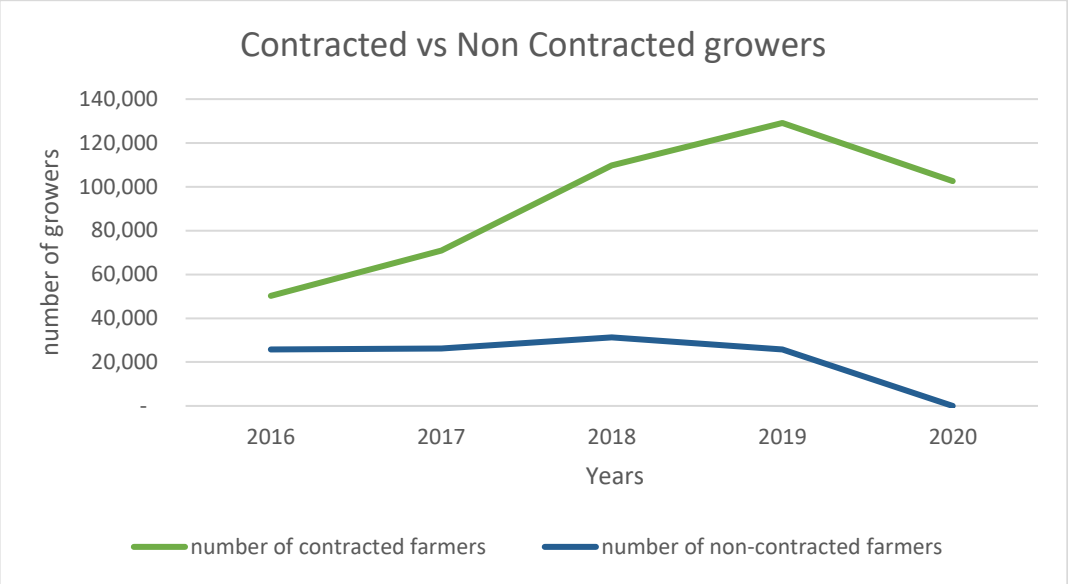

Figure 2 Contracted vs Non-Contracted Growers

Source : TIMB 2020

1.3 Statement of the Problem

The tobacco industry in Zimbabwe owes its sustained growth to the emergence of the auction system. The auction system provides a platform for open trading of tobacco, central point for merchants to come together and bid tobacco according to quality. The introduction of contract farming in 2004, however, drastically changed the marketing landscape of tobacco. Contract farming came with increased production and productivity among the tobacco farming population. Contract farming also came with improved access to farming inputs and loans as observed from the increase in the grower's database and volumes that sold through the contract market. It is against this

background that this research seeks to understand what it is that makes tobacco farmers to “under all lucrative contract environment conditions” , choose to sale under auction markets.. The redirection of almost all of Zimbabwe’s tobacco yield going for sale under the contracting model presents an information gap in the academic field to understand why some tobacco farmers still choose to participate in the auction market that is almost dying.

1.4 Research Objectives

The overall objective of the study was to identify the factors that influence the participation of tobacco farmers in auction marketing.

The **specific** objectives are to:

1. To determine the socio economic characteristics of Tobacco Farmers.
2. Establish determinants of farmer participation in auction tobacco market.
3. To identify options to improve market participation in auction markets.

1.5 Research Questions

1 What are the socio-economic characteristics of the population?

2 What factors affect participation in the auction market?

3 How can participation in auction markets be improved?

1.6 Assumptions of the Study

The study assumed all farmers are actively participating in the tobacco industry and have a complete understanding of contract farming and free farming fully knowing and understanding the differences in the marketing models.

1.7 Significance of the Study

Understanding the factors of tobacco farmers participation in auction model is important as it allows for design of a long-term policy to underlie tobacco industry sustainability. This study is also important to tobacco auction floors as it provides the reasons for the decline in the auction volumes, which can be crucial in their design for turnaround plans. To the policy maker, this study is critical as it unpacks reasons for the decline in auction sales and allows them to gauge whether the shift is likely to be permanent or not and allow them to shape appropriate intervention strategies. The study is also very important since the tobacco sector is an integral industry of the Zimbabwe economy. The decline in tobacco production will have pervasive effects across the whole country in terms of GDP, employment and foreign currency. Lastly, the auction floors have been a source of employment to many people during the selling season and the closure of these companies will bring anguish to a larger part of the society.

1.8 Delimitation of the Study

The study only looks at Tobacco growing farmers in Zimbabwe specifically in Mashonaland east under the Wedza district ward 14.

1.9 Limitations of the Study

The Covid 19 pandemic was the biggest limitation to this study. The researcher complied with the international COVID guidelines through adhering strictly to zero gatherings and collection of data through telephone interviews.

1.10 Organization of the Study

This study is organized in five chapters, including this introduction. Chapter 2 captures the literature review , the theoretical framework, related studies as well as review of empirical studies. Chapter 3 summarises the methodology, model specification and a

detailed discussion of the variables and the methods and procedures which will be used to collect the data which will be utilized in the study. Chapter 4 will highlight and discuss the results of the estimated determinants of participation and summary statistics of the variables used in the study. Chapter 5 will wrap up the study by presenting the conclusions, of the major findings, recommendations and suggestions for future research based on the findings.

1.11 Summary

This Chapter detailed the background into the research titled farmers participation in auction marketing model. The next chapter will look into relevant theoretical and empirical studies.

CHAPTER 2 REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter presents the theoretical and conceptual framework to help understand the factors that affect participation of farmers in tobacco auction farming in Zimbabwe. A theoretical model of participation in auction farming as supported by theory and empirical findings is also presented.

2.2 Theoretical Framework

Market participation is both a cause and a consequence of economic development (Reardon & Timmer, 2005). Higher market participation can drive productivity by providing incentives, information, and cash for purchasing inputs. Higher productivity could drive market participation because farmers with high productivity have surplus to participate in the market, ceteris paribus (Barrett, 2008; Rios *et al*.,2008). Studies on the success factors of commodity exchange platforms that can be a proxy for farmer participation have also been labelled to be adequate supply and demand within the market and the pricing matrices.

2.2.1 Utility Maximization Theory

The most widely excepted model of individual behavior is based on the expected utility theorem (Anderson *et al*., 1979) which takes into account the risk attitudes of the decision maker .This is the basis of many economic , psychological and behavioral models. The utility maximization theory is a concept that businesses, individuals or companies seek to get the highest satisfaction from their economic decisions for example when choosing a marketing model , a farmer will always choose a marketing model with the best returns. In context, tobacco farmer choice of market can be

generally argued to be a proxy of this utility theory as the psychological behavious in terms of choice is more inclined towards a marking model with more utility.

2.2.2 Random utility theory

Random utility theory explains that people choose what they prefer and do not .This can be explained by random factors for instance a person may choose their preferred dish 9 out of 10 times and on the 10th occasion they choose something else due to some random factor. The term 'random' in this instance has a very precise meaning. The variations in behaviour due to randomness must not be explainable. That is, if it is known that the reason that the consumer deviated from their preferred dish on the 10th occasion is because it was out of stock then this is not a random phenomenon. Random utility theory is not always an accurate description of human behaviour (Daniel, 2011). The decisions of tobacco farmers to participate in any model can be summed up to be as a result of this random utility theory.

2.2.3 Transaction cost economics paradigm.

Transaction cost economics is understood as alternative modes of organizing transactions (structures – such as markets, hybrids, firms, etc) that minimize transaction costs (Williamson, 1979). Transaction cost theory (Williams, 1979) postulates that the optimum organizational structure is one that achieves economic efficiency by minimizing the costs of exchange. The theory suggests that each type of transaction produces coordination costs of monitoring, controlling, and managing transactions. Williamson has defined transaction costs broadly as the costs of running the economic system of firms. He has argued that such costs are to be distinguished from production costs and that a decision-maker can make a choice to use a firm structure or source from the market by comparing transaction costs with internal

production costs. Thus, cost is the primary determinant of such a decision. In tobacco marketing they are a lot of transactional costs associated with the choice of marketing model that are grower chooses. This theory communicates very well with the topic under discussion as certainly a farmer's decision criterion or choice is heavily centered by the cost of transaction that they may experience in either the auction or the contract marketing arrangement.

2.2.4 Game Theory

Applies to a wide range of behavioral relations, and is now an umbrella term for the science of logical decision making in humans, animals, and computers. Theory main focus is on benefits or losses of participants for instance while one may never know with full certainty what competition is thinking or planning to do next, the strongest businesses think strategically and make educated guesses. Farmers participation is more aligned with business models that create blue oceans and offer unmatched service and value-added offerings to clients. Farmers participation in agri commodity platforms is arguably catalyzed by the game theory concept as its core is best on the best outcomes for the party involved in this case being the farmer choosing a market based on the different value propositions .This theory is somehow the same with a thin line in differences from the Decision theory.

2.2.6 Decision theory

This theory assesses the rationality of decisions in the light of preferences over outcomes and beliefs about the likelihood of these outcomes to appear. The basic difference between the two lies in the way they view the likelihood of outcomes. Decision theory treats all outcomes as exogenous events, 'moves of nature'. Game theory, in contrast, focuses on those situations in which outcomes are determined by

interactions of deliberating agents. This theory in context means farmers choice of participation in tobacco marketing model can be determined by a lot of independent factors as the average prices , deduction and commission charges during sales etc.

