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Analysing trader behaviour in the maize marketing system in Zambia

by

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DECLARATION

I, Sombo Makeche, declare that the thesis, which I hereby submit for the degree MSc (Agric) Agricultural Economics at the University of Pretoria, is my own work and has not been submitted for a degree at any other tertiary institution.

SIGNATURE: ……..…… DATE: May 2016

DEDICATION

To my Father,

Luke Makeche,

and

my Late Mother,

Anna Mwanza – May your sweet soul continue resting in God's peace.

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ABSTRACT

Private traders are perceived to extract monopoly rents from farmers by offering very low prices. However, little attempt has been made to understand the behaviour of private traders and the factors that influence their behaviour. This study, therefore, examines the behaviour of private traders and determines the factors influencing their behaviour by means of the Chi-squared test. It further identifies the characteristics of smallholder farmers and private traders transacting with each other and examines the pricing, grading and weighting systems used by private traders, as well as the relationship that exists between farmers and private traders. Understanding private trader behaviour, factors influencing this behaviour, and the relationship between farmers and these private traders are important questions and have great implications for policy.

Primary data was used in this study which involved interviews and direct observations with both private traders and smallholder farmers. The sample sizes for private traders and smallholder farmers were 50 and 200, respectively. The data was collected in the Kalomo District of Zambia between June and August, 2015. Only those farmers that transact with private traders or use assembly traders as the marketing channel were included in this study.

The data collected was analysed using gross marketing margin, the Chi-squared test and descriptive statistics. The measure of the extent of opportunistic behaviour was also used to achieve the study objectives.

The findings show that the mean price paid by private traders was ZMW 0.989 (USD 0.13) per kg and private traders were the ones who determine the prices and grades of maize. The private traders also weigh the maize and the smallholder farmers have little control on the final weight of the maize, as they do not participate in the weighing. This indicates that the private traders have power in the determination of the weight of maize. The majority of the private traders were found to behave opportunistically, accounting for 58 % of the surveyed traders. Experience and education level of the private traders were found to influence their behaviour. Given the importance of the above factors in influencing private trader behaviour, particularly experience and education, the results suggest that monitoring of the maize trading could potentially significantly reduce opportunistic behaviour among these less-experienced and less-educated traders. Lastly, the study reveals that 68.5 % of the smallholder farmers did not trust the private traders, whereas 46 % of the private traders did trust the farmers. The findings of this study indicate great potential for public sector investments in organisations that ensure standard weights (such as the Zambia Weights and Measures Agency 'ZWMA') and grades for maize. The ZWMA is the Zambian organisation responsible for enforcing weight institutions. An agency enforcing grading institutions for the smallholder maize farmers, however, does not exist in Zambia. Investment in such organisations would increase the levels of trust between farmers and traders, as neither would be suspicious of the weight or grade obtained, and possible opportunistic behaviour would be reduced.

The suggestions and recommendations given by this study should help reduce the possibilities for opportunistic behaviour and exploitation of smallholder farmers. Because this study is in line with Zambia's poverty reduction plan to reduce poverty levels through increased agricultural production and improved maize trading among smallholder farmers, the recommendations given will help improve maize trading and the livelihoods of smallholder farmers. This is because they will be able to sell their maize at higher prices owing to reduced opportunistic behaviour of private traders, thus realising profits. The development of a grading system will lead to a better trading environment for both smallholder farmers and private traders, as both parties will be certain of the maize quality.

In conclusion, a trading environment where organisations and institutions are in place, monitored and enforced to ensure reliable grading and weighing systems will help improve maize trading by smallholder farmers and private traders in Zambia. The improved maize trading will be the result of reduced opportunistic behaviour. This will ultimately increase the welfare of smallholder farmers and improve their livelihoods, which will contribute towards the reduction of the poverty levels in Zambia.

Key words: Agency theory, Trader behaviour, Zambian maize market, Pricing, grading and weighing systems, Gross marketing margin, Chi-squared test

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LIST OF ACRONYMS

CSO	Central Statistical Office
FISP	Farmer Input Support Programme
FRGs	Farmer Research Groups
FRA	Food Reserve Agency
GRZ	Government of the Republic of Zambia
JAICAF	Japanese Association for International Collaboration of Agriculture and Forestry
MACO	Ministry of Agriculture and Cooperatives
MAL	Ministry of Agriculture and Livestock
NAMBOARD	National Agricultural Marketing Board
NAP	National Agricultural Policy
PHS	Post Harvest Survey
USD	United States Dollar
ZMWA	Zambia Measures and Weights Agency
ZMW	Zambian Kwacha

CHAPTER ONE

INTRODUCTION

1.1 Background

In the Zambian maize market, smallholder farmers have an option to either sell their maize produce to private traders (also known as assembly traders), or to the government agency. Despite having these options, access to markets by smallholder farmers continues to be a major concern for Zambian policy makers. Therefore, government agricultural policies, particularly maize marketing policies, have been put in place as a response to the poor market access by remote rural farmers which often leads to market failure (Chapoto & Jayne, 2011). Market failure is widely perceived as the inability of private traders to provide a market to farmers located in the remote areas (Keech, Munger & Simon, 2012). This inability often leads to direct government intervention. In Zambia, government intervention has been effected through the buying of maize thereby providing markets to smallholder farmers as they have difficulty accessing markets to sell their maize. Consequently, the purchasing of maize by the government has been expanded to remote areas so as to reach farmers in these areas. This is because maize is the major source of income for smallholder farmers and thus it is important that their maize is purchased to enable the improvement of their livelihoods.

Despite the continued intervention of the Government of the Republic of Zambia in the maize markets through the marketing board (Food Reserve Agency, 'FRA'), private traders still remain the major maize buyers throughout the country. Most of the farmers (both large-scale and smallholder farmers accounting for 70 %) therefore sell their maize to private traders, known as assembly traders (Sitko & Jayne, 2014). These private traders buy small quantities of maize from multiple smallholder farmers for re-selling in large quantities. The private traders usually buy maize directly from smallholder farmers residing in rural villages, particularly smallholder farmers who have difficulty transporting their maize to the district markets. They thus provide a conveniently accessible market to smallholder farmers who are unable to access the marketing centres and collection points created by the FRA.

Several studies (Kähkönen & Leathers, 1999; Sitko & Jayne, 2014; Nijhoff, Tembo, Shaffer, Jayne & Shawa, 2003) have investigated the maize markets of Zambia with a focus on how marketing policy and government intervention (crop marketing authority) would affect smallholder farmers' market performance. In addition, the studies assessed smallholder farmers' perceptions of private traders. Nijhoff *et al*. (2003), for example, assessed Zambia's grain marketing policy and how a crop marketing authority would affect maize market performance among smallholder farmers. Their findings suggested that the marketing policy and the crop marketing authority would increase maize production and improve the maize market performance of large-scale farmers, as opposed to smallholder farmers. This study, therefore, recommended the participation of the private sector, particularly private traders, in the maize markets to enable smallholder farmers to increase their maize production and market performance.

Further, Kähkönen and Leathers (1999) analysed the maize and cotton markets and the perceptions of smallholder farmers on private traders in Zambia and Tanzania. The findings were that farmers perceived the prices charged by private traders as being low and thereby the farmers were being exploited. Farmers perceived private traders as untrustworthy, as there had been instances where traders promised a high price, collected the maize, and later paid a lower price. Similarly, Sitko and Jayne (2014) found that private traders offered low prices to smallholder farmers in Zambia. For instance, farmers who sold directly to grain processors were found to receive 0.08 USD more than those who sold to private traders, thereby confirming the possible exploitation of smallholder farmers by private traders (Sitko & Jayne, 2014).

The farmers also revealed that the private traders offered varying prices to different farmers in the same area. This intra-village price variation was based on the whether or not the smallholder farmer had information on prevailing market prices or not. This was considered as exploitation of the uninformed smallholder farmers, as the private traders would buy maize at low prices from the smallholder farmers that had no information on the prevailing market prices. This price information is provided by the Ministry of Agriculture and Livestock (MAL) through mobile phones and media; however, about 60 % of the smallholder farmers do not own mobile phones and have limited access to media (MAL, 2013). Private traders, however, do have access to these sources of price information and they seem to take advantage of this information asymmetry by not sharing this information with the smallholder

farmers, permitting them to buy maize at relatively low prices from smallholder farmers. The prices are non-negotiable and are usually set by the private traders. The scales used for weighing also belong to the traders, which seems to create further problems. Farmers complained that the traders tended to manipulate the scales when buying maize. In doing this, traders get more maize and ultimately pay farmers less.

The privatisation of agricultural markets has led to the participation of private traders in the Zambian maize markets. The participation of private traders improves smallholder farmers' access to maize markets. However, private traders are perceived to exploit smallholder farmers by paying low prices. This perception has not really been confirmed through empirical studies while at the same time, little is known about the reasons driving opportunistic (exploitative) behaviour of private traders. In addition, the interaction between smallholder farmers and private traders has not been explored in depth.

1.2 Problem statement

Private traders are perceived to exploit smallholder farmers, despite being an important market for smallholder maize farmers residing in remote areas with little or no access to urban markets. A larger proportion of the Zambian smallholder farmers would have difficulty selling their maize if these traders did not operate in the remote areas. This is because, contrary to the FRA's mandate of providing a market for farmers in remote areas, the FRA has been targeting farmers that are located closer to the district towns, rather than those in remote areas (Chapoto & Jayne, 2011). Bwalya, Mugisha and Hyuha (2013) revealed that finding the right buyers, negotiating prices and delivering the maize to markets increase the transaction costs incurred by farmers. However, private buyers who either visit farmers in their villages to buy maize or have a central buying point in the villages close to the farmers, reduce transaction costs that these farmers incur.

Although private traders are said to reduce transaction costs and serve as the main marketing link for smallholder farmers, they are perceived to offer low prices. Another cause for concern is the fact that private traders buy maize at different prices from various smallholder farmers in the same villages, which can considered as exploitive (Sitko & Jayne, 2014). This exploitation is of major concern and is an issue, as it affects smallholder farmers and the rural economy as a whole in a number of ways. Zambia's National Agricultural Policy (NAP) has

an objective of promoting the development of an efficient, competitive and sustainable agricultural sector, which assures food security and increased income, with a vision to achieve poverty reduction. This vision strives to contribute to the overall goal of the Poverty Reduction Strategy Paper (PRSP), which is to achieve national poverty reduction and economic growth (MACO, 2004). This is in line with the goal of the NAP. The NAP's goal is to increase incomes of farmers, particularly smallholder farmers, through increased production and productivity. Emphasis is on the development of smallholder farmers as this would enable them expand their production and enable them to commercialise.

Smallholder farmers, however, if exploited, will not be able to commercialise as they would be realising lower profits as a result of lower prices paid by private traders for maize. Low incomes and profits realised by these smallholder farmers would impede the achievement of food security. Achieving food security in rural areas is important as more than half of Zambia's population live in rural areas where incomes are consistently lower than those in the urban areas (MACO, 2004). Therefore, the payment of fairer prices, that is, through less opportunistic behaviour by private traders, would ultimately lead to increased livelihoods for the smallholder farmers, who account for the majority (over 70 %) of the rural population (MAL, 2013).

Smallholder farmer exploitation by private traders is exacerbated by the systems governing the weighing and grading of maize. Zambia, like most African countries, does not have adequate and standardised weighing and grading systems (Giovannucci, Sterns, Eustrom & Haantuba, 2001). This presents chances for opportunistic behaviour as traders are, for instance, able to manipulate the scales as they are not standardised. Lack of access to prevailing market price information by smallholder farmers and the pricing system also enables traders to exploit these farmers. A formal pricing system is not available and therefore private traders take advantage of this by paying lower prices to the smallholder farmers. The prices paid by private traders are not monitored, despite the Government's announcement of the floor price through the Food Reserve Agency (FRA). The floor price is a minimum price that a kilogram of maize should be bought at, and this lack of price monitoring leads to private traders getting away with exploitation.

Despite the perception that traders exploit farmers, there is a paucity of empirical evidence in literature to confirm exploitation, and whether or not this exploitation is linked to trader

behaviour or trader characteristics. Additionally, little is known of the factors shaping trader behaviour and strategy when participating in the Zambian maize markets. Furthermore, there is little knowledge concerning the weighing and grading systems used by private traders. Understanding the weighing and grading systems will provide information on the reasons why traders get away with opportunistic behaviour. This will shed light on whether or not the current systems have loopholes which enable private traders to behave opportunistically, thereby exploiting smallholder farmers.

Several studies have investigated only the farmers' perception of the private traders (Kähkönen & Leathers, 1999; Sitko & Jayne, 2014) without investigating the behaviour and "modus operandi" of private traders. After a detailed review of available literature, the following questions remained unanswered:

- Is there really evidence of exploitation or opportunistic behaviour? That is, are private traders paying lower prices, and if they are, there is a need to find out how low these prices are compared with the FRA floor price.
- Is opportunistic behaviour really a problem, and if it is, why is that the case? It is important to investigate if opportunistic behaviour of private traders has an effect on smallholder farmer welfare, as it would aid with recommendations to minimise the opportunistic behaviour and exploitation.
- What are the factors shaping trader behaviour: are they socio-economic factors or poor enforcement of rules (weights and standards)?

This study attempts to answer the above questions in order to narrow the existing literature gap. An understanding of private trader behaviour (that is, whether they exploit the farmers or not), the characteristics that shape this behaviour and the relationships that private traders have with smallholder farmers will help in designing appropriate institutions and enforcement mechanisms to curtail this potential opportunistic behaviour and the perceived exploitation of smallholder farmers. This study will, therefore, contribute to existing literature on maize markets in Zambia by determining whether or not exploitation of smallholder farmers exists, by identifying the factors that shape the behaviour of private traders in these markets, and by evaluating the institutions surrounding the price, grading and weighing systems. The ultimate goal of this study will be to inform Zambian policy makers on the factors that lead to

opportunistic behaviour and give recommendations on what could be done to reduce opportunism to enable improvements in the maize trading in Zambia. This is because maize trading improvements, in the form of reduced information asymmetries and higher prices paid for maize, would lead to the reduction of opportunistic behaviour. This would further reduce the exploitation of smallholder farmers, and ultimately, lead to the achievement of increased profits (through the payment of higher prices by private traders), which is likely to result in improved rural livelihoods.

1.3 Research objectives

The overall objective of this study is to understand the behaviour of private traders in the maize markets in Zambia, as well as their relationships with smallholder farmers. The specific objectives leading this study are:

- To identify the characteristics of smallholder maize farmers and private traders, transacting with each other
- To determine whether private maize traders behave opportunistically or in principled ways
- To identify and analyse the factors that influence or shape the behaviour of private traders
- To understand the pricing, grading and weighing systems used by the private traders
- To evaluate the relationship between smallholder farmers and private traders
- To give policy recommendations to reduce opportunistic behaviour and thus improve the relationship between farmers and traders, thereby improving informal maize trading.