2.2.7Social choice theory

Social choice theory or social choice is a theoretical framework for analysis of combining individual opinions, preferences, interests, or welfares to reach a collective decision or social welfare in some sense. Social choice blends elements of welfare economics and voting theory. It is methodologically individualistic; in that it aggregates preferences and behaviors of individual members of society. Individual preferences are therefore argued by this theory to be a causative effect to the choice of marketing option a farmer might have.

The theory that informs this study more is the utility maximization theory in that farmers seek to get the highest satisfaction from their economic decisions .It would then be very important to identify those factors that ensures a grower gets maximum utility as it's the basis for market choice in the marketing options existent in the tobacco industry.

2.3 Review of empirical studies

Roche (2017) in a paper on the success criterion for commodity exchange which are the auction markets for agricultural produce highlighted very key indicators for the success of the marketing model that will then probe participation by farmers. Factors identified for a successful auction marketing model include large supply and demand for a standardized commodity , relative transparent determination of prices , wide price fluctuations , a wide absence of distortions in price setting and differentiated market participants e.g. (banks , traders , transporters , buyers and manufacturers)

who working together with the exchange can create the necessary liquidity , adequate IT and physical infrastructure for trading , grading , storage and transport. It is very important then from conclusions of this paper that for a marketing model to have support through farmer participation, it has to first satisfy the above highlighted pre-requisites.

At a global view, a very recent and important paper done by Dube (2020) looked at the factors that affect market participation by smallholder farmers. Dube (2020?) indicates that markets play a critical role in economic development and strengthening market participation by smallholder farmers in both input and output markets is critical for the development of smallholder agriculture in Zimbabwe. In his study , he analyzed the determinants of output markets participation .Results that he derived show that the variables that have a positive and significant effect on market participation are age of the head of household, the size of the household, the level of education of the head of household, the household agricultural income, the degree of farm specialization, access to irrigation, access to draft power, on demand extension service, quality of extension support, distance of the farm from the nearest rural business center and tenure. Gender of the head of household, the level of education of household members, farming experience, the block training approach, the level of dependency, the farmer-to-farmer extension approach and household members with off-farm employment significantly and negatively influence market participation. These results give a basis to model this study and also compare with results obtained from other related studies.

In related literature, Costales (2008) did a study on the determinants of participation in the pig production models in Northern Vietnam .Unlike Dube (2020) who used a binary model, a multinomial logit model was used to identify the factors that determine the likelihood of engagement in formal or informal contracts. A simple probit model was subsequently developed for the determinants of engagement in informal contract arrangements. Results indicated that farmers with higher levels of education and larger physical asset holdings are more likely to be engaged in formal contracts. Households with higher levels of education, managing full-cycle pig operations, and with pig production being a main occupation, were observed to more likely engage in informal contracts, than remain independent producers. Nevertheless, rather than size of physical assets, social capital appeared to be a more important determinant of engaging in informal contracts.

A study by Zuvarimwe (2015) looks at farmer participation in multiple models including auction system using livestock as a key agricultural enterprise. This research has shown that participation in livestock markets by smallholder livestock farmers is influenced by a number of key factors. Production and marketing dynamics, transaction costs, human capital, state of marketing infrastructure and level of business orientation of the smallholder livestock farmer have shown to be very critical when a farmer chooses to participate in an auction market.

Marumahoko (2017) shows that in Zimbabwe smallholder farmers are attracted to tobacco contract farming by the provision of inputs. Most small-scale tobacco farmers most of which are newly resettled farmers lack collateral to access required finance from formal banks. The author, however also finds that there is significant side marketing in the tobacco industry in Zimbabwe. In Kenya, Minot (1986) noted that contracted tobacco farmers who were well supported had higher incomes than non-

contract farmers. Observations from these studies show that farmers are more inclined to the contract scheme which leaves a mystery in trying to assess the causative factors why farmers still find themselves with their tobacco at the auction floors.

Another very important study was done looking at the factors impacting farmers participation in a rice open marketing model or system. Kyaw (2018) analyzed the factors influencing smallholder rice farmers' decisions regarding participation in the agricultural market. This study revealed that the decision to participate in the rice market was dependent on different factors such as the household head age, education status, household size, total produce of rice, price of rice, household income, ownership of livestock, membership of farmer organization, access to roads, distance to market, access to extension services, and market information. The results of this study have implications as to what needs to be addressed to encourage smallholder rice farmers to participate in established open markets.

Market Awareness and Participation for Cattle Farmers in the Kaonafatso ya Dikgomo (KyD) Schemein KwaZulu-Natal Province, South Africa is another study that relates well with the subject under discussion. In this study undertaken by Ngarava *et al*., (2019) , The study utilized a cross-sectional survey for the randomly selected sample of 116 KyD farmers in the KwaZulu-Natal Province. A Logit model was used to analyze the data. The results showed that more farmers were aware of farm gate market channels, but however, they tended to utilize auction market channels. The significant variables in capturing why farmers participation was under auction are gender, marital status, educational level, employment status, farm income, source of income, herd size, labor and training. Furthermore, socio-economic factors had a bearing on the

awareness and use of the marketing channels for smallholder farmers in the KyD scheme.

Also looking at studies that focus on contract market participation. Moyo (2014) in his study of effectiveness of tobacco contracts in Mazowe a district in Zimbabwe, the results suggest that tobacco contract farmers received better incomes than non-contract farmers. This was because the tobacco contracted farmers had increased access to inputs, extension services and finance. The study, however, show there was no significant difference in the prices received by the farmers. To add on ,The study of resettled small scale tobacco farmers in Zimbabwe also show that farmers that get access to inputs and extension services mainly through contract farming tend to have better yields and concomitant higher incomes compared to communal farmers relying on own finance (Deininger, *et al*., 2002) .Barrett (2008) argues that contract farming is important in that it allows end markets are normally associated with higher returns. Precisely, contract arrangements also allows risk sharing between the farmers and producers as well as decline in transaction.

Different scholars have undertook studies to look at the pull factors for farmers in the contract scheme arrangement. It is widely agreed that farmers have to an extend benefited. Justice has not be done to also understand and address farmer independence in production and marketing and also the reason why participation under open market's is still existent despite emerging viable production and marketing models which is what the author in this paper will seek to understand and address.

2.4 Identification of Gaps

The author identified knowledge gaps in relation to Auction marketing models in Zimbabwe. The only successful auctioning model has been the tobacco model with emerging models as the Mutasa Auction model failing before its full implementation. It is with this research that the author seeks to cover the knowledge gap and contribute to the school of academics literature on market participation in the auction models.

A lot of research work has been done on contract farming schemes under different value chains. This literature becomes a basis for this study as most research work only looked at market participation under the contract farming arrangement.

2.5 Conceptual Framework

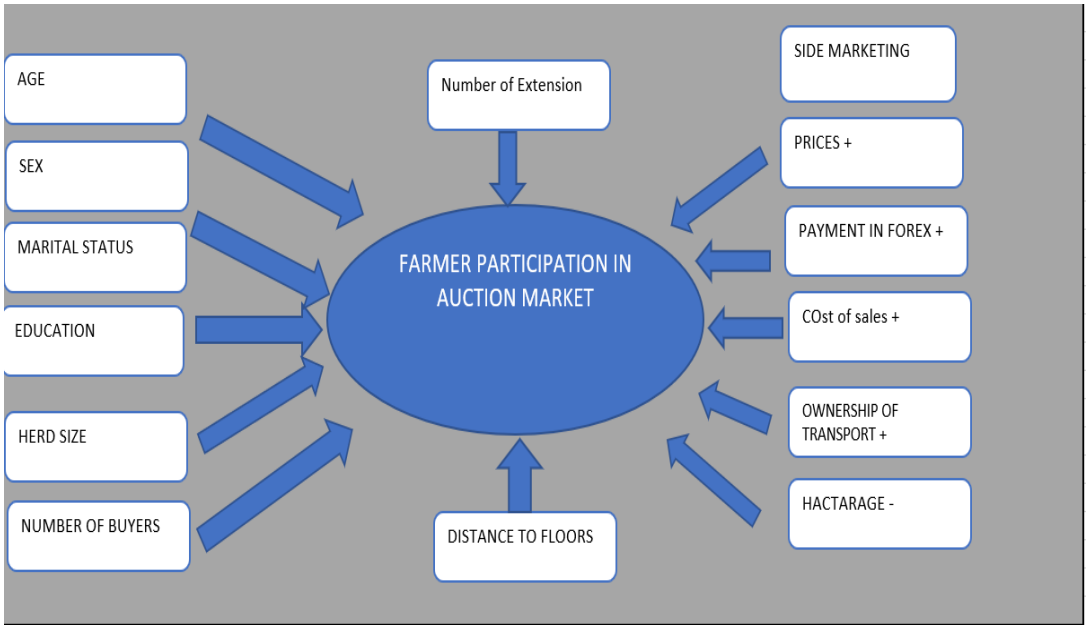

Figure 3 : Conceptual Framework

Source: Author

From related studies, the author selected key variables expected to affect growers participation in the Zimbabwe tobacco auction model. The variables include a range of demographic variables and other independent variables expected to have a significant impact towards the choice of marketing that a farmer choose to participate under.

A positive relationship is expected when growers have access to credit lines as loans from banking and financial institutions. Access to finance imply growers don't rely on assistance from contractors which thereby promotes participation under the auction market. Distance to floors is expected to have a positive impact on auction tobacco participation. It is in the researcher interest to believe that with increased distance, growers prefer selling with a model with higher returns thereby expectancy of a positive relationship.

Side marketing is a variable that captures the selling of contracted tobacco to an open market. It is however hard to capture the variable as responds are likely to give the wrong perceptions out of fear of victimization. The study will ask the question to growers in a manner that seeks to capture if the farmers sale with both markets during a season. If the answer is yes it automatically implies the act of side marketing as the industry is structured in a manner that ensures one sales with a single market during a season that is either contract if inputs were forwarded or pure auction if it is an open farmer who utilized his or her own resources.

Prices is a variable that will be capturing the average prices that growers get at their choice of market. The author expects a positive effect to participation in auction models. An increase or offering of good prices under the auction model is expected to result in higher market performance by tobacco growers.

Payment in foreign currency at the markets is expected to bring about a positive impact on farmer participation in the auction markets. Deductions is a variable that captures the cost of transaction growers face when they choose to participate in a marketing model of choice. The expectation is a positive relationship for growers participating in the auction model as a result of less interest rates due to non cash and input related loan advancements.

Another variable expected to have a positive impact on grower participation under the auction market is ownership of transport . This variable captures a growers ownership of a vehicle for delivery of tobacco during deliveries a tobacco marketing phase. The understanding is that ownership of transport reduces dependency of growers on contractual commitments that provide transporting services. A grower with own

transport services is expected to participate more in a auction market than a grower without transport services.

Hectarage capture the land size that a grower puts under tobacco production. As the land size increases, its expected that a growers participation is more aligned towards the contract farming model as there is appetite for more resources. The expectation is a negative relationship of farmer participation as a farmers production landscape increases [ha].

The conceptual framework also has socio economic characteristics included for an understanding of the sample population under study. Gender is expected to have zero effect on participation in either marketing model. Age of the household age is expected to positively impact farmer participation in auction markets as with experience come knowledge on transactional costs .

Farmers with more formal education are more market-oriented as they have the knowledge and skills to be to be able to engage in marketing effectively. As a farmer grows older, they become wiser to make rational decisions and choices in selection of markets.

2.6 Summary

This chapter was looking into the theories that relates to the topic of market participation by farmers. It also looked into the relevant literature from other scholars. The next chapter details the methodology for data gathering and processing.

CHAPTER 3 METHODOLOGY

3.1 Introduction

The purpose of this chapter is to articulate the research methodology for this study regarding the determinants of farmers' participation in Tobacco auction. Misra & Alok (2017) define research methodology as a science of studying how research is conducted systematically. It is an analysis of, and rationale for, the method or methods used in a given study including data collection and analysis. The chapter presents the research design, and research strategy including the data collection methods that were adopted in the research. It also covers the research instrument and the sampling procedures that were adopted in the research. Finally, the chapter discusses the method of analysis and ethical concerns.

3.2 Research Design

Research design is the framework of research methods and techniques chosen because it allowed the use of research methods that were suitable for the subject matter and set up the study for success. The research design utilized a quantitative research approach. Quantitative research is for cases where statistical conclusions to collect actionable insights are essential. A descriptive research design was adopted. In a descriptive design, a researcher is solely interested in describing the situation or case under their research study. It is a theory-based design method which is created by gathering, analyzing, and presenting collected data. This allows a researcher to provide insights into the why and how of research was conducted.

3.3 Population and sampling

3.3.1 Population

The population for this study were the growers doing tobacco production in Mashonaland East under the Wedza district. The total number of tobacco farmers in

this area is 148 growers. The population encompasses both the auction and the contract tobacco growers.

3.3.2 Sample size and sampling procedure

This study was based on survey data collected from the Wedza District. The sample was drawn from a total population of 193 tobacco farming households. Using the Raosoft sample size selection calculator, (Raosoft, 2021) the minimum target sample size for this survey was 193. This sample size was based on the assumptions of a 5 % margin of error and 95% confidence level. The initial stage was selected using a multi – staged random selection method. The second stage involved randomly selection of growers from the sample size. A randomization and indexing formulae was then used on excel to generate a random sample of the sampling frame.

Table 1 Sample Size

Area	**No. of Farmers**	**Confidence interval**	**Margin of Error**	**Sample size**
Wedza	398	95%	5%	194

3.4 Data Collection and Instruments

A structured and tested questionnaire was used to collect data from the population. A sample of 8 growers of varying sizes was selected for pre survey test run. The questionnaire was coded and laid out in a simple structure. Due to the Covid-19 pandemic, the researcher ensured that guidelines were employed for maximum safety. Telephone interviews were implemented for growers who preferred zero interactions.

3.5 Data Collection Procedure

Data was collected through face-to-face interviews using structured questionnaires. Three trained data collectors was used to administer the questionnaires in a standardized format for uniformity in responses. Telephone interviews were also used to cover growers who indicate social distancing and discomfort in face-to-face interactions due to the COVID-19 pandemic.

3.6 Data sources and description of variables

This study captured data primarily from the actual growers on the ground. The initial growers framework were extracted from a central grower database .This list was used to draw up the population from the study areas selected by the researcher .It is from the population that the researcher selected a sample size ensuring that also grower contact details or mobile number is captured to fulfill the study requirements for the survey. The model specification and description of variables heading below will be a detailed explanation of the variables to be used in the model.

3.7 Analysis and organization of Data

3.7.1 Model Specification

In order to determine the factors of farmers' participation in auction markets, the probit model was adopted because of the dependent variable which is dichotomous in nature. It is the capability of the probit model over the logit model to oblige the usefulness value of the choice to combine variables so as to lay within 0 and 1, and Asante, Afari-Sefa, & Sarpong (2011) also its capability to solve the heteroscedasticity problem. Market participation (Y) was used in the model as a dummy variable carrying the value of 1for those farmers participating in the auction markets and the value of 0 if it's a contract. The two choice models from Greene (2003), can be written as;

$Y_i * \{1 \text{ if } Y_i * > Y, 0 \text{ if } Y_i * \leq 0\}$ ……... (1)

The model is a popular specification of a generalized linear model, using the probit link function and generally specified as;

$\ln\left[\frac{Pi}{1-Pi}\right] = \beta_0 + \sum_{i=1}^{k} \beta_i X_i + \varepsilon_i$…….. (2)

Where;

$Pi =$ Probability that farmer i chooses to participate in auction market

$1 - Pi$= Probability that the farmer chooses not to participate in auction markets

$\beta_0 =$ Intercept

$\beta_i =$ Slope coefficient

$X_i =$ Vector of factors that influence the farmer's decision to participate or not to participate in an auction market

$\varepsilon i =$ Error term

The empirical model suggested for this study is as follows;

$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 \ldots\ldots B1_6X_{16}$.

Where

Y [1] = Farmer participation in auction markets & Y[0] Farmers in contract market.

X_1= Floors prices

X_2= Payments in forex

X_3= Sale deductions

X_4 =Access to transport

X_5=Hectarage

X_6= Distance to floors

X_7= Sale with all markets

X_8=Gender

X_9 =Marital status

X_{10}=age

X_{11}=Employment status

X_{12} = farming experience

X_{13} = Number of family members

X_{14}= Access to other income

X_{15} = Number of extension visits

X_{16}= Number of buyers

The logit model is able to provide valid estimates, regardless of study design (Harrell, 2001). The dependent variable is the decision to participate in auction farming. Participation in contract farming was coded 1, whilst participation under contract was coded 0. The independent variables and the codes will be as follows:

Table 2 Expected Signs

Variable	**Expected sign**
1- gender of household head (male=1, otherwise=1);	-
2- Household size (continuous)	+
3- education level (number of years at school-continuous),	-
4- age (years);	+
5- employment status (1=full time farmer; 0= otherwise);	-
6- farming experience (number of years farming);	+
7- payment in forex (yes 1 : otherwise =2);	-
8- cost of sale deductions (high =1 ; low =0);	-
9- land size (size of hectares);	-
10- access to irrigation (yes=1, otherwise=0);	+
11- access to transport (yes=1 ; no =0);	+
12- distance to floors (km)	-
13-side marketing [yes=1 , otherwise= 0]	+

14 Access to other income. [yes=1 , otherwise= 0]	+
15 Number of extension visits [continuous]	+
16 Number of Buyers	+

3.7.2 Analytical Framework

The establishment of socioeconomic characteristics was attained through the use of descriptive statistics utilizing the Stata software version 15. The descriptive statistics included means, percentages and frequencies. The parameters for farmer participation under the auction system was obtained from a regression analysis using the Probit model.

3.7.3 Description of variables

Gender of household head

Gender of the household head was captured as a dummy variable indicating whether the household was headed by a male or female. The gender of the household head was hypothesized to influence market participation positively because male households might have more information on production techniques and input access than their female counterparts. Rayes *et al*., (2012) found that the gender of the household head positively influenced the probability of market participation.

Education level

Education level of the household head was captured as a continuous variable, indicating the number of years spent in formal school by the household head. The

education level of household head has been found to influence market participation because heads of households with relatively more education may have better abilities to negotiate and have more information than those with relative less education Lubungu *et al*. (2012).