1.4 Conceptual framework

The interaction between smallholder farmers and private traders is of utmost importance as it to a large extent shapes the behaviour of both parties to the transaction. Private traders are, however, the main focus of this study and understanding their behaviour is of key interest in order to make recommendations towards achieving improved maize trading. This behaviour is influenced by a number of agency theory factors, such as information asymmetry, bounded

rationality and conflicting interests that exist in the environment in which trade takes place. The relationship between the smallholder maize farmer and the private traders are unpacked by utilising the agency theory of new institutional economics.

1.4.1 Agency theory

Agency theory is concerned with the conflicting interests that arise when trade in commodities or transactions by economic actors take place. Economic actors have general characteristics affecting their economic behaviour which often leads to principal–agent problems. These include imperfect (asymmetric) information, bounded rationality and conflicting interests (Kirsten, Dorward, Poulton & Vink, 2009). Trading of commodities takes place in environments where there is asymmetric information and individuals are bounded rational and have conflicting interests. Consequently, bounded rational economic actors, with conflicting interests (such as a smallholder farmer wanting to maximise his or her profit by demanding higher prices, while the private trader wants to minimise costs by paying the lowest price possible), trading in an environment of asymmetric information open up possibilities for opportunistic behaviour, Agency theory therefore explains the bounded rationality of individuals.

1.4.1.1 Bounded Rationality

Bounded rationality means that individuals have a limited capacity to absorb and evaluate information. Despite their intention to make rational decisions, individuals have a limited capacity to accurately evaluate all possible alternatives to a decision (Holt & Edwards, 2013, in Hobbs, 1996). For example, although a private trader might know a smallholder farmer, he might not know the decision that the smallholder farmer will make when selling the maize. The smallholder farmer may decide not to sell his maize after the private trader who visits him at his village for the sole purpose of buying maize. Similarly, the trader, despite being known by the farmer, might act opportunistically and manipulate the scales used for weighing the maize. This therefore shows that, despite having information about another party to the transaction, one is not able to fully evaluate all possible decision alternatives of that party. Because perfect information does not exist in new institutional economics, and it is impossible to anticipate all the potential outcomes of a transaction, both the smallholder

farmer and private trader are exposed to exploitation by the other as a result of their conflicting interests.

1.4.1.2 Conflicting Interests

In addition to being rationally bounded, both smallholder farmers and private traders have their own interests which may conflict with each other. When two agents with conflicting interests transact, opportunistic behaviour is likely to occur (Groenewegen, Spithoven & van der Berg, 2010). This is because these agents have separate objective functions which affect the way both parties behave. Private traders, on the one hand, have an interest of minimising the cost of buying maize by paying the lowest possible price. This is done so that they are able to make profits after reselling the maize. Smallholder farmers, on the other hand, have an objective or interest of maximising profits by selling their maize at the highest possible price. These conflicting interests lead to possibilities of opportunistic behaviour by both the traders and farmers. In trying to pay the lowest possible price, traders may act opportunistically by distorting price information and manipulating the scales. Price information is important to smallholder farmers, as private traders would end up paying low prices to those farmers without this information (Courtois & Subervie, 2014). Farmers could also act opportunistically in trying to fulfil their interests by mixing good quality maize with that of poor quality, so as to increase the weight and realise an average grade in the case of poor quality maize (Nordier, 2013). This potential opportunistic behaviour is heightened by the fact that there is information asymmetry which opens up opportunities for both traders and smallholder farmers to cheat as there is unequal distribution of information between them.

1.4.1.3 Information Asymmetry

Transactions often take place in an environment of asymmetric information. Asymmetric information occurs as a result of incomplete information being available to some parties to the transaction (Hobbs, 1996). In other words, there is unequal distribution of information among actors (Groenewegen, Spithoven & van der Berg, 2010). This unequal distribution of information could lead to opportunism, as actors with more information can use the information to their advantage. For instance, the smallholder farmer might have more information about the maize, that is, he might know that the maize did not dry completely and be prone to post-harvest losses, but he might not tell the private trader. The private trader

might not have access to this information, as he does not monitor the smallholder farmer because he trusts that the smallholder farmer produces good quality maize. The fact that a smallholder farmer, having more information about the maize quality than the private trader does, indicates unequal distribution of information (information asymmetry). This private trader would then end up buying this maize without knowing that it is of poor quality. The smallholder farmer in this case would have acted opportunistically and taken advantage of the private trader's lack of knowledge about the maize quality. Similarly, the private trader might have information about the prevailing market price for maize, but because the smallholder farmer might not have this price information, the private trader could act opportunistically and offer to buy the maize at a lower price. The above shows that there are possibilities for opportunistic behaviour in the trading environment.

1.4.1.4 Opportunistic behaviour

Opportunistic behaviour or opportunism implies an effort to realise individual gains through a lack of honesty in transactions (Williamson, 1975). Individuals and businesses at times seek to exploit a situation to their own advantage (Hobbs, 1996). Private traders, on the one hand, may act opportunistically by manipulating the scales so that the kilograms displayed are less than the actual amount of maize. On the other hand, the smallholder farmer may mix poor with good quality maize to increase the quantity and average quantity of maize sold. Individuals behave opportunistically because they are self-interest-seeking individuals who want to take advantage of situations for their own benefit, without much concern for the other party.

As demonstrated above, and graphically illustrated in the conceptual framework (Figure 1.1 below), private traders and smallholder farmers transact in an environment of asymmetric information, which means that they do not have complete information about the product quality and prices, among other factors. Additionally, because both parties are rationally bounded, they are not able to fully absorb and evaluate all the future potential outcomes of the transaction. Smallholder farmers and private traders also have conflicting interests in that they are profit maximisers, even if it means acting in self-interested ways with guile, without consideration of the other party to the transaction.

The characteristics of the smallholder farmers and private traders, and the relationship between them, are of interest as these could influence whether or not opportunistic behaviour occurs. Socio-economic factors, such as the age, education and experience of the trader, among other factors, could influence the relationship between the traders and farmers, as well as their behaviour. Other factors, such as the pricing, grading and weighing systems in place (as well as their reliability), have an influence on traders' behaviour and the relationship that they have with farmers. Often, the relationship is influenced by trust and reputation. Good relationships exist when two parties to a transaction (farmers and traders in this case) trust each other (Fafchamps & Gabre-Madhin, 2001). Reliable grading, pricing and weighing systems instil trust and enhance good relationships between the two parties. The government can thus play an important role in the reduction of opportunistic behaviour by establishing organisations and institutions responsible for determining and monitoring weights and grades leading to them being reliable. Institutions for monitoring grading and weighing systems are important, as it is costly to transact without them (North, 1992). Transactions without these institutions are costly in that they open up opportunities for opportunistic behaviour which is more likely to result in losses (by increasing transaction costs) for both parties to the transaction (North, 1992).

1.4.2 Transaction costs / Costs of Exchange

Transaction costs are those costs that are incurred when the exchange of a commodity is carried out, that is, costs that are incurred during the operation of an economic system (North, 1992). A similar definition for transaction costs is "the costs of running an economic system", which is used by Williamson (Arrow, 1969, in Williamson, 1975). An economic system refers to the economic activity taking place, as well as the participants involved in the activity (North, 1992). In this study, smallholder maize farmers and private traders are involved in maize exchange (an economic activity) and thus incur costs (transaction costs) during the exchange. These costs include searching costs incurred in the process of looking for buyers, negotiation costs, transport costs and storage costs. Increased transaction costs increase opportunistic behaviour, as parties to a transaction instead of searching for price information (for instance), can decide not to so as to reduce the costs. Due to this lack of price information, smallholder farmers can end up being cheated as they do not have information on what the prevailing market prices are and traders would take advantage of this by buying

maize at low prices. Therefore, based on the agency theory above, a conceptual framework (Figure 1.1 below) was designed to guide this study.

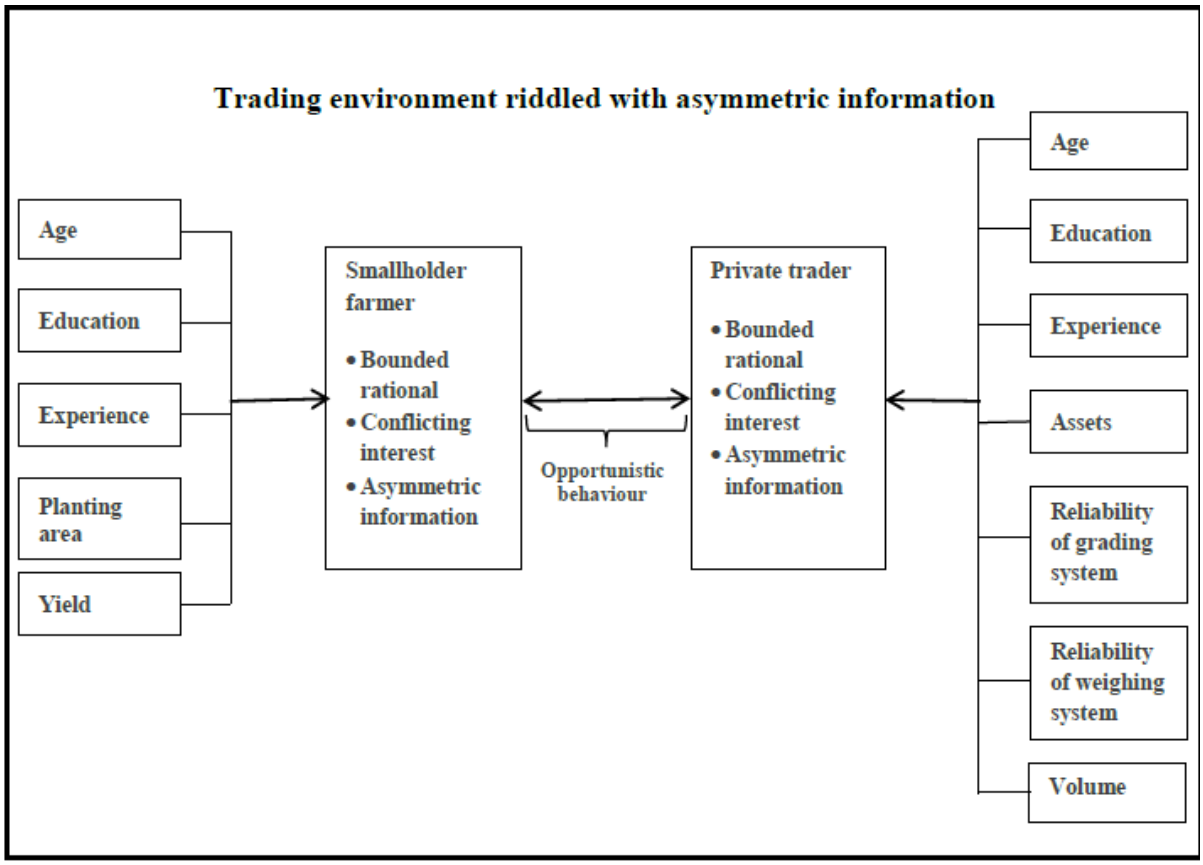

Figure 1.1: A conceptual framework for analysing trader behaviour
Source: Compiled by the author

The characteristics of farmers are important in this study as they provide information on the kind of smallholder farmers that transact with the private traders. How these farmers behave depends on their characteristics. The age, gender, education level and experience of smallholder farmers are important attributes. The planting area and yields are also important in the understanding of whether smallholder farmers with larger farms and higher yields are the ones that sell to the private traders, and vice versa.

1.5 Identification of the hypotheses

Opportunistic behaviour or exploitation could affect the welfare of farmers, as they would fetch lower prices from selling their maize. This would pose a threat to their food security, as maize farming is their major source of income. Although Kähkönen and Leathers (1999) and Sitko and Jayne (2014) indicated a perception that private traders exploit smallholder farmers,

there is a need to find out whether or not exploitation exists. If it does, the factors influencing whether or not a trader behaves opportunistically are to be examined. The reliability of the pricing, weighing and grading systems is also important. Private traders would get away with opportunistic behaviour if these systems are not in place, or if they exist, and are not reliable. From the above, several hypotheses are proposed for this study.

For statistical analysis, trader behaviour is regarded as the dependent variable, with the socio-economic factors (age, education, experience, assets and volume) as the independent variables, which might possibly influence trader behaviour. These factors that were hypothesised to have a possible influence on trader behaviour, as well as the null and alternative hypotheses of these variables, are shown in Table 1.1 below.

Table 1.1: Independent variables, expectations and hypotheses

No.	Independent Variable	H_0: θ=1	Expectation	Ha: θ>1
1	Age	Trader behaviour is independent of the age of the trader	Older traders are more likely to behave opportunistically	The proportion of traders who behave opportunistically is higher among older traders
2	Education	Trader behaviour is independent of the education of the trader	More educated traders are more likely to behave opportunistically	The proportion of traders who behave opportunistically is higher among more educated traders
3	Experience	Trader behaviour is independent of the experience of the trader	More experienced traders are more likely to behave opportunistically	The proportion of traders who behave opportunistically is higher among traders with more experience
4	Assets	Trader behaviour is independent of the assets owned by the trader	Wealthier traders (more assets) are more likely to behave opportunistically	The proportion of traders who behave opportunistically is higher among traders with more assets
5	Volume	Trader behaviour is independent of the volume of maize traded	Traders buying larger volumes of maize are more likely to behave opportunistically	The proportion of traders who behave opportunistically is higher among traders trading larger volumes of maize

1.6 Discussion of the hypotheses

The following section will discuss each of the above-mentioned hypotheses in detail.

Hypothesis 1: The older private traders have a higher probability of behaving opportunistically. This is due to the fact that older traders are more respected and trusted by farmers, therefore they would take advantage of this and pay lower prices.

Hypothesis 2: The higher the education level of the traders, the higher the probability of them behaving opportunistically. This is due to the fact that educated traders would be considered by the farmers to have accurate price information, as education is seen to enhance one's ability to acquire and process information more efficiently (Huffman, 1974). These educated traders would then take advantage of this and offer lower prices, especially to the uneducated and uninformed farmers.

Hypothesis 3: The more experienced traders are assumed to behave more opportunistically than those with less experience do. More experienced traders are believed to have better market and price information, compared with farmers, and would therefore exploit farmers by offering lower prices. Experience and age have a similar effect on opportunistic behaviour, as the older traders, like the more experienced ones, are expected to behave more opportunistically. Additionally, the more experienced traders are more likely to be the older, as opposed to the younger traders. Therefore, the older the trader is, the more experienced he is, and the higher the probability of him behaving opportunistically is.

Hypothesis 4: Traders with more assets (wealthier traders) tend to behave less opportunistically than those with fewer assets do. The reason for this is that these traders already own assets and do not see the need to offer low prices to farmers and in turn acquire more assets. Conversely, traders with fewer assets would pay lower prices, so as to have a mark-up after reselling the maize, enabling them to acquire assets (wealth).

Hypothesis 5: Traders who trade larger volumes of maize per season are more likely to offer higher prices than those trading lower volumes of maize do. The reason for this is that they have better bargaining power as a result of higher volumes when reselling maize. This means that they can actually pay farmers more for maize, as they would realise bigger profits from

bargaining. Traders who trade small volumes do not have the same bargaining power and would therefore be more inclined to behave opportunistically and pay farmers a lower price for their maize.

It should be noted that the issue is much deeper than just opportunism by means of offering lower prices. Traders are also believed to be opportunistic when it comes to the grading and weighing systems that they use. Qualitative analysis was used for the empirical testing of the reliability of these systems in this study. In Zambia, grades and standards do exist and are implemented in the formal large-scale farmers' value chain (explained in detail in Chapter Three). However, this is not the case with the more informal smallholder farmer value chain, where grades and standards are less-stringently implemented and monitored. These systems are thus unreliable. Unreliable (unstandardised) grading systems open up opportunities for opportunistic behaviour, as they would lead to traders being dishonest about the quality or grade of a farmer's maize and thus get away with cheating. This would enable the traders to pay lower prices for the maize. Similarly, unreliable weighing systems would allow for the manipulation of scales, leading to traders paying less for more maize. It is therefore important to have grade, standards and standardised weighing systems in place to enable a better trading environment, with reduced opportunism.

As with reliable grading and weighing systems, the relationship between smallholder farmers and private traders can contribute towards reducing opportunistic behaviour. Good relationships lead to the development of trust between smallholder farmers and private traders. The development of, and increased, trust would contribute towards improved trading (Lu, 2007). An improved maize trading environment will further minimise the incentive for one to behave opportunistically, as either party to the transaction would trust the other and work towards maintaining such trustworthy relationships. Any form of opportunistic behaviour would jeopardise their relationship and both would lose out. This is because both private traders and smallholder farmers would end up trading with people they do not know, which would lead to greater losses through cheating. Trust and good relationships, which are developed over a period of time, therefore minimise opportunistic behaviour.

1.7 Methodology

1.7.1 The study area

The study involved an analysis of smallholder maize farmers and private traders in Kalomo District (Figure 1.2 below). The area has many maize farmers and traders, as the southern and central provinces are the second-largest producers of maize, after the eastern province of Zambia. The Kalomo District was selected as it has many maize farmers and traders (traders are mostly found in Kalomo town) who are of major importance for this study. The Kalomo District is situated in Zambia's Southern Province, north-east of Livingstone (Figure 1.2 below). Maize trading takes place in Kalomo town, on the main road between Lusaka and Livingstone. Some traders go to the villages to buy maize directly at the homes or fields of farmers, while others have a buying point close to the farmers.

Figure 1.2: Map of Zambia showing the location of Kalomo
Source: Google Maps, 2016

Data was collected from both smallholder maize farmers and private traders in the town of Kalomo. Data collected in this study included information on socio-economic factors of both

smallholder farmers and private trader. For the private traders, data on socio-economic characteristics that influence their behaviour, as well as the pricing, grading and weighing systems used, was collected. Data on the relationship that exists between smallholder maize farmers and private traders was also collected.

1.7.2 Sampling

The study focused on trader behaviour, as well as their operations, in terms of pricing, grading and weighing of the maize from smallholder farmers. Smallholder farmers were also included to gain a better understanding of what kind of farmers the traders transacted with, in terms of demographic characteristics, as well as the relationship that exists between them.

The population of this study comprised private traders buying maize from smallholder farmers, as well as the smallholder farmers from which the maize was bought. The study employed both random and purposive sampling methods in arriving at a sample of smallholder farmers and private traders, respectively.

Smallholder farmers were randomly selected from a sampling frame made available by the Zambian Ministry of Agriculture and Livestock (MAL). The sampling frame consisted of 53 210 smallholder farmers, that is, all smallholder maize farmers in Kalomo District. Of these farmers, 200 farmers were randomly selected for interviews to provide data on the farming area, age, education level, experience and other socioeconomic factors, as well as on their levels of trust and relationships with traders. The sample size of 200 was selected as the resources available could not allow more farmers to be included in the study. According to Holton and Burnett (1997), one of the advantages of both qualitative and quantitative research methods is their ability to use smaller groups of people (sample) to make inferences about larger groups (population) that would otherwise be prohibitively expensive to study. Therefore, the sample size of 200 smallholder farmers was chosen owing to financial and time constraints. Further, the agricultural structure in the Kalomo District required that smallholder farmers from the various agricultural camps in the district should selected to have a representative sample. Failure to do this would have led to bias, as farmers from only a few camps, for instance, if selected, would have led to inaccurate inferences. To minimise bias, therefore, the farmers in this study were selected by randomly sampling 8 farmers in each of the 25 agricultural camps, giving a total of 200 farmers. They were scattered around various

farming blocks and the 25 camps gave a representative sample. A farming block is a huge piece of land that is demarcated into various farm sizes, specialised in different agricultural ventures. Agricultural camps fall under the farming blocks and they are defined as a zoned area that is supervised by an agricultural camp officer who attends to farmers' needs and concerns (MAL, 2013). The camps are the smallest division in the agricultural sector units; therefore, it is easier for the camp officer to interact, know and attend to the needs of the individual farmers.

Because a trader union or association does not exist, each farmer was asked to identify at least two traders he sold maize to (purposive sampling). The existence of a trader association would have enabled access to trader information, such as where they can be found, as well as the farmers they buy maize from. The traders targeted in this study therefore were only those who transact with the surveyed farmers. Purposive sampling of traders was specifically chosen, as a random sampling of the traders could have led to the possibility of surveying traders who do not interact with the sampled farmers. This would have limited the analysis of the relationship between the maize farmer and the trader, which is a crucial element in understanding trader behaviour. Purposive sampling, therefore, allows the selection of a particular population (private traders) with special characteristics that are of interest to the researcher, for instance, private traders who transact with smallholder farmers in the Kalomo District of Zambia. However, purposive sampling might induce some form of bias, as there is a possibility that farmers would only direct the researcher to private traders offering low prices, although there might be those that offer higher prices.

Of the private traders surveyed, some were found to be local residents residing in the same villages as the smallholder farmers, while others lived outside the villages or communities, but followed the farmers to their villages. Other traders were selected at the rural and district markets, or by the road-side where maize was bought from the farmers. A total of 50 traders were interviewed, as most of the farmers in the district sold to the same traders. A sampling frame of the traders was unavailable as the number of traders has not yet been captured by the Ministry of Agriculture and Livestock (MAL, Kalomo District Office, 2015).

1.7.3 Data collection

Data for this study was collected by means of face to face interviews with the respondents. The respondents were interviewed using the questionnaires as a guide and the responses to each of the questions were recorded on the questionnaires by the interviewers. This method of data collection was used so as to include all farmers and traders, as Kalomo District is in the rural areas where access to technology (internet and mobile phones) is still a challenge; for instance, according to the MAL (2013), about 60 % of the farmers in Zambia did not own mobile phones. The advantages of face to face interviews include high response rates and accuracy, as more information can be gathered from social cues such as voice, intonation and body language (Opdenaker, 2006). Nevertheless, face to face interviews may be expensive to conduct and susceptible to interviewer bias.

The private traders and smallholder farmers were interviewed by using a structured questionnaire (Appendices A and B). Two questionnaires were used in the survey; one for traders and the other for farmers. In addition to the interviews administered, direct observations of the transactions between farmers and traders were made. During the direct observations, the researcher was disguised as a private trader with the help of some agricultural officers who also buy maize from the smallholder farmers. The fact that the farmers and traders were unaware that a survey was being conducted led to them transacting in their usual manner, without any reservations. This was advantageous in understanding the nature of the trade and the relationships between farmers and traders. In an attempt to gain more understanding and complement the primary data collected, unstructured interviews were conducted and this involved asking the respondents to give their views on the topic at hand. The farmers and traders were interviewed individually so as to reduce the chances of one's opinion being influenced by the presence of colleagues or friends.

Some of the key questions posed included trader and farmer characteristics, such as age, gender, experience, education and assets, the price that is paid by the traders, and trust and relationship between the farmers and traders, as well as the grading and weighting systems used by the traders.

1.7.4 Data Analysis

The data collected was captured and cleaned in Microsoft Excel. The STATA statistical package was used for the calculation of the descriptive statistics. The gross marketing margin was used to test for opportunistic behaviour and the Chi-squared test of independence was used to test the study hypotheses.

1.7.4.1 Marketing margins

Several studies (Kalule & Kyanjo, 2013; Phokrel & Thapa, 2007; Yamano & Arai, 2010; Sitko & Jayne, 2014) used marketing margins to assess whether or not market intermediaries are exploitative. A wider marketing margin is indicative of exploitative or opportunistic behaviour while a smaller margin indicates that market intermediaries behave in principled ways (are not exploitative). Phokrel and Thapa (2007) for instance estimated the gross marketing margin of intermediaries as:

Gross marketing margin= [(a-b) x *100/a)]*

Where a = market price, b = Farm gate price.

In the current study, ‘a’, the market price is the FRA price as this is the price received by traders and farmers when they sell to the FRA and ‘b’ is the price paid by traders at the farm gate as they follow the traders to their farm gates or villages to buy maize. The gross marketing margin for each trader was calculated in this study to establish whether traders behave opportunistically or in principled ways (see appendix A).

The market price (FRA price) is fixed as it is set by the government, therefore only the price paid by an individual trader differs and affects the size of the marketing margin. Therefore, traders are categorised as being opportunistic or principled, based on whether they have a wider or smaller gross marketing margin which is the same as categorising them based on whether they pay a price that is lower or greater than mean price respectively.

1.7.4.2 The Chi-squared test of independence

A number of studies (Mahlalela, 2014; Mungatana & Ahimbisibwe, 2012; Piwowar, 2014) have used the Chi-squared test of independence to assess the factors that influence a particular phenomenon. The Chi-squared test is appropriate when the interest is to assess the association between two categorical variables. Therefore, the Chi-square test can be used to assess knowledge, perceptions and attitudes on a particular phenomenon (for instance, opportunistic behaviour) through individual relationships or associations with socio-economic variables (age, education, and experience). The current study employed the Chi-squared test to assess factors influencing private traders' behaviour. Piwowar (2014), for instance, based the methodology of his analysis on the Chi-squared test for independence to determine factors influencing agricultural producers' behaviour (whether to purchase fertiliser or not) in the maize mineral fertilisers market in Poland. The Chi-squared test is used mainly in survey research and requires a minimum sample size (sample size of at least 30) which is comparably smaller to other models like the logit and the probit models.

The null hypothesis for the Chi-squared test is that there is no association between the variables, whereas the alternative hypothesis states that there is an association. Stated differently, the null hypothesis is that the variables in question are independent of each other.

The Chi-squared test assumes the following (McHugh, 2013):

- The variables being measured are categorical
- The categorical variables are mutually exclusive
- In each cell of the contingency table, the expected frequency count is at least 5.

A violation of the above assumptions leads to inaccurate estimates. The null hypothesis of independence is not rejected if the p-value of the Chi-squared test is greater than the 5 % level of significance, that is, a p-value greater than 0.05. On the other hand, the Chi-squared test results are significant if the p-value is less than the 5 % significance level. Significant Chi-squared test results show that the row variable is not independent of the column variable. This means that the independent variable potentially influences the dependent variable as the null hypothesis of independence is rejected.

1.8 Justification of the study

Private traders are an important component in maize marketing in Zambia (Sitko & Jayne, 2014). However, little is known in terms of their operations and behaviour. The strategies that traders use for pricing, grading and weighing are not clearly understood. Traders offer a valuable service to smallholder farmers who are not able to reach retail and wholesale markets. Nevertheless, there is a perception that traders exploit these farmers (Kähkönen & Leathers, 1999; Sitko & Jayne, 2014). Therefore, understanding trader behaviour will clarify whether this purported farmer exploitation does exist, as well as identifying the operations and strategies that traders use when transacting with farmers. This will furthermore aid in designing and implementing appropriate institutions and regulations to curtail potential exploitation, which will ultimately inform recommendations for proper protocols regarding prices, grades, weights and standards in the Zambian maize market.

1.9 Organisation of the thesis

Following Chapter One, Chapter Two focuses on maize production in Zambia and the characteristics of the smallholder farmers that transact with private traders. Chapter Three focuses on private traders, their characteristics and the factors influencing their behaviour. The pricing, grading and weighing systems used by traders are also presented in Chapter Three. Chapter Four highlights the relationship between smallholder farmers and private traders. In this chapter, trust, which is the major mechanism through which relationships are developed, is the main focus. Other points of contact between the traders and farmers, such as reputation and the reliability of the grading and weighing systems, are also presented. This thesis concludes with a summary of the research findings in Chapter Five, where recommendations for policy are also discussed.

CHAPTER TWO

MAIZE FARMING AND SMALLHOLDER FARMER CHARACTERISTICS IN ZAMBIA

2.1 Introduction

Information about the characteristics of smallholder farmers and private traders is important for understanding the relationship between the farmers and traders that transact with each other. These characteristics of smallholder maize farmers and private traders in the Zambian markets are discussed in this chapter. The discussion focuses on maize production, maize markets, techno-economic attributes of maize, the maize marketing channels, and the characteristics of smallholder farmers and private traders in the maize markets.

2.2 Maize Production in Zambia

Maize is produced in almost all the provinces of Zambia as it is the staple food crop. Zambia is a large producer of maize. White maize is the staple food and it accounts for 90 % of the total maize production, while 10 % of yellow maize is produced in Zambia (FAO, 2013). The volume of maize produced in the 2013/2014 farming season was 3 350 671 metric tonnes, indicating the large maize production (IAPRI, 2015). A farming season is known, for example as the '2013/2014' season, as maize is planted in October of one year (2013 in this case) and harvested in the following year (2014). Due to the fact that it is a large maize producer, Zambia exports maize to eastern and southern African countries, including the Democratic Republic of Congo (DRC), Tanzania, Zimbabwe, Malawi and Mozambique (CSO, 2015). Zambia is positioned as the 8th largest maize producer in Africa (USDA, 2015). In terms of world maize production, Zambia ranks as the26th largest producer (USDA, 2015), contributing about 0.25 % to the total world maize production (FAO, 2013). This, in addition to the production volumes, shows that Zambia is a large maize producer. As mentioned above, maize is Zambia's staple food, after it had replaced sorghum and millet. As early as 1964, 65 % of the planting area was allocated to maize (JAICAF, 2008). Of all the maize produced in Zambia, 76 % is produced by smallholder farmers, while the large-scale (commercial farmers) produce the remaining 24 %. (FANRPAN, 2010). Production volumes

were relatively low in the1960s, after which there was an increase following the introduction of subsidies (chemical fertilisers) in the 1970s. There was a drop in the volumes produced in the 1980s, despite the input subsidy programmes that were introduced and high-yielding maize varieties that had been discovered. The maize yields in the 1960s were between 0.57 and 0.77 metric tonnes per hectare and the area planted ranged between 0.75 and 0.87 million hectares (Figure 2.1 below).