Payment in forex

Payment in forex was captured as a dummy variable indicating whether a household had received any forex after sales processes at the markets. Access to forex is important regarding market participation because it enables households to purchase hybrid seed, fertilizer and productive assets which increase the likelihood of producing a marketable surplus.

Land size

The size of land owned by a household was captured in hectares as a continuous variable. Land is an important factor in production and ownership of land is crucial for households to engage in production which will cause participation in markets.

Access to irrigation

Ownership of irrigation will be captured as a dummy variable, indicating if the household owned irrigation systems. Water is an important production shifter because it increase the capacity for a household to produce surplus hence increasing the chances of a household's market participation (Barrett, 2008)

Access to transport

This variable is treated as a dummy variable .Ownership of means of transport increases the chances farmers to participate in markets as it reduces transportation

costs (Jagwe, 2011). Mather et al. (2011) found that ownership of an ox-cart positively influenced both the probability and intensity of market participation.

Distance to floors

The distance to the nearest market was captured in kilometers. Omiti *et al*., (2009) found households that were in urban centers sold more than those that were in rural areas because the former could access markets at lower transportation and transaction costs than the latter. It's expected that farmer participation in auction will be significant where proximity is shorter.

Side marketing

This variable was captured as a dummy. It is expected that side marketing will be positive as a sign for auction participation as farmers flee from contract transactional costs. This variable will be captured using sale with all markets as a proxy that indicates the likely potential behavior of side marketing by a grower.

Price increments at Sale.

Komarek (2010), found output price to positively influence both the probability and intensity of market participation among banana producers in Uganda. Potential for price increments boosts market participation so the expectant sign is positive.

3.7.5 Methodological Limitations

In an event that some participants in the sample did not sell tobacco, then the researcher is faced with the selection bias problem. Sample selection bias arises when the researcher does not observe a random sample of the population of interest. In the linear regression, selection bias occurs when data on the dependent are missing non-randomly conditional on the independent variable. This yields biased and inconsistent

estimators of the effect of the independent variables (Winship & Mare, 1992). The model uses a probit regression to assess the probability of participation and ordinary least squares (OLS) to determine the intensity of market participation

3.8 Summary

The chapter highlighted the methodology to derive factors that affect farmer participation in auction marketing.

CHAPTER 4 DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.1 Introduction

This chapter presents all the findings gathered by the researcher. This chapter details the results as directed by the objectives of the study. It starts with a discussion based on the socio-economic characteristics of the farmers and then the factors impacting farmer participation in auction marketing model.

4.2 Demographic and Socio- Economic Characteristics of the Sampled Population

4.2.1 Gender

46% were male whilst 54% were female. The characteristic of gender shows that a huge number of females dominate in the marketing of the tobacco. This could be as a result of man working on other income generating projects whilst woman focusing predominantly on actively production and the marketing of the tobacco crop. Tobacco is a labor intensive entity so the expectation would be to have a more masculine gender dominating the territory. Maertens & Swinnen, (2007) found no female-headed household participated in contract farming in Senegal. Similar results were displayed by Benfica *et al*., (2006) who stressed that female headed households were less likely to engage in tobacco production. This is however not the observed pattern from the Wedza distrit..

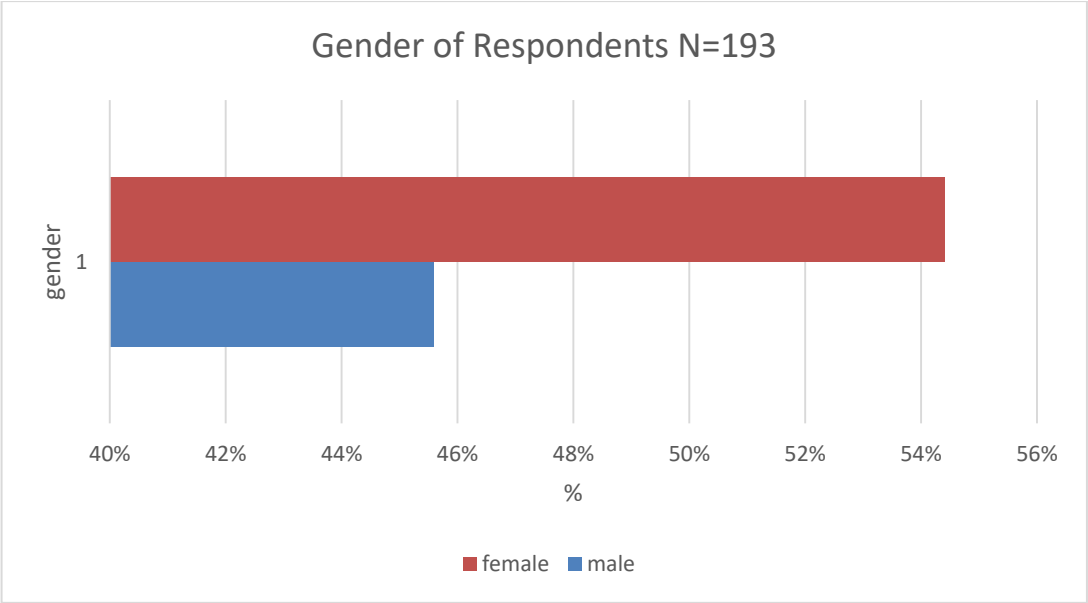

Figure 4 : Gender of Respondents

4.2.2 Household size

The study population is characterised by households with a mean of 6 people per household. The minimum number of people from the sample is 2 whilst the maximum household number is 18. Miyata (2009); Maertens & Swinnen, (2007) found that households with more active family labour tend to participate in contract production than households with less labour. The expectation from this study is that larger households will participate more than smaller households.

Table 3 :Household size distribution of respondents

	Distribution	**Respondents**	**Percentage**
1	Below 5	106	55%
2	6 – 10	73	38%
3	11 – 15	13	7%
4	above 15	1	1%

4.2.3 Farming Experience

Results indicate that the minimum number of years in farming from the study population is 1. The Maximum number of years spend in farming in the study population is 20 and the average number of years spend in farming by the study population is 6. Most farmers have between 5 and 10 years of farming experience. The mean farming experience can be as a result of the land reform programme that saw most farmers participating in tobacco production after they accessed land. From related studies in the tobacco value chain, Muroiwa (2018) in his study done in Mt Darwin observed that farming experience increases participation in tobacco markets .

Table 4 : Farming Experience distribution

	Experience	**Distribution**	**% distribution**
1	below 5	394	30%
2	5to 10	725	54%
3	11 to 15	323	24%
4	17 and above	91	7%

4.2.4 Market Participation

From the study population, the sample size is constituted of mostly contract market participants than auction participants .30% of the study population are auction growers whilst 70 % of the growers are active contract growers. Sharma (2018) highlights that tobacco growers are more under the contract scheme than the auction scheme as observed from the study sample population.

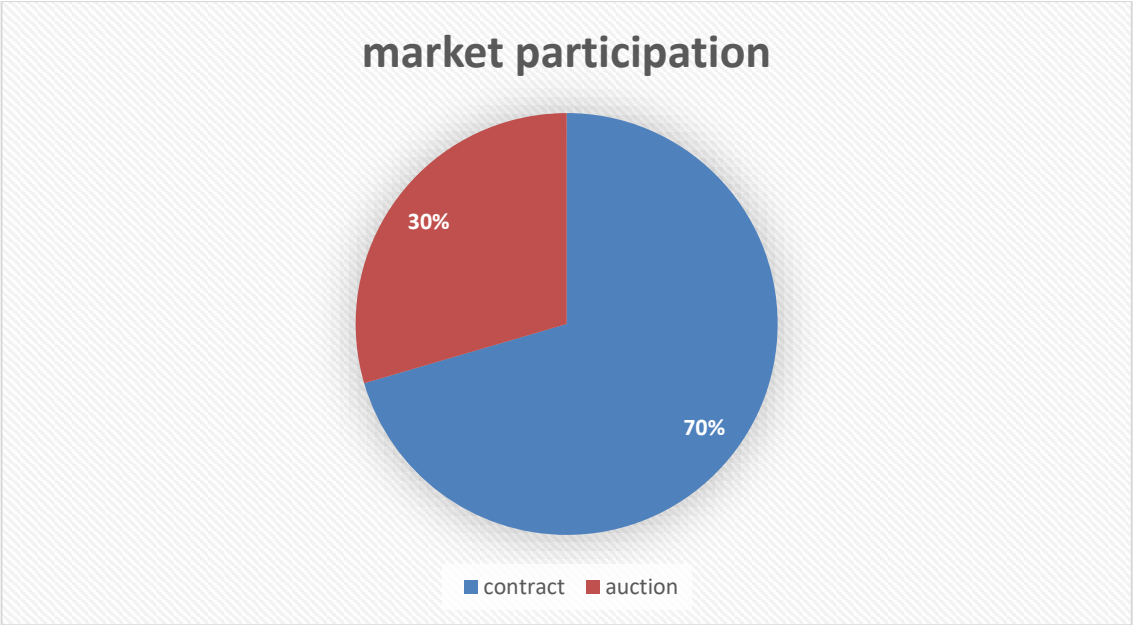

Figure 5 :Market Participation Auction vs Contract

4.2.5 Employment

Only 11% of the tobacco growers interviewed were employed and the rest (89%) were non formally employed. This could be associated with the physical location of most growers. Most farmers are in the marginal lands and the expectation would be that they survive on agricultural production and marketing without any formal employment. Moono (2015) in her study also observed a very small number of growers who were employed within the study population .Employed farmers are relatively low in the farming communities .