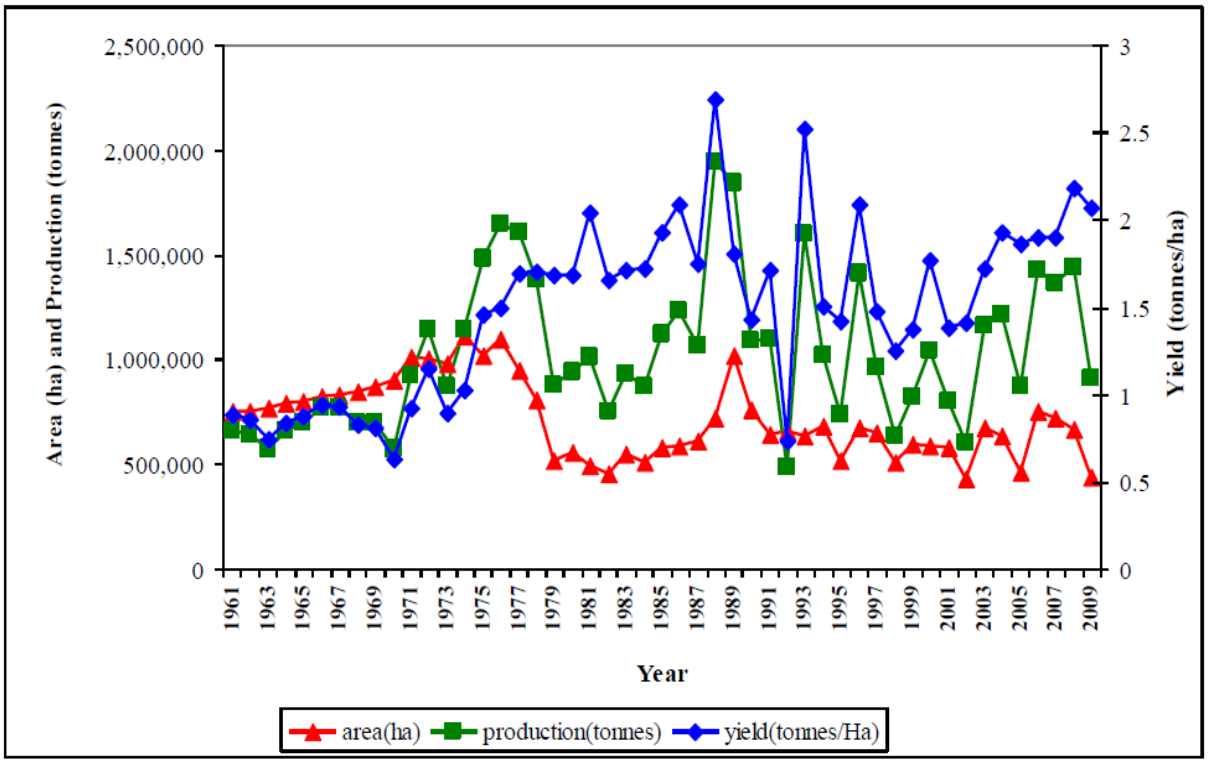

Figure 2.1: Annual Yield, Planting Area and Production Volumes of Maize
Source: Chiona *et al.*, 2011:2

There was an improvement in the 1970s as productivity increased and the unit yields reached around 2.5 metric tonnes per hectare. However, maize yields stagnated between 1997 and 2007, at 1.3 to 1.8 metric tonnes per hectare. The 2008/2009 farming season showed an improved productivity to about 2 metric tonnes per hectare. Maize productivity in Zambia, as seen from Figure 2.1 above, has not been stable. Some years show a drop in maize yields, despite it being the staple crop widely produced and consumed in the country. Before liberalisation, maize was the dominant crop produced in Zambia as it accounted for 76 % of all crops grown by smallholder farmers (Jayne, Govereh, Chilonda, Mason & Chapoto, 2007). This was due to the massive support of maize production by the government through subsidies. Subsidies favoured the production of maize, as the farmers would access inputs (seed and fertiliser) at prices lower than the prevailing market prices. There was, however, a

reduction in subsidies after 1990 which led to a decline in the share of maize as part of the total crop production of smallholder farmers by 16 %. This is in line with Figure 2.1 above; particularly the sharp drop in maize yields indicated for the year 1991. Figure 2.2 below shows that maize is the major crop cultivated by the majority (86 %) of smallholder and medium-scale farmers.

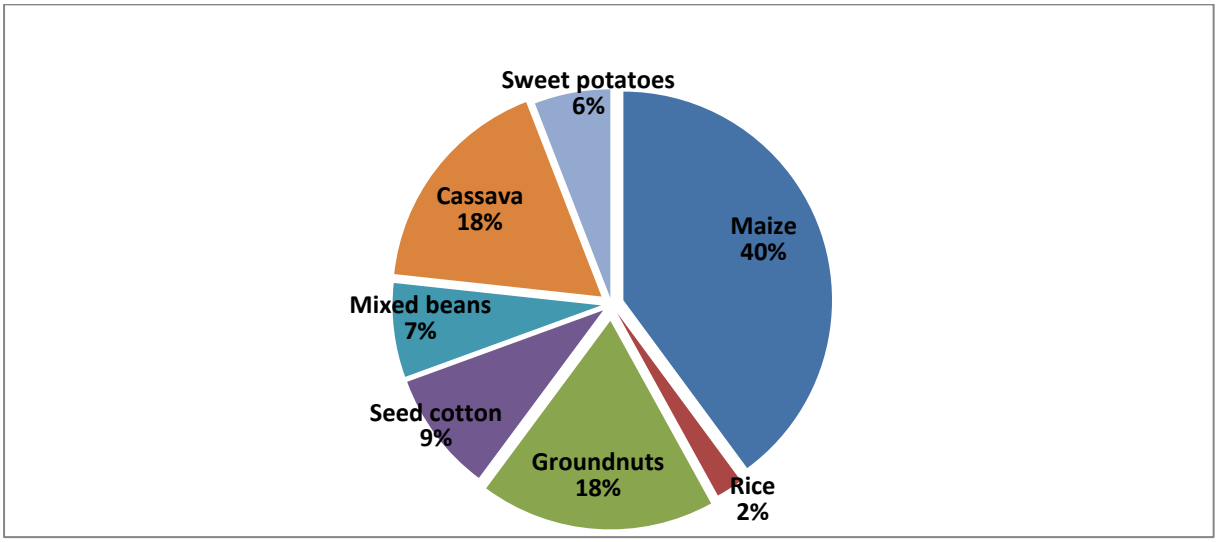

Figure 2.2: Smallholder and medium scale farmers cultivating various crops (%) (2012)
Source: Tembo and Sitko, 2013 based on raw data from MAL, CSO, Lusaka.

This indicates that, despite the decline in maize output produced after 1990, maize still remains a dominant crop in Zambia. An increase in the output of maize has continued, as depicted in Figure 2.3 below.

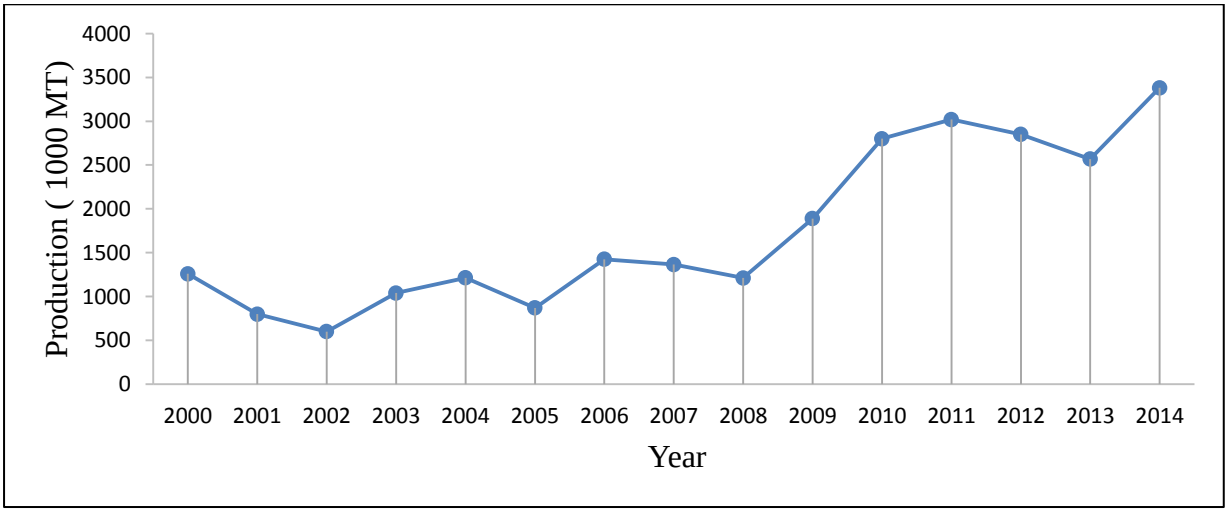

Figure 2.3: Annual maize production in Zambia: 2000-2014
Source: Author's computations using USDA raw database, 2014

Several government policies, such as the Farmer Input Support Programme (FISP), that are aimed at increasing maize production in Zambia have contributed to this continued increase in maize production. The FISP programme is on-going, despite having been reduced in 1990. The maize sector, therefore, remains an important sector in Zambia's agriculture and the need to understand the behaviour of its participants, particularly the private traders, is of utmost importance as this would provide information on whether the private traders behave opportunistically. The identification of the factors that influence private traders' behaviour is also important. This is because the factors that contribute to opportunistic behaviour would be known and measures to reduce opportunistic behaviour of private traders will be suggested through these factors. Apart from private traders, smallholder farmers are investigated in this study as the reduction in opportunistic behaviour of private traders would improve their livelihoods, as they would fetch higher prices for their maize and realise profits.

Smallholder farmers are also of interest in this study, as it is important to know the kind of farmers (in terms of areas cultivated, yields, assets and labour) that sell maize to private traders. The areas cultivated by smallholder farmers are usually less than five hectares and the average yield is about 2.13 metric tonnes per hectare (Central Statistical Office, 2011). This average yield is close to the country yield average. The reason why it is close to the country average is that the majority of farmers (76 %) in Zambia are smallholder farmers (FANRPAN, 2010). This, therefore, brings the average down, despite the large-scale farmers producing higher yields. The levels of education and skills training of the farmers are usually low. Smallholder farmers have little assets and use simple technologies and cultivation practices in their farming operations (Siegel, 2008). Hand hoes and oxen are the main cultivation implements used and smallholder farmers have difficulty accessing inputs such as fertiliser and seed. Family labour is mostly used, with few or no hired labourers. The males in the family are in charge of making production and marketing decisions, as they decide when to plant and when to harvest, as well as when, to whom and where to sell. The females are involved in planting, weeding and harvesting of the maize. The maize cultivated is sold within the villages or taken to the nearest district market. Assembly or private traders are the major buyers of the maize and they usually go to the villages to buy maize at the farmers' homesteads (Chapoto & Jayne, 2011).

2.3 Techno-economic attributes of maize and its exchange in Zambia

Maize (white maize) is the staple food crop in Zambia, accounting for over 50 % of the total area under agricultural production (Central Statistical Office, 'CSO', 2011). It is mostly a rain-fed crop as the majority of farmers are not able to afford irrigation technologies. Maize is grown between October and March, which is the rainy season in Zambia. Farmers invest their time and input into maize production during this period to ensure they have a good harvest. Weeding, fertiliser and herbicide application are some of the activities undertaken. Harvesting is done between May and June and the maize is harvested wet. Drying of the maize is done by putting the maize on top of sacks and leaving them in the sun to dry (sun-drying). The drying is done after harvesting because the farmers are of the view that sun-drying by putting them on sacks is faster than letting the cobs dry on the plant in the field. This drying is important as the recommended moisture content for dried maize is about 12 % (MAL, 2013). Maize that is not properly dried and has higher moisture content is rejected as it increases the risk of post-harvest storage losses. The marketing of dried maize is done through different channels and it is has several uses (MAL, 2013).

2.4 Maize Markets in Zambia

There has been an increase in the participation of both formal and informal private traders in the Zambian maize market after liberalisation. The agricultural marketing channels in both rural and urban markets include private traders, in addition to the government's buying maize through the Food Reserve Agency (FRA). There is a large involvement of the private sector (private traders) in the maize marketing chain. (Akiyama, Baffes, Larson & Varangis, 2003; Barret, 1997). Since liberalisation, anyone is allowed to participate in the market as there are no entry or exit barriers. Smallholder farmers are therefore able to sell their maize either to private traders or to the government (Sitko & Jayne, 2014).

Previous studies have shown that private traders, known as assembly traders, are the largest maize channel used by smallholder farmers (Chapoto & Jayne, 2011; Sitko & Jayne, 2014). These private (assembly) traders purchase small quantities of grain from multiple smallholder farmers. Their working capital is low and they have few storage facilities. Rural assembly points are used by these traders to gather the maize into larger quantities. This would provide them with economies of scale and negotiating power when they resell their maize to buyers

who prefer to purchase larger quantities. These traders usually go to the farmers' homesteads or farm gates to purchase the maize. These traders comprise a party in the private sector market that is misunderstood in that there are perceptions that they are exploitative businessmen (Sitko & Jayne, 2014). Despite these perceptions, assembly traders are valuable to smallholder farmers as they provide them with a market for their maize. This further merits an understanding of the role played by these private traders in the grain markets, as well as their behaviours, when transacting with smallholder farmers.

There have been several transformations in the maize marketing system in Zambia. These transformations have been in the control of the marketing and price setting of maize. Prior to liberalisation in 1991, the National Agricultural Marketing Board (NAMBOARD), a government board, controlled the marketing of maize and private traders were not allowed to participate in the market. The maize producer prices were set by the government through NAMBOARD, as well. In 1989, however, NAMBOARD was abolished which led to the legalisation of the participation of private traders in maize trading, and prices were no longer set by the government. After the abolishment of NAMBOARD, the private sector controlled the marketing of maize and price setting until 1996, when the government decided to intervene in the market to reduce the high maize price variability. This intervention was through the establishment of the Food Reserve Agency (FRA).

The FRA is a parastatal maize buying agency, as well as a strategic food reserve, run by the Government of the Republic of Zambia. The FRA was established in 1996 after the enactment of the Food Reserve Act of April 1995 (GRZ, 1995). In a bid to reduce maize price variability, buffer stocks were held by the FRA with a mandate of establishing and administering a national food reserve while the private sector continued to trade maize. In 2005, the FRA functions were extended to include crop marketing and the setting of prices (GRZ, 2005). The FRA, to date, sets the price of maize. This price is announced at the beginning of each marketing season (that is, when the farmers begin to harvest the maize in readiness for selling). Maize is then bought from farmers by both the private traders and the FRA. Private traders can, however, buy maize either at a price below or above the FRA price, as this price is merely a guideline for the price at which the maize should be bought at. Smallholder farmers, therefore, have an option of whether to sell to the private buyers, to the FRA, or through any other channel, as there are several categories of buyers available to the farmers (Figure 2.4 below).

2.5 Maize Marketing Channels in Zambia

There are many buyers and sellers in the Zambian maize market. The merchants include the private traders that are being investigated in this study. Some of the private traders are contracted by the FRA to buy maize on their behalf, whereas others are individuals buying maize in their own name. There are several market channels (Figure 2.4 below) through which maize is sold, as well as the alternative of it being consumed on the farm. The market channel that a farmer chooses depends on several factors, including transaction costs (Nkosi & Kirsten, 1993).

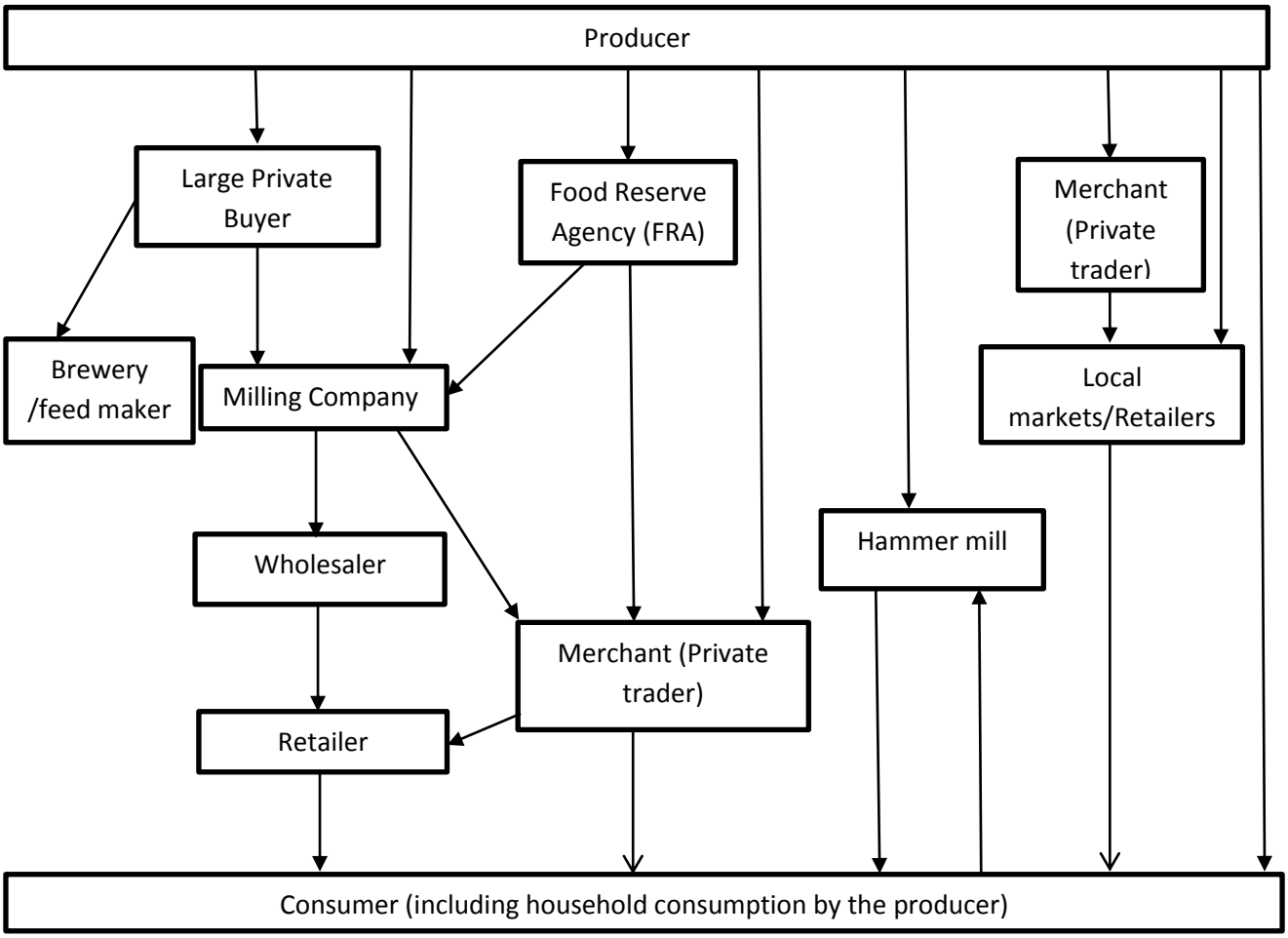

Figure 2.4: The Distribution Channels of Maize in Zambia
Source: JAICAF, 2008: 21

Transaction costs are those costs that are incurred when the exchange of a commodity is carried out, that is, costs that are incurred during the operation of an economic system (North, 1992). It is possible that private traders are the marketing channel where farmers face the

lowest costs when marketing and selling their crop, hence their being the largest marketing channel. The reason for this is that most private traders go to the farmers' homesteads to buy the maize, thus lowering the farmers' cost of selling the maize, as they no longer have to pay for transport to take their maize to district markets for sale. Shoals (2013) indicated that, of all the marketed maize in Zambia, between 36 % and 86 % was purchased by the FRA between 2004 and 2010. Despite these huge purchases by FRA, the larger farmers with more land are the majority sellers of maize to the FRA and therefore benefit the most in this regard. Smallholder farmers, on the other hand, seem not to benefit as they are not able to access the FRA's buying points and thus very few of them sell their maize to the FRA.

Naylor and Falcon (2010) indicated that the FRA policies raise the average maize market prices in Zambia and this makes them regressive. The higher maize prices cause harm to a large proportion of rural households, as well as the urban consumers, and benefit large-scale farmers and only a small number of relatively better-off smallholder farmers who are able to sell maize at the FRA buying points. The policies thus disproportionately benefit households that are relatively better off, and have a negative effect on relatively poor households.

2.6 Characteristics of the agents: smallholder farmers and private traders

This section presents the characteristics of the smallholder farmers and the private traders that were included in the study. The age, education levels, yield, assets and volumes traded are the characteristics presented. Other characteristics include the gender of both the smallholder farmers and private traders, which will give an understanding whether there are more males than females in Zambian maize trading, or vice versa.

2.6.1 Smallholder farmer characteristics

This study surveyed 200 smallholder farmers situated in the Kalomo District of Zambia. The characteristics of these smallholder farmers that sell maize to private traders were explored to gain a better understanding of the profile of the smallholder farmers that transact with these private traders. The characteristics of interest included age, gender, experience, areas planted and yields obtained by the farmers transacting with private traders.

Of the farmers surveyed, the majority were males, who accounted for 70 %. These findings are in line with those of Zulu (2015) who found that the majority (82 %) of maize smallholder farmers in Zambia are male. The reason for this is that the males are the household heads and are responsible for making production and marketing decisions. Women, on the other hand, are not decision makers and they merely help with farm work, especially during planting, weeding and harvesting. It was found in this study that some of the women do, however, have their own separate fields in addition to their husbands' fields. It is in these fields that they are able to make marketing decisions, as they are the owners. The main purpose of women owning these fields is to supplement the incomes earned by their husbands from farming.

The education levels of the smallholder farmers were categorised as having no education, lower primary, upper primary, junior and senior secondary, and tertiary (Figure 2.5 below). The level of education influences the level of understanding and articulation of issues, thus playing a major role in decision making and behaviour. The majority of smallholder farmers surveyed had attained an education level of upper primary and lower primary; 42 % and 36 %, respectively. Of the total number of surveyed farmers, 9.5 % attained junior secondary education, while 8 % attained an education level of senior secondary. Tertiary education was only attained by 2 % of the farmers, and the farmers with no education at all accounted for 2.5 % of the farmers.

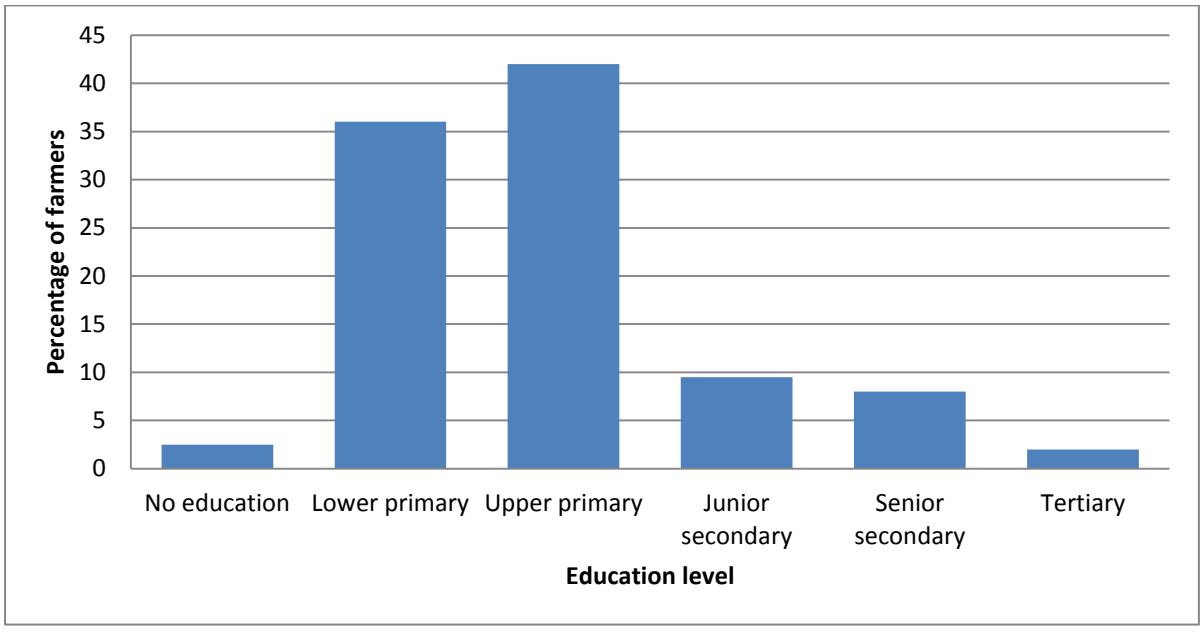

Figure 2.5: Education levels of farmers
Source: Author's computations, 2015

The average age of the farmers was found to be 43 years, with a mean farming experience of 13 years (Table 2.1 below). These farmers had an average planting area for maize of about 2.4 hectares (Table 2.1). This is consistent with the fact that the majority of smallholder farmers in Zambia plant their maize on less than 5 hectares of land (Central Statistical Office, 2011). This is about half the number of hectares of land cultivated by large-scale (commercial) farmers in Zambia. The average distance to the nearest district market (boma) was found to be 42 km. These long distances led to the smallholder farmers preferring to sell their maize to local private traders. However, because private traders incur transport costs when buying maize directly from farmers in villages, they might be inclined to pay lower prices to recover these costs.

Table 2.1: Farmer Characteristics

***Variable* description**	**Mean**	**Distribution of Variables**				
		p10	p25	p50	p75	p90
Age of farmer (Years)	43.39	30	35	41.5	52	58.9
Farming *experience* of farmer (Years)	13.1	5	6	10	18.75	28
Area of maize planted (Ha)	2.369	1	1.5	2	3	4
Maize *yields* (tonnes)	2.605	0.653	1.25	2.5	3.75	4.25
Distance to district market/ boma (Km)	42.07	32	36	41	47	54
Non- agricultural *income* (USD[1])	312.57	0	0	164.47	394.74	693.42

Source: Author's computations, 2015

The surveyed farmers were all smallholder farmers with minimal income from agricultural production (CSO, 2011). They typically operate small land portions with average yields of 2.6 tonnes (Table 2.1 above). These yields are lower than those of large-scale farmers, whose average yields are about 5.8 tonnes per hectare (MAL, 2013). The reasons for these lower yields obtained by smallholder farmers include limited access to inputs, such as hybrid seed and fertiliser due to restricted funds, little use of hired labour, and insufficient farming skills and technology use, as well as poor irrigation electricity infrastructure in the rural areas (Chapoto, Govereh, Haggblade & Jayne, 2010).

Despite the low incomes from farming, these farmers have several financial needs, such as feeding their families and sending their children and dependants to school. These needs

[1] 1 USD = 7.4 ZMW.

demand favourable incomes to support household needs. To be able to cope in such a demanding environment, farmers engage in non-farm or non-agricultural activities. According to the surveys done among smallholder farmers, these include petty trading and working as casual workers in other industries, to mention a few. Other sources of income include remittances from family and friends. For the purpose of this study, all these sources of income are collectively called non-agricultural income, and the average value of this income was found to be USD 312 for the surveyed farmers (Table 2.1 above).

2.6.2 Description of the farmer-trader transaction

In terms of the transaction between these two parties, the smallholder farmers did not seem to trust the private traders. Among the reasons for this mistrust is the fact that the traders re-weigh the maize before exchange, despite the fact that farmers weigh their maize in the villages with borrowed scales from community members.

The bags used when selling maize also lead to mistrust and problems between the smallholder farmers and the private traders. The bags used by smallholder farmers are usually 50 and 90 kg bags. The farmers revealed that these bags were slightly bigger than the actual kilogram capacities, so as to allow room for stitching the tops of the bags to prevent spillage. Private traders, however, usually require that the farmers' bags be filled to the brim and transferred into the private traders' bags. The private traders attributed this transferring of maize into their own bags to the farmers wanting to take back their own empty bags. After the private traders transfer the maize into their own bags, they would re-weigh the maize, despite the farmers having weighed it in the villages. From the observations, it was seen that more often than not, after re-weighing, the traders would tell the farmers that the maize weighed less than the initial weight provided by the farmers. The farmers would then have to add more maize to top up to 50 or 90 kg, depending on the bags being used. The problem with the above set-up is that there is a possibility that the private traders end up obtaining more maize than they pay for, as they might manipulate their scales. This scale manipulation problem increases the levels of mistrust by smallholder farmers. Furthermore, these farmers end up receiving less income than they had expected, which further reduces the possibility of an improvement of their livelihoods.