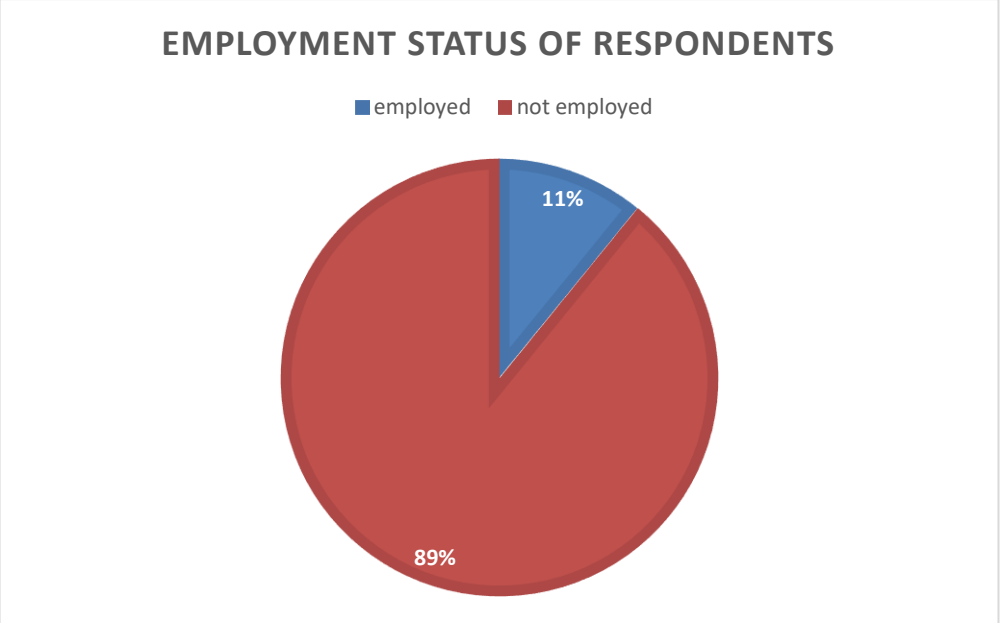

Figure 6 : Employment Status of respondents

4.2.6 Land holding

Landholding is another key variable that has been captured to identify the socio-economic characteristics of the study population. From the results it is noticed that most growers have access to an average of 3 hectares. The minimum land size owned by the study population is 2 whilst the biggest land holding is 18 ha. Jagwe (2011) found that the size of land owned by a household positively influenced the probability to enter the market among banana producers. Also Komarek (2009) found size of land owned by a household influences intensity of market participation positively among banana producers. In this study, the size of land owned by a household was hypothesized to be negatively related to market participation among tobacco farmers in Wedza.

Table 5 : Land size of respondents

Land size [ha]	Sum of HA	%
below 3	160	22%
4 to 6	548	76%

above 10	17	2%

4.2.7 Distance to floors

The categorized variable of distance to floors indicated that for growers who stay far away that is 140km are 30.5% whilst the grower who stay between 97 and 140 km is 36 %. Sampled growers who stay nearer the floors rated less 97 km and less are 33.5 %. From related studies, Omiti *et al*. (2009) found households that were in urban centres sold more than those that were in rural areas because the former could access markets at lower transportation and transaction costs than the latter. Renkow *et al.* (2004) also found that areas that were closer to the market had higher market participation.

Table 6 : Distance of respondents from Floors

Distance	**Number of growers**	**%**
80 and below	45	23%
81-130	74	38%
130 and above	74	38%

4.3 Factors impacting Farmer Participation in tobacco auction models.

4.3.1 Correlation Matrix

The researcher before running the regression model to derive the relationship between the variables in the model ran correlation matrix tests to check if the variables had no correlation in the model. A correlation of 0.6 and above means variables are highly correlated and a correlation of below 0.6 means two variables are not highly correlated. If variables are highly correlated it means we cannot include both in the same model but one and if the independent variables are not correlated to the dependent variable that is if they are less than 0.05 it won't be wiser to include the variable in the model

because we will not see any significant relationship in the model. The variables indicate that they is no highly correlated variables in the data. Theoretically the researcher could use all variables in the model**.**

However, variables as employment, distance to floors and education with a very low correlation are likely to not affect the dependent variable at all. A dummy variable was introduced for experience above 6 years high experience and 0 low experience. For education, number of years was divided into two categories being 1 high level of education and 0 low level of education. Distance to the floors when correlated against market participation give a very low correlation of 0.0092 which also warranted the researcher to categorise it into 3 levels named 0 near to floors[1-96 km] ,1 medium distance[97-139] and 2 far [140km and above] .This transformation of variables showing a low correlation was done to try and capture the likely impact of the continuous variable to the dependent It was after transforming these variables that the researcher started to notice some significant correlation levels between the variables.

4.3.2 Model Specification

For the study findings and the model adopted by the researcher, the results that show that the model was correctly specified;

Table 7 : Model Specification

Market participation	**Coefficient.**	**Std. Err.**	**P value**
_hat	1.038666	0.2533	0.000
_hatsq	-.0470118	0.318	0.139

The model is correctly specified as suggested by the hatsq figure which gives a value of 0.139 (13.9%) showing that the value is greater than 10% and the hat coefficient that is significant at 1 % thus it shows that the model is correctly specified. A model is correctly specified when the har figure is significant and the hatsq figure is insignificant. The test fails to reject the null hypothesis where it indicates no misspecification errors exist. There is no need to include or omit variable and the predicted Yhat is very identical to the real Y dependent variable values; hence, the model specification is correct.

4.3.4 Results and Interpretation of the Probit Model Estimator

The estimated coefficients (values), the standard errors and the marginal effects of the independent variables in the model are presented in the following table. Gujarati & Sangeetha (2007) asserts that the coefficient values measure the expected change in the probit for a unit change in the corresponding independent variables, holding other independent variables constant. Pundo & Fraser(2006) asserts that it follows that a positive value indicates an increase in the likelihood that a household will change to alternative option from the baseline group. A positive value implies that an increase in the likelihood of participating in an auction market On the other hand, Pundo & Fraser(2006) asserts that a negative value shows that it will be less likely that households consider the alternatives. Therefore, this study entails that a positive value will mean that an increase in the probability of farmer participation in the auction markets.

Gujarati & Sangeetha(2007) asserts that significance values (p-values) entails whether a change in the independent variable significantly influences the probit at any given

level. Hill, Griffiths, & Judge(2001), argues that the standard errors will measure the deviation of the error in values of the listed variables.

4.3.5 Probit Analysis factors affecting decision to sell and choice of tobacco marketing choice.

Table 8 : Regression Output

	Probit Coefficient		Marginal Effects			
Market participation	**Coef.**	**Std. Err.**	**dy/dx**	**Std.Err**	**z**	**P>|z|**
Gender**	-1.32909	0.745765	-0.07747	0.04387	-1.78	0.075
Experience_farming	0.639067	0.617171	0.034978	0.03491	1.04	0.3
Employment***	-2.74288	0.868666	-0.04378	0.03515	-3.16	0.002
Household size***	0.569739	0.141567	0.030345	0.0211	4.02	0.00
Hectare***	-1.60391	0.465697	-0.08543	0.05767	-3.44	0.001
Non agric income	-0.9374	0.589598	-0.04193	0.05148	-1.59	0.112
Payments **	1.213417	0.736354	0.02982	0.03133	1.65	0.099
Dist_floors_far	0.198655	0.49677	0.011478	0.03215	0.4	0.689
Dist_floors_medium***	-3.60851	1.333055	-0.24258	0.09203	-2.71	0.007
Sale with all markets***	1.595909	0.65189	0.1544	0.07128	2.45	0.014
Cost of sale***	-2.37278	0.77436	-0.05884	0.05424	-3.06	0.002
Number of buyers***	2.576348	0.360157	0.13722	0.10472	7.15	0.00
Number of extension services	-0.06447	0.133712	-0.00343	0.00854	-0.48	0.63
Ownership of transport	0.3569	0.483455	0.024896	0.05162	0.74	0.46

Number of obs = 193

Pro > chi2 = 0.0000

Log pseudolikelihood = -9.0452359

Pseudo R2 = 0.9228

*Statistically significant at 10% significance level,

**statistically significant at 5% significance level &

***statistically significant at 1% significance level

Because probit coefficients are difficult to interpret (Briscoe et. al., 1990), the effects of the independent variables on the probability of auction market participation are presented in different way. For qualitative models, the estimated coefficients should be interpreted in the sense that they affect the probability that a certain event would occur (Misraet. *et al*., 1991). Elasticities are a meaningful measure: the percentage change in the probability of auction market participation due to changes in the continuous variables.

Variables with a positive and significant relationship

As household size increase household sizes, the probability of participation in auction markets increases significantly. This is significant at 1%.A unit increase in the household size increase the probability for participation in an auction market by 3 %.From related studies , Siziba *et al*. (2011) found household size to negatively influence the decision to participate in cereal market among cereal producers in SSA. However, the same variable had no impact on the intensity of participation in a study done by Boughton *et al*.., (2007) who found number of adults in a household to

positively influence the decision to participate in the tobacco market in Mozambique .The study finding tally with observations by Boughton *et al*.., (2007). The likely reason for willingness among growers to participate under auction when the household size is bigger is the benefit of additional labor to assist in production thereby resulting in a reduction of the cost of labor in the production costs for the grower. These results are in line with *a priori* expectations by the researcher.