Another factor that contributes to the mistrust is the fact that the private traders offer a price that is lower than the FRA price, although the traders attributed this to a mark-up for re-selling the maize to either larger traders or the FRA. The traders had either a collection point near the villages or visited the farmers at their homesteads for the sole purpose of buying maize. This implied that they incurred transport costs, and as a way to recover these costs, they offer lower prices to farmers. Smallholder farmers who took their maize to the district markets therefore fetched higher prices, as the buyers did not incur transport costs to reach these farmers. Because most smallholder farmers do not have transport to travel to district markets, they ended up selling to local private traders, despite them offering lower prices.

Additionally, the smallholder farmers live in remote areas with mainly poor road infrastructure, which makes it very costly for them to transport their maize to the district markets or FRA depots were the price is higher than that offered by private traders. This contributes to them resorting to selling their maize to local private traders. Further, the farmers have few or inadequate storage facilities to store maize for long periods of time. This often means that they sell their maize to the first buyer (usually private traders) they come across, despite low prices. Another reason for smallholder farmers selling to private traders, as opposed to the FRA, is their urgent cash need. Private traders pay cash upon collection of the maize, whereas the FRA was reported to delay its payments by 2 months or more. The delay in FRA payments is due to them buying maize from many farmers in addition to government financial difficulties (MAL, 2013). These financial difficulties lead to the government (through the FRA) taking long times to pay all the farmers from which they buy maize. The FRA also pays in cash, although the main problem is the delay in paying the farmers.

Despite the above observations, it is not clear as to whether the above is true for the surveyed farmers and traders. The cause for this type of opportunistic behaviour is also unclear, and further analysis was therefore required. During the conceptualisation of the survey, the variables considered to impact on trader behaviour were identified as age, gender, education and experience.

2.6.3 Private (assembly) trader characteristics

This section focuses on the quantitative and the qualitative analyses of the data and the observations made among private traders. As mentioned in Chapter One, the survey had a sample size of 50 maize traders from the Kalomo District. A purposive sampling technique was used to enable the identification of private traders who actually transact with the smallholder farmers. This is important for this study, as smallholder farmers and private traders who transact with each other are the main interest of this study, and understanding the relationship between them is critical. Random sampling of the traders would have led to the inclusion of private traders who do not transact with the surveyed smallholder farmers and the relationship found would not have been representative of that of smallholder farmers and private traders who transact with each other. The maize marketing system in Zambia was investigated by means of a survey among private traders and smallholder farmers, as well as direct observations of them transacting. From the observations, the majority of private traders and smallholder farmers involved in maize trading were male.

The age of the trader is important as it is a determining factor as to whether the household benefits from the experience of older traders or the risk-taking attitude of younger ones. The level of education influences the level of understanding and articulation of issues, thus playing a major role in decision making and trader behaviour when transacting with smallholder maize farmers. The descriptive statistics of the variables are presented by the mean, as well as the distribution, of each variable at five different percentiles.

The majority of the private traders were male, with very few female traders being seen, that is, 90 % and 10 % respectively. The reason for this could be that the majority of the women in the area trade in commodities other than maize. Most women were observed to sell fruits and vegetables at the local markets, while the men were the ones that were involved in, and controlled, agricultural activities such as maize trading.

The average age of the traders was about 38 years (Table 2.2 below). The age distribution confirms that 90 % of the traders were aged either below or equal to 46 years, which can be regarded as relatively young. The reason for this could be that the maize traders usually have to travel long distances (moving between villages) and work long hours, which might not be

sustainable for older people. The years of trading experience are also fundamental in the trading business and the average years of experience were about 5 years, as mentioned above.

In terms of education, the majority (32 %) of the private traders had attained an education level up to the fifth grade, that is, lower primary (Figure 2.6 below). This is in line with the observed trend, as most of the traders could barely read or write, and it was difficult for them to communicate in English during the interviews. Of the traders surveyed, 26 % had attained an education level of upper primary; thus, primary education accounted for the highest education level, that is, a total of 58 %. Junior and senior secondary school levels of education were attained by 22 % and 18 % of the traders, respectively. Tertiary education was attained by only 2 % of the private traders.

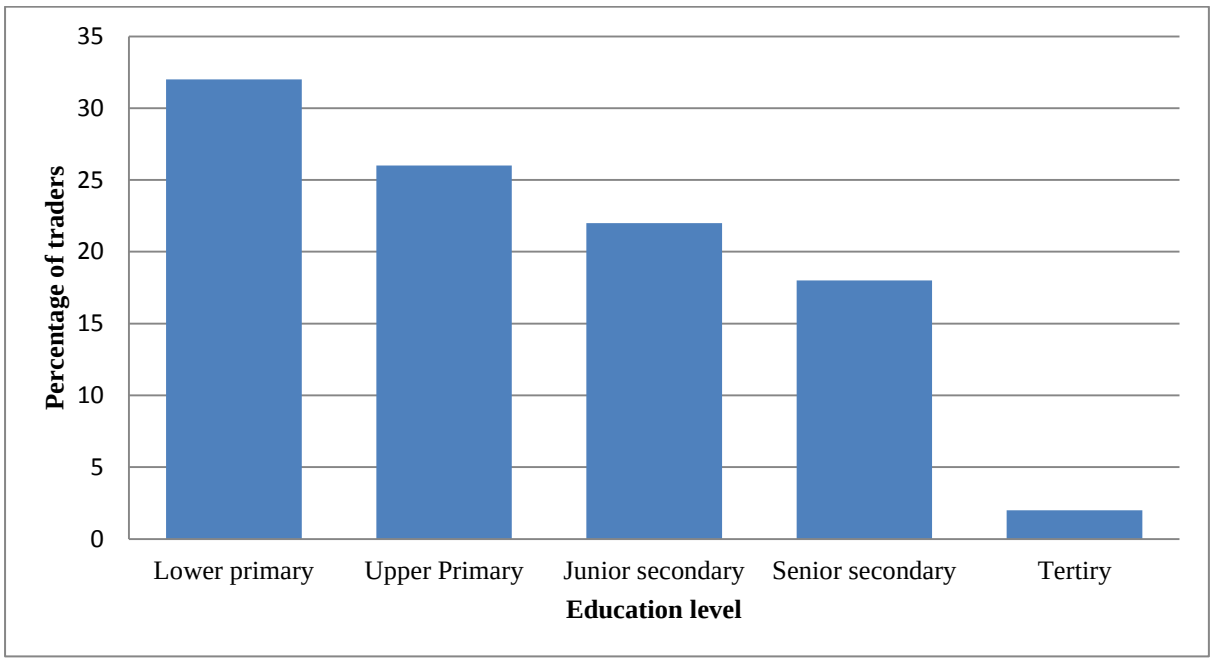

Figure 2.6: Education levels of traders
Source: Author's computations, 2015

The private traders were found to trade in several commodities, with maize being the most-traded commodity. Of the commodities traded by the surveyed private traders, maize accounted for 98 %. This confirms that it was the major commodity traded by the private traders. The mean price paid by the private traders for the maize was found to be ZMW 0.989 (USD 0.13) per kg of maize (Table 2.2 below). This means that the farmers receive a lower price from the private traders than they would if they sold directly to the FRA or other marketing channels, such as processors (the FRA price being ZMW 1.4 per kg, that is, USD

0.18 per kg of maize). This means that a farmer would lose about USD 0.05 per kg bag of maize sold by selling to private traders. This difference is significant, as a farmer loses about ZMW 20.6 (USD 2.7) per 50 kg of maize sold. The value lost by farmers when they sell to traders found in the current study is lower than that found by Sitko and Jayne (2014). Sitko and Jayne (2014) found that farmers selling their maize to traders obtained USD 0.08 less per kg bag of maize than those selling to other channels, grain processors inclusive. The lower value lost in the current study could be attributable to the fact that only one district was surveyed. Sitko and Jayne (2014) investigated the average value lost by smallholder farmers who sell their maize to private traders across Zambia. Therefore, some districts might have had lower differences than others yielding an average difference of USD 0.08/kg. Both studies, however, indicate that farmers who sell their maize to private traders do fetch lower prices, compared with the FRA prices.

Table 2.2: Trader characteristics

***Variable* description**	**Mean**	**Distribution of Variables**				
		p10	p25	p50	p75	p90
Age of trader (Years)	37.92	28	32	37.5	43	46.5
Price of maize per Kg (USD)	0.130	0.079	0.099	0.112	0.145	0.151
Asset value of all trader assets (USD[2])	4768.62	75.79	203.95	1338.49	5653.78	16376.64
Trading *experience* of trader(Years)	4.65	2	2.5	4.0	6.0	9.0
Volume of maize traded per season (Metric tonnes)	24.13	5	12	20	30	50

Source: Author's computations, 2015

Note: Various trader assets were considered during the survey, with the assets of major interest being a storage shed, a pick-up vehicle, trucks, mobile phones and radios, among others. Storage is important in maize trading as the traders usually store the maize that they buy from farmers before they can re-sell it. Transportation of the maize from the villages to the depots is also a huge concern. Communication via radios, mobile phones and other communication media is vital for accessing price and demand information, hence their inclusion in the assets of interest. The average value of assets owned by private traders included in the survey was ZMW 36 241.5 (USD 4 768.62). It is likely that these assets have been accumulated from maize trading with farmers.

[2] 1 USD = 7.4 ZMW.

In addition to the revelations about the private traders' assets, the survey revealed the major source of capital for traders as being own capital. It was found that 88 % of the traders rely solely on funds of their own to run their business, and only 12 % (6 out of the 50 surveyed traders) were found to use funds from friends and family. These findings are similar to those of Fafchamps and Minten (1999), where 89 % of the agricultural traders in Madagascar relied exclusively on own capital. None of the traders surveyed in this study used formal credit such as loans from financial institutions. The use of both formal and informal credit in the maize trading was limited due to difficult access to financial institutions in the area.

In the trading of maize, the majority of the traders (58 %) carried out the maize trading on their own, while those that used hired labour accounted for 42 % of the traders. The reasons given for always taking care of the business themselves was that workers often steal the maize and are dishonest about the selling or purchasing prices of the maize. Traders therefore opt to do the trading themselves to avoid becoming victims of opportunism.

2.7 Summary

Maize production in Zambia has varied over the years. The maize marketing system comprised mainly of the FRA, until 1991 when privatisation led to an increase in the participation of private traders. There are several marketing channels through which farmers can market their maize. The merchants, assembly or private traders are the largest channel used by smallholder farmers. The smallholder farmers who transact with the private traders were mostly male and so were the private traders. The majority of smallholder farmers had attained education up to the primary level, while 40 % of the private traders had attained secondary education. This thus shows that there is a larger proportion of private traders who attained higher education levels, compared with smallholder farmers. The characteristics of smallholder farmers and private traders are important as they would enable the government to intervene in a way that benefits the players of the Zambian maize market, particularly the smallholder farmers. The government of the Republic of Zambia has policies, such as the National Agricultural Policy, in place to lift the poor smallholder farmers out of poverty. The government plans to do this by ensuring that smallholder farmers have a market for their maize and that they fetch favourable prices. Therefore, it is important to understand the smallholder farmer, and the environment he or she operates in, as well as the private traders he or she transacts with, so that the government can establish institutions and organisations to

create a favourable trading environment in an attempt to increase the livelihoods of smallholder farmers and their communities.

CHAPTER THREE

TESTING FOR OPPORTUNISTIC BEHAVIOUR AMONGST PRIVATE MAIZE TRADERS IN ZAMBIA

3.1 Introduction

Traders, known as private traders, merchants or assembly traders, purchase grain from multiple smallholder farmers in small quantities. They have little working capital and limited storage facilities. They visit the smallholder farmers at their farm gates or they have rural assembly points where they buy maize from farmers so as to have sufficient quantities to gain economies of scale when they re-sell the maize. Chapoto and Jayne (2011) found that private traders usually visit a village for the sole purpose of purchasing grain. In most cases, the private traders do not provide financial assistance or credit to the smallholder farmers. These traders have little or no storage facilities and their maize is sold directly to millers, feed companies, breweries or other grain processors.

The social background of these private traders is usually the same. The acquisition of greater capital, thus permitting the possibility to trade in maize, has led to some farmers to become traders, as they accumulated assets. Farmers and traders are therefore usually of the same ethnic tribe and social background (Minten & Kyle, 1999). This same social background enables ease of communication. Transactions take place easily and it brings some sense of trust for the farmers when they trade with people they know. In the absence of costly legal enforcement, trust is important as it acts as an enforcement mechanism for the prevention of cheating. Trust, therefore, is an incentive for honest behaviour (Kirsten *et al*., 2009). Two parties to a transaction that trust each other are less likely to behave opportunistically, as they want to maintain a good relationship (Lu, 2007). Little formal or legal enforcement exists in Zambian smallholder maize marketing for cases where one party to the transaction cheats in terms of weights, prices and grades. Despite the traders and farmers having the same social background, farmers still believe that they are being exploited by traders. This view that smallholder farmers have of trader behaviour is a source of their mistrust and their cynical perceptions that traders behave opportunistically. A need, therefore, exists to understand if private traders do, indeed, behave opportunistically. In order to make inferences on this, it is

important to identify the typical private trader characteristics leading to opportunistic behaviour, the factors influencing trader behaviour when transacting with smallholder farmers, and the reputation of these traders, as well how the institutions in place (if any) influence the trust between smallholder farmers and private traders. This chapter therefore focuses on trader behaviour and determines whether or not traders behave opportunistically. The factors that influence trader behaviour and the extent to which traders behave opportunistically are also covered in this chapter.

3.2 The role and behaviour of traders in agricultural markets in Africa

Studies on maize marketing in Zambia have concentrated on the effect of policy and the crop marketing board (Food Reserve Agency) on the marketing of maize (Mwanaumo, 1999; Nijhoff *et al*., 2003; Mason, Jayne & Myers, 2012). These studies have also predominantly focused on smallholder farmers.

Most smallholder maize farmers in Zambia have been found to sell their maize to private traders (Chapoto & Jayne, 2011). These traders visit the farmers at their villages and buy the maize directly from them on their farms. The private traders have to travel long distances to the villages to purchase the maize from smallholder farmers. The smallholder farmers, as a result, incur little or no marketing costs as the cost of doing business falls on the private traders. This proves the importance of private traders as a marketing channel for smallholder maize farmers. Despite their importance in the maize marketing system of Zambia, studies have continued to focus on smallholder farmers, with little attention being given to the private traders and their operations and behaviour.

Unlike Zambia, other African countries have investigated private traders and their operations. In a study by Fafchamps and Gabre-Madhin (2001), for example, agricultural markets in Benin and Malawi were investigated through agricultural trader surveys. Traders dealing in several agricultural crops were surveyed. This study found that search and transport costs were the largest transaction costs incurred by traders.

Apart from incurring high search and transport costs, the traders were also found to have low capital. Their physical and working capital was low and they had limited access to financial institutions for the provision of credit. Only 3 % of Malawian traders were members of trader

associations, while the majority of traders in Benin were members of trader associations (Fafchamps & Gabre-Madhin, 2001). This latter study focused mainly on transaction costs and capital used by the traders, as well as on credit provision. The current study, however, focuses on trader characteristics and their behaviour that influence a trader to behave either opportunistically or in a principled manner.

The validity of the perceptions among farmers that grain traders act opportunistically in East Africa and southern Africa were examined by Sitko and Jayne (2014). The study found that farmers relied on traders for market access due to ease of payment, despite traders offering prices that are lower than other market channels. Additionally, traders paid lower prices to farmers that were further away from the district market, as compared with those who lived closer to these markets. This is indicative of the relatively high transaction costs incurred by private traders, for which they try to make up for by reducing the prices paid to smallholder farmers. The smallholder farmers' reduced search and transport costs, as a result of private trader assembly points in the villages, warranted this reduction in prices paid by traders.

The offering of lower prices by traders is a major complaint by farmers. Private traders are viewed to be opportunistic or exploitative when they offer prices that are lower than other market channels (the FRA inclusive) to smallholder farmers. Several studies have used marketing margins or price spreads to examine whether or not traders actually solicit abnormal profits and thus are exploitative or opportunistic (Kalule & Kyanjo, 2013; Yamano & Arai 2010; Pokhrel & Thapa, 2007; Sitko & Jayne,2014). Marketing margin analysis has been used as a measure of market access conditions, as well as an indicator of farmer exploitation. An estimate of the cost that traders incur during the transfer of grain between locations, compared with the size of the marketing margin, is an indicator of whether or not farmers receive a fair share of the crop benefit (Myers, Sexton & Tomek, 2010). A wide marketing margin indicates that a smaller share of the retail price is obtained by farmers. Traders were mostly found to be the marketing channel with the widest marketing margin. They offered the lowest price to the farmers, compared with prices offered by the FRA and grain processors, indicating that traders were exploitative and behaved opportunistically.

Despite exploitative and opportunistic behaviour being examined, the above studies did not explore the characteristics of exploitative or opportunistic traders. With the exception of

traders being found to use unstandardised scales (Sitko & Jayne, 2014) the operations of traders in terms of the pricing, grading and weighing systems were not analysed.

3.3 Categorisation of Traders

Traders are categorised in this study to determine the traders that behave opportunistically and those that behave in principled ways. This study used the gross marketing margin method to categorise trader behaviour as either opportunistic or princled. A number of studies (Kalule & Kyanjo, 2013; Phokrel & Thapa, 2007; Yamano & Arai 2010; Sitko & Jayne, 2014) used the marketing margin method to assess whether market intermediaries (traders) were exploitative through the offering of lower prices to farmers. However, the aforementioned studies did not categorise market intermediaries into groups, based on whether they behaved opportunistically or in principled ways. In a study conducted by Phokrel and Thapa (2007), a gross marketing margin of 31% was estimated and it was concluded that the market intermediaries were not exploitative. This meant that market intermediaries realised normal profits at this marketing margin. It is on that basis that the current study assumed a gross marketing margin of 35% to be a cut-off for categorising trader behaviour. Traders with a gross marketing margin lower than 35% (or paying a price higher than the mean price) behave in principled ways while those with a gross margin higher than 35% (or paying a price lower than the mean price) behave opportunistically (see appendix A).

The t-test was further used to test if there were differences in the means among the two trader categories (opportunistic and principled) in terms of the price per kg paid by traders in either group, age, experience, assets and volume of maize traded. A t-test is done to test the difference in a specific variable between two populations (Wooldridge, 2009). An example would be if there are differences in the examination scores between males and females.

Null hypothesis: There is no statistical significant difference in the mean price per kg of maize paid by opportunistic and principled traders.

Alternative hypothesis: There is a statistical significant difference in the mean price per kg of maize paid by opportunistic and principled traders.

t-test statistic:	12.684
p-value:	0.001
Rejection rule: **(p-value < 0.05)**	The null hypothesis of no statistical difference in the mean price per kg of maize paid by opportunistic and principled traders can be rejected at a 5 % level of significance

It can be concluded that there is a statistically significant difference in the mean price per kg between opportunistic and principled traders. The above test procedure was done for the other variables and the t-statistics are presented in Table 3.1 below. This was done to enable the comparison of the t-statistics so as to allow the selection of the variable that has the highest t-statistic as the proxy measure for opportunistic behaviour.

Table 3.1: Differences in the means of various characteristics by trader behaviour

Variable	Traders having a gross marketing margin > 35% or paying < mean price (Opportunistic=58 %) N=50	Traders having a gross marketing margin < 35% or paying >mean price (Not opportunistic=42 %)	t-statistic
Price per kg maize (ZMW/Kg)	0.7365 (0.08663)	1.0729 (0.09888)	12.684***
Age (years)	38.9615 (2.3327)	36.9615 (1.2554)	0.800
Experience (years)	2.73 (0.1906)	6.73 (0.5492)	7.098***
Assets (ZMW)	11510.06 (3024.41)	62003.42 (21521.9)	2.371**
Volume (metric tonnes)	19.48 (3.22)	21.45 (3.18)	2.131**

*** p<0.1 ** p<0.05 *** p<0.01**

Source: Author's computations, 2015

3.3.1 Opportunistic Private Traders

This group accounted for the majority of the private traders surveyed (58 %). The mean price paid by the opportunistic group of private traders was ZMW 0.74 (USD 0.097) per kg of maize. This price is ZMW 0.251 (USD 0.033) per kg lower than the mean price paid to surveyed smallholder farmers by traders. The average years of experience for opportunistic traders were about 3 years and they owned assets, such as livestock, land, bicycles and mobile

phones, with an average value of ZMW 11 510 (USD 1 514.47). The maize volume that they traded per season was 19.5 metric tonnes.

3.3.2 Principled Private Traders

The principled private traders, on the other hand, accounted for 42 % of the surveyed traders and their average price paid to farmers was ZMW 1.07 (USD 0.141) per kg of maize, that is ZMW 0.084 (USD 0.011) per kg higher than the total group average or mean price paid by the traders. The average years of experience for traders who are not opportunistic was about 7 years, with an asset value of ZMW 62 003 (USD 8 158.289), and a trading a volume of about 21.5 metric tonnes per season. Following the identification of the two groups of private traders according to opportunistic and principled behaviour, the Chi-squared test was used to analyse the factors that influence trader behaviour.

3.4 Factors influencing private trader behaviour

Various socio-economic characteristics were tested for their influence on private trader behaviour. This involves quantitative analysis using the Chi-squared test for testing the hypotheses identified in this study. A significant Chi-squared test result is interpreted as being where the independent variable potentially influences the dependent variable as the null hypothesis of independence is rejected. As explained in Chapter One, this is a test of independence between variables. The sections that follow present the hypotheses, Chi-squared test results, and the rejection rule, as well as the conclusions, which are summarised in Table 3.2 below.

Table 3.2: Socio-economic factors associated with trader behaviour

No	Hypotheses	Chi-squared test statistic	Rejection rule (p-value>0.05)	Conclusion
1	Trader behaviour is independent of the age of the trader	1.4994	Hypothesis 1 cannot be rejected on a 5 % level of confidence	The age of the trader does not influence trader behaviour
2	Trader behaviour is independent of the education level of the trader	32.5665***	Hypothesis 2 can be rejected on a 5 % level of confidence	The education level of the trader does influence trader behaviour
3	Trader behaviour is independent of the experience of the trader	17.4152***	Hypothesis 3 can be rejected on a 5 % level of confidence	The experience of the trader does influence trader behaviour
4	Trader behaviour is independent of the assets owned by the trader	6.1727	Hypothesis 4 cannot be rejected on a 5 % level of confidence	The assets owned by the trader does not influence trader behaviour
5	Trader behaviour is independent of the volume of maize traded	2.3601	Hypothesis 5 cannot be rejected on a 5 % level of confidence	The volume of maize traded does not influence trader behaviour

*** p<0.1 % ** p<0.05 *** p<0.01**

The remainder of Chapter Three includes a detailed discussion of the hypotheses, the Chi-squared test results, and their conclusions.

3.4.1 The effect of age on the behaviour of traders

The initial expectation was that age might influence trader behaviour. This is because older traders could take advantage of the fact that smallholder farmers respect and trust them, and thus these traders might behave opportunistically. Younger traders, however, would be expected to be more principled. The results, however, revealed the opposite.

Hypothesis 1:	The behaviour of traders is independent of age
Chi-squared test statistic:	1.4994
P-value:	0.473
Rejection rule: p-value >0.05	Hypothesis 1 cannot be rejected on a 5 % level of significance
Conclusion:	The age of the trader does not influence trader behaviour

It can therefore be concluded for hypothesis one that age does not have an effect on trader behaviour. Younger traders could be influenced (relatively easily) by other traders. This might lead to opportunistic behaviour, as these younger traders might also want to be like the others and accumulate wealth. Older traders, on the other hand, could behave more opportunistically if the farmers respected them and believed that the older traders are more trustworthy than their younger counterparts are. Additionally, opportunistic behaviour of older traders could be as a result of them wanting to retain wealth to keep supporting their families. Therefore, both younger and older traders can potentially behave opportunistically. Their opportunistic behaviour is therefore independent of age.

3.4.2 The effect of education on trader behaviour

It was initially expected that the education level of the traders influences their behaviour, as more-educated traders are expected to have other income sources, thus behaving in a principled manner. The opposite is likely true for the less-educated private traders. The Chi-squared test results confirmed this effect of education on trader behaviour.

Hypothesis 2:	The behaviour of trader is independent of the education level attained
Chi-squared test statistic:	32.5665
P-value:	0.000
Rejection rule: p-value >0.05	Hypothesis 2 can be rejected on a 5 % level of significance
Conclusion:	The education level of the trader does influence trader behaviour

It can be concluded that the level of education attained by the traders does influence their behaviour. Traders who attained primary education (both lower and upper primary) accounted for the majority of opportunistic traders, while most (all in case of tertiary education) of those with an education level of junior secondary or higher were not opportunistic and paid a price greater than the mean. The more-educated traders had other sources of income, hence their more principled behaviour. Those traders with little education depend solely on maize trading and consequently showed higher tendencies of opportunistic behaviour.

3.4.3 The effect of experience on trader behaviour

For hypothesis three, it was initially expected that experience could have an effect on trader behaviour, as the more-experienced traders are expected to behave opportunistically. The reason for that is that they are expected to know how to convince the smallholder farmers that the prevailing market prices are indeed low. This expectation was supported by the Chi-squared test.

Hypothesis 3:	The behaviour of traders is independent of experience
Chi-squared test statistic:	17.4152
P-value:	0.000
Rejection rule: p-value >0.05	Hypothesis 3 can be rejected on a 5 % level of significance
Conclusion:	The experience of the trader does influence trader behaviour

For hypothesis three, the years of experience of the trader does affect his or her behaviour. Despite expecting that the more-experienced traders would pay lower prices, as they have knowledge on how to convince the farmers to accept these prices, the opposite was true. It was found that the majority of traders with experience of less than three years were opportunistic. Conversely, most of the traders with more experience were found to be principled, as they paid a price higher than the mean trader price. The reason for this could be that these traders with more experience (and better negotiating skills) know how to obtain a good mark-up from the large traders, millers or the FRA (depending on who they sold their maize to) as they have been in the maize trading business for a longer period of time. Additionally, this could mean that these traders have developed relationships or networks with the farmers over the years, hence their non-opportunistic and principled behaviour. The other reason for this could be that opportunistic behaviour pays off more in the short run (Ganesan, 1994), as transacting parties build relationships in the long run. This leads to lower pay offs through opportunistic behaviour and it is better to behave in a principled manner to maintain the good relationships which enable both parties to realise returns from the exchange. Therefore, it is possible that, with time, the returns to opportunistic behaviour are low, leading to the principled behaviour of the more-experienced traders.

3.4.4 The effect of assets owned on trader behaviour

It was initially expected that asset-rich traders would be more opportunistic, compared with the asset-poor traders. Traders owning more assets could behave opportunistically, as they would have scales, which they are able to manipulate, and access to media through which they can access information. Wealthy traders would thus get away with opportunism through the manipulation of scales which they own, unlike the poor traders who would rent or borrow scales. It would be more difficult for the poorer traders to manipulate these scales, as they do not belong to them. However, smallholder farmers might trust a wealthy trader, as opposed to a poor trader, as they believe that the wealthy trader has the right information and equipment. The Chi-squared test results, however, revealed the opposite.

Hypothesis 4:	The behaviour of traders is independent of assets owned
Chi-squared test statistic:	6.1727
P-value:	0.187
Rejection rule: p-value >0.05	Hypothesis 4 cannot be rejected on a 5 % level of significance
Conclusion:	The assets owned by the trader does not influence trader behaviour

It can be concluded for hypothesis four that assets do not have an effect on trader behaviour. Therefore, traders, whether owning greater or fewer assets, can behave opportunistically, regardless of their wealth. On the one hand, wealthy traders might behave opportunistically by manipulating the scales that they own. Poor traders, on the other hand, might behave opportunistically by ensuring that they pay the lowest possible price. These poor traders obtain price information from other traders in the market, therefore they are able to cheat the farmers by offering them a price that is lower than the prevailing market price. This therefore implies that either wealthy or poor traders can behave opportunistically and this opportunistic behaviour does not depend on their wealth.

3.4.5 The effect of trade volume on trader behaviour

It was anticipated that traders selling higher volumes of maize would be more opportunistic than those trading lower volumes are. This is because traders selling higher volumes interact with several farmers, some without information on the prices. Lack of price information by the farmers presents opportunities for traders to behave opportunistically. They end up paying lower prices to those farmers who have no knowledge about what the prevailing market prices are. The opposite, however, was revealed by the Chi-squared test.

Hypothesis 5:	The behaviour of traders is independent of the volume of maize traded
Chi-squared test statistic:	2.3601
P-value:	0.307
Rejection rule: p-value >0.05	Hypothesis 5 cannot be rejected on a 5 % level of significance
Conclusion:	The volume of maize traded does not influence trader behaviour

The conclusion drawn for hypothesis five is that the volume of maize traded per season per trader does not affect trader behaviour. A trader can act opportunistically, regardless of the volume of maize traded per season. This therefore means that private traders trading either low or large volumes of maize can behave opportunistically.

From the hypothesis testing by means of the Chi-squared test, it was found that education and experience are the factors that have a possible influence on the behaviour of private traders. More-educated traders are principled, whereas the less-educated ones behave opportunistically. Private traders with more experience were also found to behave in a principled manner, as compared with those with less experience. Hypothesis testing has contributed to this study by answering the third objective of identifying and analysing the factors that influence or shape the behaviour of private traders. To further investigate the extent of opportunism, another measure of opportunistic behaviour was used in this study. This measure was also used to confirm the results of the hypothesis testing by means of the Chi-squared test.