Sale with all markets has a very high impact on farmer participation in the auction markets. The relationship is significant at 1%.The probability of a farmer selling with the auction model increases by 7 % for every grower who sales who by chance sell with both markets. This variable is a proxy for side marketing and from the research , the output allows the researcher to quantify the marginal effect of side marketing on auction participation. This variable is in alignment with *apriori* expectations from the researcher. A positive relationship was expected since selling with all markets is a proxy for side marketing in a space dominated by contract farming.

The probability of participation in auction markets increases with a unit increase in the number of buyers by 10 % and this is significant at 1%. An increase in buyers means growers are bound to get better prices for their tobacco. Auction is therefore the most preferred marketing channel due to more buyer participation than the contract floors. This is also a pull factor to contracted growers and the researcher sees this as a gateway of side marketing which then improves the levels of market participation in the auction market.

Variables with a negative and significant relationship

From the regression analysis, Male headed households are less likely to be involved in auction farming than female headed households. The relationship is significant at 5.

When a male heads a family , this decreases the probability to participate in an auction market by 7% .This result tallies with the researcher's *a priori* expectations. In other related studies Rayes *et al*. (2012) found that the gender of the household head positively influenced the probability of market participation in Mozambique. Siziba *et al.* (2010), on the other hand, found gender not to significantly influence the probability and intensity of market participation among cereal producers in SSA. Omiti *et al.* (2009) found gender of the household head to positively influence intensity of market participation in Kenya. Although this studies results are not expected, it is consistent with the findings of Onoja *et al* (year??) and Dube (2020).The assumption generated from these results is that males when they lead families and don't have any other employment , the need for resources to fund production through contract markets become a primary concern as man are less involved in money generating projects as women thus the negative indication between farmer participation in auction markets and males as heads of households.

Employment is another variable that impacts auction market participation highly at 1%. The impact of employment on auction participation is negative, The level of participation in an auction market by an employed farmer goes down by a probability of 4.7 % in comparison to a household led by an unemployed farmer. Muroiwa (2018) in his paper noted that employment has a negative impact on farmer participation in agriculture marketing but the relationship was highly insignificant. The coefficient observed is in line with *a priori* expectations only that the level of significancy is very low.

The likelihood of participating in auction markets given an increased land size is negative. A unit increase in a farmers hectarage decreased the probability of a farmer's participation in auction by a margin of 9%. The results fall within the researchers expected results. As the land under production increases, so does the costs of inputs to use in the production function. Tobacco growers preferably seek funding to sustain the increased production land size. Growers tend to self-fund when they grow on a small scale. This finding does not tally with observations from other related studies . Jagwe (2011) found that the size of land owned by a household positively influenced the probability to enter the market among banana producers in East Africa. In addition, Komarek (2009) found size of land owned by a household to influence intensity of market participation positively in Uganda among banana producers.

Distance to the floors is another very critical variable that the researcher looked at .The results indicate that the farmers who are 90km- 140km away from floors are less likely to participate in auction markets than those who are closer that is 0-89 km and this is statistically significant at 1%.The likelihood of farmer participation in auction markets given a unit increase in distance over medium km ,decreases probability by 24 %. The probability of growers who are far away to participate in auction market is not significantly different from those who are near the floors. For growers, being medium positioned from the floors *decreases* the probability of auction participation by 0.24. In related studies , Omiti *et al*. (2009) found households that were in urban centres sold more than those that were in rural areas because the former could access markets at lower transportation and transaction costs than the latter. Renkow *et al.* (2004) also found that areas that were closer to the market had higher market participation because of reduced proportional transaction costs. This is however not the observation in the tobacco industry as results show that farmers who are not too far from markets have

a negative relationship which indicates that they might have many market options from their positioning.

High cost of sale results in lower probability of market participation in auction markets and this is very significant at 1%. If transactional costs of sales are higher, the probability of growers to participate in auction markets goes down by 5%.Farmers are likely to sale their tobacco in a market they feel costs them less. The assumption is that growers will sale where the net effect of returns vs costs is better. Key *et al.* (2000), identified that when a household is faced with higher cost of sales participation into the market is delayed until the price is large enough to cover the fixed transaction costs which is confirmed by the study results. Chilundika (2011) found higher costs of sales to negatively influence intensity of market participation among female bean producers in Zambia.

Insignificant variables

Olwande & Mathenge (2011) found that experience of the household head negatively influenced the decision to enter the market participation among milk producers in Kenya. On the other hand, Martey *et al*. (2012) found age to positively influence the intensity of market participation among maize producers, while among cassava producers it negatively influenced them. Based on this evidence, experience of the household head was hypothesized to have an indeterminate relationship with the probably of market participation Experience had a positive impact on a farmers probability to participate in auction markets .This result was however insignificant at all levels from the study findings of this research.

A growers access to non-agriculture income showed that the probability to participate in the auction market goes down though the probability was insignificant at all

levels.Key and Warning (2002) noted that farmers with higher income tend to have higher level of acceptance compared to lower income farmers. However, Musara et al., (2011) and Benfica et al., (2006) found that farmers who are socially and financially better off are unlikely to participate in contract although the likelihood of being contracted increase as farmers' access to income from off-farm and non-farm sources rises.

In this study, ownership of transport had a positive impact on a farmer's participation but the magnitude was not significant which rules out having access to transport as a factor that impacts a growers decision to participate in an auction market. However, Jagwe (2011) and Mather *et al.,* (2011) found that ownership of transport positively influenced both the probability and intensity of market participation among maize producers in Zambia. In addition, Reyes *et al*., (2012) found that ownership of a bicycled only influenced the intensity of market participation positively among potato producers in Mozambique.

When growers stay far from the floors , the probability of participation in auction market increase in an insignificant way the same with a scenario where a farmer owns transport for delivery of bales to the market. An increase in extension visits also decreases the probability of farmer participation in auction markets its highly insignificant at all levels.

4.4 Conclusion

Empirical outcomes of the study were presented in this study. Results from the descriptive and the probit model were presented and interpreted accordingly. The diagnostic tests of the model were ran and also presented in this chapter. The next

chapter seeks to give an overall conclusion of the study and also suggest the policy implications and also gives the areas for further study

CHAPTER 5 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

Presented in this chapter are the study findings, conclusions and policy implications and recommendations in this chapter.

5.2 Discussion

The main objective of this study was to identify factors of participation that affect tobacco grower's participation in the auction market. The analysis was done, and some variables were dropped from the model namely irrigation extension and transport ownership due to their high levels of insignificancy. Variables identified to significantly contribute to the decision or market choice of growers to participate in auction tobacco markets noted are gender, employment, house hold size, land size under production , payments ,distance from floors, sale with all markets , cost of sales at the markets and also number of active buyers at the markets. Variables identified to have no significant impact towards auction market participation include farming experience, employment status , no agricultural income , payments at floors and ability to sale with all markets.

5.3 Conclusions

The study findings pointed out that the dual marketing model are still existent among the growing population and quite a number of factors have been identified to be significant at addressing auction related discussions. Among the significant auction marketing determinants, the following have been found to be very significant which are gender, Household size and employment under the socio economic characteristics of the population. Payments model adopted for grower payments also impact significantly grower's participation in auction markets. Farming hectarage and

distance to floors are other variables observed to have an impact on growers participation in the auction market. The other variable identified to have an impact on growers participation in the auction market include growers ability to sale with all markets , the overall costs of selling in a market and lastly the existing number of buyers participating in a market.

It is also very important to mention that when discussing about farmers choice in tobacco marketing, farming experience, access to nonagricultural income and growers who are positioned far from the floors are variable that have weighting that is not significant.

Results indicate that payment modalities have an impact towards how growers behave towards making marketing decision for selling their tobacco, the indication is that a Nostro (USD) payment facility is the dominant strategy that a government can incorporate in the auction market to stimulate interest thereby increasing the growers participation in the auction markets. The local currency should be scrapped off auction markets to make auction facilities competitive to growers.

As a policy contribution, the government needs to invest funding in female growers if there is an agenda to boost auction deliveries. We see that male headed families have the probability to reduce the likelihood for participation in auction markets. It's also very important note that employment has an overall negative impact on auction participation. It then becomes a strategic selling tool to policy makers to incorporate non educated female headed growers as the target market that can drive volumes also for the free market.

As another recommendation , the government should spearhead a decentralization strategy for auction floors in all areas that are not within a 90 km radium to the auction

floors as results indicated that grower participation in auction floors is negative with every km increase .To counter measure this challenge which is likely because of increased transport costs , the government has to also provide government transport schemes that help reduce the cost of deliveries to auction floors as a measure to subsidize growers from losses that emanate from positioning,

Cost of sales at floors have to be heavily regulated by the government policy through regulating bodies as TIMB. If sales deductions are cheaper for growers, we expect better response and participation in the markets by the growers than when the cost of sales or transactional costs are very high. Growers will always want cheaper costs when they sale at the markets and lower costs will always have the hearts of growers.

Competition is another key variable that is very important to stimulate grower participation in the auction markets. As a recommendation, a policy suggestion would be ensuring that auction markets have benchmark minimum numbers that will excite growers to send more bales at the market in anticipation of better prices from the bidding process of multiple buyers.'

5.4 Implications

The study pointed out well that two models are still existent in the tobacco marketing space .Of notable observation is the indication that contract tobacco marketing has more growers participating to auction grower. It becomes very important for policy makers to come up with policy that drives auction participation .

5.5 Recommendations

This study has been aimed to assist various stakeholders as the auction floors , the government , TIMB , and other various stakeholders interested in tobacco marketing.

Auction is an important sub sector in an economy that strives to maintain a balance in a value chain. When free farming dies, market failures arises. It then becomes of strategic importance to the government to ensure auction thrives. The government can allocate a budget towards ensuring growers are allocated more proceeds in Nostro funds as results showed that participation increases more when farmers have access to United States dollars.

Government policy should also make it strict for all growers including the contracted farmers to manage to sale with the auction marketing as well as results show that the probability of participation in auction markets increases when growers have the access to all marketing models. The tobacco act should be documented in a manner that allows selling in all markets willingly.

When the number of buyers increase, auction participation improves. The government should open up market entry to potential buyers as it increases demand, this demand thereby improves market demand by growers which will result in a positive growth in auction market participations.

Auction floors can be assisted by identifying a target market through gender segregation as women have a higher probability of participation to man in auction markets. Also, as observed from results, auction floors can target directly smallholder growers as the target population as they participate better than the large scale growers. Its observant that when distances are longer growers tend to participate less in auction, It becomes important for TIMB and the auction companies to be strategically positioned closer to growers through policies as decentralization.

TIMB the regulatory board for the tobacco industry can also put in place policy and act that caps and reduces the cost of all charges that are levied on growers.This is very

key as results show that participation goes down for every unit increase in the charges experienced by the farmer.

As a recommendation to the central bank (RBZ) , payment modalities have an impact towards how growers behave towards making marketing decision for selling their tobacco, the indication is that a Nostro (USD) payment facility is the dominant strategy that a government can incorporate in the auction market to encourage interest thereby increasing the growers participation in the auction markets. The local currency should be scrapped off auction markets to make auction facilities competitive to growers.

The ministry of agriculture together with the Ministry of women need to invest funding in female growers if there is an agenda to boost auction deliveries. We see that male headed families have the probability to reduce the likelihood for participation in auction markets. It's also very important note that employment has an overall negative impact on auction participation. It then becomes a strategic selling tool to policy makers to incorporate non educated female headed growers as the target market that can drive volumes also for the free market.

As another recommendation , the government should spearhead a decentralization strategy for auction floors in all areas that are not within a 90 km radium to the auction floors as results indicated that grower participation in auction floors is negative with every km increase .To counter measure this challenge which is likely because of increased transport costs , the government has to also provide government transport schemes that help reduce the cost of deliveries to auction floors as a measure to subsidize growers from losses that emanate from positioning,

5.6 Suggestions for Further Research

An area of further research following this research is to analyze the viability of auction tobacco production among the growers since this study was mainly focusing on exploring factors to boost participation whereas also understating if the same auction is viable at least.

Another critical area of study that the researcher identified is to have a study that looks at the technical factors that impact production among the auction growers so that policy prescriptions speak to grower challenges.

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APPENDICES

APPENDIX 1:

	market~n	Gender	marita~s	Educat~s	Employ~t	yearsf~g	househ~e	hactare	nonagr~e	irriga~n	Payamnts	kmtofl~s	owners~t	salewi~s	costof~e	Number~s
marketpart~n	1.0000															
Gender	-0.1594	1.0000														
maritalSta~s	-0.0314	0.1243	1.0000													
Educationy~s	0.0592	0.1786	-0.0220	1.0000												
Employment	-0.0074	-0.0192	-0.1204	0.1357	1.0000											
yearsfarming	0.0194	-0.0191	0.1053	0.0521	0.1124	1.0000										
households~e	-0.0797	0.0611	0.0630	0.0184	-0.1664	-0.1311	1.0000									
hactare	-0.0545	0.0139	0.0906	0.0869	-0.1386	0.0482	0.2688	1.0000								
nonagricin~e	0.1005	0.0317	-0.0550	0.0707	0.3743	-0.0523	0.1074	-0.0172	1.0000							
irrigation	-0.1564	0.0523	0.0729	0.0297	0.1366	-0.0745	0.1487	0.1475	0.1179	1.0000						
Payamnts	-0.0180	-0.1299	-0.0858	-0.1282	0.1253	0.1631	0.0020	-0.0666	0.0561	-0.1185	1.0000					
kmtofloors	-0.0092	-0.0126	-0.0355	-0.0157	-0.0468	0.0582	0.0458	-0.0237	-0.1191	-0.1212	0.0603	1.0000				
ownershipo~t	0.1900	-0.0433	-0.0417	0.2892	0.2616	0.1727	0.0088	0.1459	0.2373	0.0375	-0.0073	0.0723	1.0000			
salewithal~s	0.2598	-0.0080	0.1247	0.1024	0.1130	0.0745	-0.1521	-0.0172	0.1208	-0.0103	0.0032	0.0051	0.1857	1.0000		
costofsale	-0.0476	0.0423	0.0595	0.0168	-0.0392	-0.1644	0.1758	0.1218	0.0699	0.1339	0.0043	-0.1188	0.0530	-0.0343	1.0000	
Numberofex~s	-0.2974	0.0139	-0.0445	0.0001	0.0660	-0.0981	0.0862	-0.0154	-0.2518	0.1189	0.0889	0.0379	-0.1833	-0.2127	-0.0491	1.0000
numberofbu~s	0.9166	-0.1498	-0.0605	0.0637	0.0111	0.0148	-0.0973	-0.0453	0.1155	-0.1269	-0.0254	-0.0078	0.1432	0.2174	-0.0336	-0.2972
Experience~g	0.0333	0.0501	0.1080	-0.0236	0.0373	0.6973	-0.0569	0.0034	0.0716	0.0384	0.1435	-0.0859	0.0941	0.0261	-0.0972	-0.1361
education_~l	0.0062	0.2329	0.0340	0.8276	0.1663	0.1372	-0.0033	0.1453	0.0899	-0.0655	-0.0070	0.0107	0.2657	0.0997	0.0118	-0.0059
dist_flo~ear	0.0265	0.0844	-0.0681	0.0442	0.0366	-0.0210	-0.1631	0.0060	0.0181	0.0843	-0.0244	-0.7718	-0.0095	0.0104	0.1148	-0.0383
dist_floor~m	-0.0159	-0.1064	0.0883	-0.0208	-0.0559	-0.0627	0.2355	0.0106	0.0837	-0.0001	-0.1024	-0.0298	-0.0664	-0.0168	0.0261	-0.0405
dist_flo~far	-0.0105	0.0248	-0.0226	-0.0234	0.0210	0.0868	-0.0791	-0.0172	-0.1059	-0.0860	0.1318	0.8198	0.0790	0.0069	-0.1445	0.0814

	number~s	Experi~g	educat~l	dist~ear	dist_f~m	dist~far
numberofbu~s	1.0000					
Experience~g	0.0194	1.0000				
education_~l	0.0056	0.0494	1.0000			

```
dist_flo~ear |   0.0207   0.0405  -0.0483   1.0000
dist_floor~m |   0.0130  -0.0058   0.0694  -0.5314   1.0000
dist_flo~far |  -0.0348  -0.0353  -0.0230  -0.4674  -0.5006   1.0000
```

Appendix 2 LInear regression

```
. reg marketparticipation Gender Experience_farming Employment householdsize hactare nonagricincome Payamnts dist_floors_
> _floors_medium salewithallmarkets costofsale numberofbuyers Numberofextensionservices ownershipoftransport , robust

Linear regression                               Number of obs     =        193
                                                F(14, 178)        =      64.59
                                                Prob > F          =     0.0000
                                                R-squared         =     0.8515
                                                Root MSE          =     .18307
```

marketparticipation	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
Gender	-.0254995	.0263018	-0.97	0.334	-.0774029	.0264038
Experience_farming	.009414	.0276608	0.34	0.734	-.0451713	.0639993
Employment	-.0541522	.0468868	-1.15	0.250	-.1466777	.0383733
householdsize	.0056379	.005741	0.98	0.327	-.0056914	.0169672
hactare	-.014666	.0131212	-1.12	0.265	-.0405592	.0112271
nonagricincome	-.0137596	.0302209	-0.46	0.649	-.0733969	.0458777
Payamnts	.0012616	.0277253	0.05	0.964	-.053451	.0559743
dist_floors_far	-.0015806	.0339222	-0.05	0.963	-.068522	.0653608
dist_floors_medium	-.0329404	.0355086	-0.93	0.355	-.1030123	.0371315
salewithallmarkets	.0574218	.0322936	1.78	0.077	-.0063058	.1211494
costofsale	-.0224713	.0255566	-0.88	0.380	-.0729042	.0279616
numberofbuyers	.2043263	.0115265	17.73	0.000	.1815802	.2270724
Numberofextensionservices	-.0041381	.0066025	-0.63	0.532	-.0171674	.0088911
ownershipoftransport	.0859454	.0355032	2.42	0.016	.015884	.1560068
_cons	-.1318723	.0630718	-2.09	0.038	-.2563369	-.0074077

```
.
```

```
. hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
        Ho: Constant variance
        Variables: fitted values of marketparticipation

        chi2(1)      =    74.46
        Prob > chi2  =   0.0000
```

Appendix 3 Marginal effects

```
. mfx

Marginal effects after probit
      y  = Pr(marketparticipation) (predict)
         =    .022386
```

variable	dy/dx	Std. Err.	z	P>|z|	[95% C.I.]		X
Gender*	-.077472	.04387	-1.77	0.077	-.163458	.008514	.455959
Experi~g*	.0349782	.03491	1.00	0.316	-.033441	.103398	.518135
Employ~t*	-.0437822	.03515	-1.25	0.213	-.112671	.025106	.108808
househ~e	.0303452	.0211	1.44	0.150	-.011014	.071704	6.01554
hactare	-.0854268	.05767	-1.48	0.139	-.198457	.027604	3.75648
nonagr~e*	-.0419332	.05148	-0.81	0.415	-.142828	.058962	.34715
Payamnts*	.0298196	.03133	0.95	0.341	-.031577	.091216	.88601
dist~far*	.0114782	.03215	0.36	0.721	-.05154	.074497	.305699
dist_f~m*	-.2425789	.09203	-2.64	0.008	-.422946	-.062212	.362694
salewi~s*	.1544002	.07128	2.17	0.030	.014699	.294101	.367876
costof~e*	-.0588441	.05424	-1.08	0.278	-.165158	.04747	.186528
number~s	.1372201	.10472	1.31	0.190	-.068036	.342476	2.2228
Number~s	-.0034339	.00854	-0.40	0.687	-.020163	.013296	1.23834
owners~t*	.0248962	.05162	0.48	0.630	-.076285	.126077	.129534

(*) dy/dx is for discrete change of dummy variable from 0 to 1

Appendix 4 Link Test

```
. linktest

Iteration 0:   log likelihood = -117.12422
Iteration 1:   log likelihood = -10.865453
Iteration 2:   log likelihood = -9.1594901
Iteration 3:   log likelihood = -9.0126947
Iteration 4:   log likelihood = -8.9515329
Iteration 5:   log likelihood = -8.9429152
Iteration 6:   log likelihood = -8.9405499
Iteration 7:   log likelihood = -8.9405076
Iteration 8:   log likelihood = -8.9405074

Probit regression                                 Number of obs     =        193
                                                  LR chi2(2)        =     216.37
                                                  Prob > chi2       =     0.0000
Log likelihood = -8.9405074                       Pseudo R2         =     0.9237

------------------------------------------------------------------------------
marketparticipation |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
--------------------+---------------------------------------------------------
               _hat |   1.000657   .2533391     3.95   0.000     .5041219    1.497193
             _hatsq |  -.0470118   .0318085    -1.48   0.139    -.1093553    .0153317
              _cons |   .0848392   .3484483     0.24   0.808     -.598107    .7677853
------------------------------------------------------------------------------
Note: 66 failures and 0 successes completely determined.


. probit marketparticipation Gender Experience_farming Employment householdsize hactare nonagricincome Payamnts dist_floors_far d
> ist_floors_medium salewithallmarkets costofsale numberofbuyers Numberofextensionservices ownershipoftransport , robust

Iteration 0:   log pseudolikelihood = -117.12422
Iteration 1:   log pseudolikelihood = -16.012893
Iteration 2:   log pseudolikelihood = -11.363562
Iteration 3:   log pseudolikelihood = -9.3550395
Iteration 4:   log pseudolikelihood = -9.0590913
Iteration 5:   log pseudolikelihood = -9.0452853
Iteration 6:   log pseudolikelihood = -9.0452359
Iteration 7:   log pseudolikelihood = -9.0452359

Probit regression                                 Number of obs     =        193
                                                  Wald chi2(14)     =     130.22
                                                  Prob > chi2       =     0.0000
Log pseudolikelihood = -9.0452359                 Pseudo R2         =     0.9228

------------------------------------------------------------------------------
                     |               Robust
marketparticipation |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
--------------------+---------------------------------------------------------
              Gender |  -1.329091   .7457645    -1.78   0.075    -2.790762    .1325809
  Experience_farming |   .6390671   .6171711     1.04   0.300     -.570566     1.8487
          Employment |  -2.742881   .8686656    -3.16   0.002    -4.445435   -1.040328
       householdsize |   .5697393   .1415671     4.02   0.000     .2922729    .8472058
             hactare |  -1.603914   .4656968    -3.44   0.001    -2.516663   -.6911648
        nonagricincome |  -.9374031   .5895978    -1.59   0.112    -2.092994    .2181873
            Payamnts |   1.213417   .7363535     1.65   0.099    -.2298097    2.656643
       dist_floors_far |   .1986549   .4967697     0.40   0.689    -.7749959    1.172306
     dist_floors_medium |   -3.60851   1.333055    -2.71   0.007    -6.221249   -.9957706
     salewithallmarkets |   1.595909     .65189     2.45   0.014     .3182277    2.873589
            costofsale |  -2.372778   .7743599    -3.06   0.002    -3.890495   -.8550604
        numberofbuyers |   2.576348   .3601566     7.15   0.000     1.870454    3.282242
Numberofextensionservices |  -.0644721   .1337119    -0.48   0.630    -.3265426    .1975984
   ownershipoftransport |   .3569001   .4834549     0.74   0.460    -.5906541    1.304454
                 _cons |  -4.174904   .8382406    -4.98   0.000    -5.817825   -2.531982
------------------------------------------------------------------------------
Note: 44 failures and 24 successes completely determined.
```

APPENDIX 5: Questionnaire

FACTORS INFLUENCING FARMER PARTICIPATION IN AUCTION TOBACCO MARKETING IN WEDZA DISTRICT ,ZIMBABWE.

QUESTIONNAIRE

Please tick in given boxes or fill in the blank provided spaces next to a question

Demographic factors

Respondent number:

1. Gender [1] Male ☐ [0] Female ☐

2. Marital status?

[i] Married ☐ [ii] other ☐

3. Number of years of education? ……

4. Are you employed ? [i] Yes ☐ [ii] No ☐

5. How many are you in household?.....

6. How long have you been farming tobacco?..... Years.

LANDHOLDING FACTORS

7. How big is your farm? (hectares) …….

8. Do you have other sources of income other than farm income? [i] Yes ☐
[ii] No ☐

9. Do you have access to irrigation? [i] Yes ☐ [ii] No ☐

AGRICULTURAL INFORMATION AND MARKET PARTICIPATION

10. Which market do you sale with? Auction ☐ contract ☐

11. Do you receive payment in forex? [i] Yes [ii] No ……

12. How many kilometers do you travel to get to the nearest tobacco floor?

……..

13. Do you own any transport for movement of bales during the marketing season?

yes ☐ no ☐

14. Do you sale with all market in one season? [i] Yes ☐ [ii] No ☐

15. In comparison to the other model of sale, is the cost of selling through your market relatively lower?

[i] high ☐ [ii] low ☐

Appendix 6 Aurec Approval

AFRICA UNIVERSITY
(A United Methodist-Related Institution)
INVESTING IN AFRICA'S FUTURE

AFRICA UNIVERSITY RESEARCH ETHICS COMMITTEE (AUREC)

P.O. Box 1320 Mutare, Zimbabwe, Off Nyanga Road, Old Mutare-Tel (+263-20) 60075/60026/61611 Fax: (+263 20) 61785 website: www.africau.edu

Ref: AU1907/21 13 February, 2021

Jeffry Teya
C/O CHANS
Africa University
Box 1320
Mutare

RE: **FACTORS INFLUENCING FARMER PARTICIPATION IN AUCTION TOBACCO MARKETING IN WEDZA DISTRICT ,ZIMBABWE.**

Thank you for the above titled proposal that you submitted to the Africa University Research Ethics Committee for review. Please be advised that AUREC has reviewed and approved your application to conduct the above research.

The approval is based on the following.

a) Research proposal
b) Data collection instruments
c) Informed consent guide

- **APPROVAL NUMBER** AUREC1907/21
  This number should be used on all correspondences, consent forms, and appropriate documents.
- **AUREC MEETING DATE** NA
- **APPROVAL DATE** February 13, 2021
- **EXPIRATION DATE** February 13, 2022
- **TYPE OF MEETING** Expedited
  After the expiration date this research may only continue upon renewal. For purposes of renewal, a progress report on a standard AUREC form should be submitted a month before expiration date.
- **SERIOUS ADVERSE EVENTS** All serious problems having to do with subject safety must be reported to AUREC within 3 working days on standard AUREC form.
- **MODIFICATIONS** Prior AUREC approval is required before implementing any changes in the proposal (including changes in the consent documents)
- **TERMINATION OF STUDY** Upon termination of the study a report has to be submitted to AUREC.

AFRICA UNIVERSITY
RESEARCH ETHICS COMMITTEE (AUREC)
APPROVED
P.O. BOX 1320, MUTARE, ZIMBABWE

Yours Faithfully

MARY CHINZOU – A/AUREC ADMINISTRATORFOR CHAIRPERSON, AFRICA UNIVERSITY RESEARCH ETHICS COMMITTEE