3.5 Measuring the extent of opportunistic behaviour by traders

This section introduces another measure of opportunistic behaviour. This measure is calculated as the difference between the price paid by the FRA and the price paid by private traders. Different smallholder farmers were paid different prices by the private traders, therefore the difference between the FRA's and the traders' prices indicates the extent of opportunism. The larger the difference between these two prices, the more opportunistic a trader behaves, and vice versa. In Figure 3.1 below, "trading experience" is the number of years that the trader has been trading maize (x-axis), while "diff" represents the difference between the FRA and private trader prices in Zambian kwacha (y-axis). The difference between the FRA and private trader prices ranges from -0.2 , where the FRA price is lower than the private trader by about 14% ((FRA price-Trader price price)/FRA price*100)) to +0.6 where the FRA price is higher than the trader price by about 43%. Extent of opportunism is given by the formula:

Extent of opportunism (ZMW) = FRA price – trader price

The extent of opportunism is a good measure of opportunistic behaviour as a large difference between the price set by the government (FRA price) and that paid by the private traders is indicative of how much farmers are being exploited and how low the prices paid by traders are. The major disadvantage of this measure however, is that it does not take into account costs (transport and other costs) and risks incurred during the exchange of the product. It is however assumed that costs are taken into account when deciding what price should be paid for a product (Schrimper, 2001), therefore the difference in prices can be used in this case to measure the extent of opportunism.

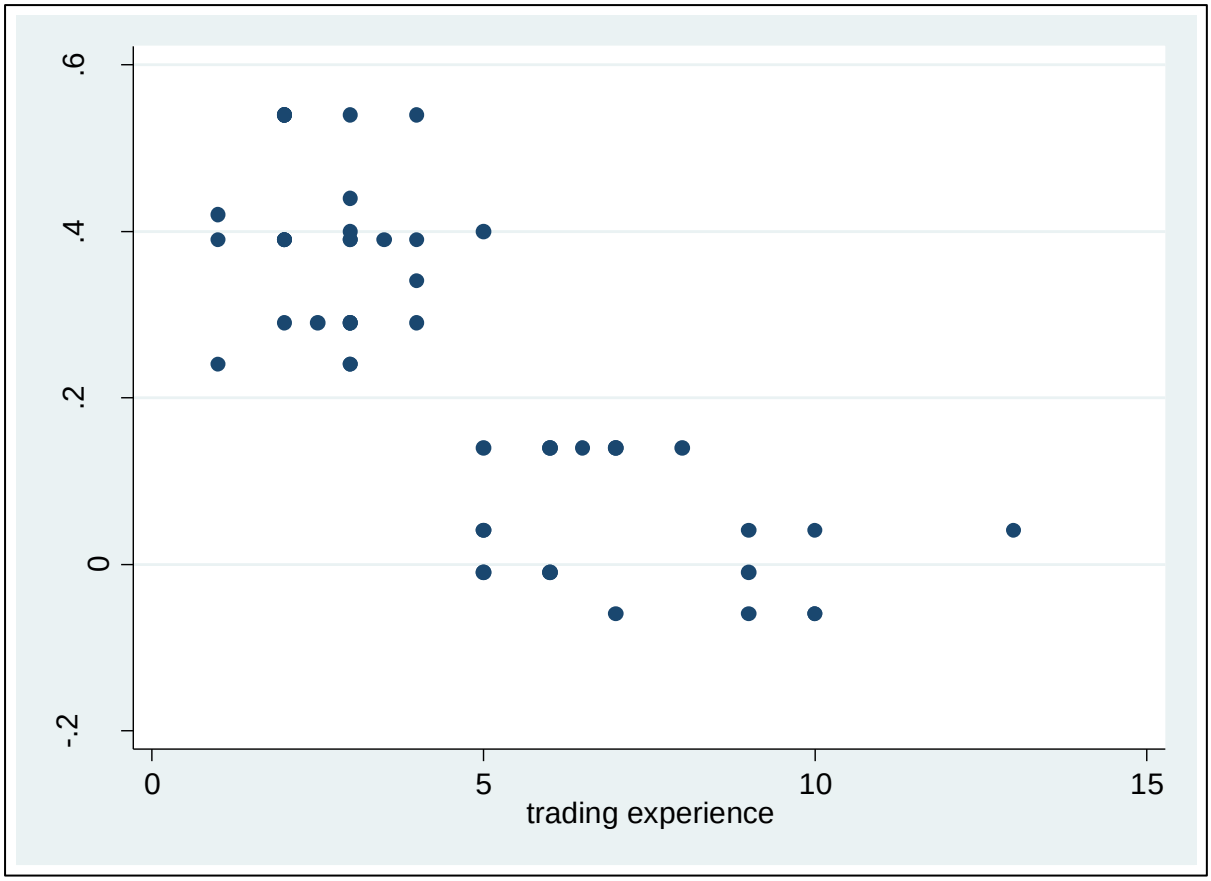

Figure 3.1: The extent of opportunism by trading experience
Source: Author's computations, 2015

As for experience, it can be seen that for private traders with a trading experience of less than five years, the difference in prices is high (above ZMW 0.2), implying that these traders pay prices that are considerably lower, that is ZMW 0.2 (14.3%) lower than the FRA prices (Figure 3.1 above). These traders can be considered to behave opportunistically. Private traders with a trading experience of five years and above show a smaller difference in prices. This means that private traders with more years of experience pay prices that are closer to FRA, and they are therefore principled or less opportunistic. This is in line with the Chi-squared test results that showed that traders with less experience behave opportunistically, while the more-experienced traders are principled. The outlier could be due variability in measurement (Wooldridge, 2009), therefore this observation could not be removed. The fact that the sample size was small also merited this observation not being discarded.

In terms of the education level of traders, the distribution observed is shown in Figure 3.2 below. Private traders who attained lower and upper primary education (one and two, respectively) were found to behave opportunistically (larger difference between FRA and trader price). The more-educated traders, that is, those who attained junior and senior

secondary as well as tertiary education (three, four and five), showed a more principled behaviour, as the difference between the FRA price and trader prices for these education levels is lower. However, there were some outliers (for instance, one trader who had attained junior secondary level (three) was found to behave opportunistically) and these could be attributed to variability in measurement. Therefore, despite the fact that this particular trader was educated, it could be that he did not have other sources of income, leading to more opportunistic as opposed to principled behaviour.

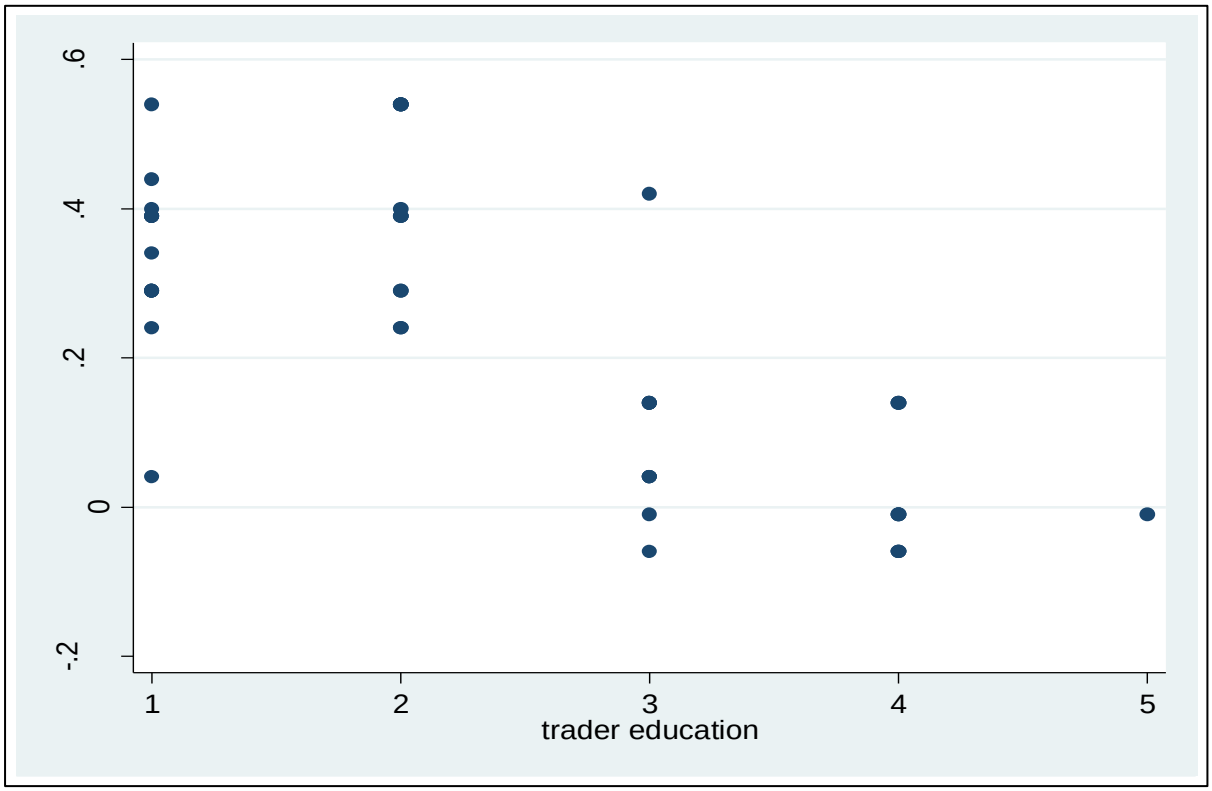

Figure 3.2: The extent of opportunism by trader education
Source: Author's computations, 2015

The above results also support the results of the Chi-squared test. The other variables (age, assets and volume) yielded distributions that do not have a sensible pattern. This could be attributed to the fact that these variables do not influence trader behaviour, as shown by the Chi-squared measure of association. The Chi-squared test of association and the measure of the extent of opportunistic behaviour enabled the analysis of human and transaction characteristics that influence trader behaviour. It is, however, important to consider characteristics or dimensions other than the human characteristics. These other dimensions include the institutional and regulatory dimensions. The institutional and regulatory dimensions that influence their behaviour are important in the understanding of the

information asymmetries present in the trading environment that lead to potential opportunistic behaviour by traders.

3.6 Institutional and regulatory dimensions influencing behaviour

This section discusses the institutional and regulatory dimensions that influence the behaviour of private traders. These dimensions include the pricing, grading and weighing systems used by private traders in the Zambian maize markets. Understanding the pricing, grading and weighing systems is important in understanding which institutions are available to ensure the proper functioning of these systems. When these systems are functioning well, loopholes that create opportunities for opportunistic behaviour are minimised.

3.6.1 The Pricing System Used by Maize Traders in Zambia

The pricing system that private traders use in Zambia was investigated. Of major concern was finding out which prices the traders use and how they come up with those prices. Of all information sources, the major source of information on prices and maize supplies used by traders was fellow traders, accounting for 28 %. Private traders communicate with other traders concerning what price the maize should be bought at, as well as which farmers they can buy the maize from. Other information sources included radio programmes, the market place, and extension officers and these accounted for 24 %, 26 % and 22 % of all information sources, respectively. Price setting is done mainly by the traders, as the survey revealed that traders set or determine the price over 90 % of the times that a transaction takes place. This is indicative of the amount of power the traders have in terms of price determination. The smallholder farmer has little say, if any, on what price he or she sells maize to the trader. Thus, farmers are price takers (JAICAF, 2008). Other players that play a role in determining the maize price were the farmers, a government institution (when farmers sold directly to the FRA), and millers, all of these accounting for 2 % each. The government institution responsible for setting the maize price is the FRA. Traders, however, rarely buy maize from the farmers at the FRA price, as they need to resell the maize to the FRA and millers, among other buyers. To enable them to make a profit on maize, private traders had to offer lower prices to smallholder farmers, as the millers they sold to also offer prices that are lower than the FRA price.

Half of the surveyed traders did not offer a uniform price to all the smallholder farmers in the same village. These findings are similar to those found by Sitko and Jayne (2014). In both the current and the study by Sitko and Jayne (2014), smallholder farmers reported that private traders offer different prices to different farmers living in the same village. The prices paid by the traders in the current study ranged from ZMW 0.6 per kg (USD 0.079) to ZMW 1.2 per kg (USD 0.158) of maize. The current study furthermore explored the reasons for the above variations in prices. Various reasons were given for this intra-village price variation. The main reason, accounting for 84 % of all reasons, was that the price paid to the farmers depended on where the farmer lived. The further the farmer lived from the district markets (as most of the traders were based in the district markets where they resold the maize to millers or the FRA), the lower the price paid for his or her maize by the traders, and vice versa. The reason is that traders had to travel longer distances to the farmers living further away, thus incurring higher transport cost to reach those farmers. The other reasons for the price variation given by the traders were the negotiation skills of the farmer and relationship the trader had with the farmer, accounting for 12 % and 4 %, respectively. The traders are obliged to pay a higher price to those farmers with better negotiation skills, and the farmers are better at negotiating when they have information on the prices. A farmer without any information on prices would accept any price offered by the more-informed traders.

Some traders had a long history of transacting with the same farmers, thus building relationships with them over time. It was found that the traders offered better prices to farmers they knew and had a relationship with, as opposed to those they did not know. This shows the importance of relationships in transactions, affirming the findings of Lu (2007): relationships promote interpersonal trust and minimise opportunism as buyers are less likely to cheat the sellers that they have a relationship with and trust. In instances where the farmers trusted that the traders would pay a better price, the traders also trusted that the farmers would deliver good quality maize that would not be mixed with maize of poor quality. This indicates that mutual trust existed between farmers and traders who had an existing relationship. The reliability of the price information received was also examined. The majority (52 %) of the traders reported that the information received from the various sources was reliable. However, 48 % of these traders reported that the information received was unreliable. The reason given for the unreliability of the information was that the farmers believed that the sources of information are opportunistic and as such, they would reject the prices obtained from these

sources by the traders. A lack of trust of the traders also contributes to farmers' rejecting the prices offered by traders.

3.6.2 The grading and weighing standards used by maize traders in Zambia

In addition to the pricing system, the grading system of maize was investigated. Grading of products facilitates better quality products (higher grade products) being offered for sale, which fetch better prices than those of lower quality do. It was found that the maize traders in Zambia are the ones who determine the grade of maize bought from farmers whenever grade determination is done. The traders inspect the maize and ensure that it is not rotten, broken, clean (free of foreign objects) or of mixed colours. The traders reported that some farmers mix white maize with yellow maize so as to increase the volumes. The need, therefore, arose for traders to clearly state that mixing was not allowed. The traders do an inspection during every transaction. This is similar to the finding of Fafchamps and Minten (2001) where the traders inspected the maize every time they bought from farmers. The farmers, therefore, have to ensure that their maize is of good quality and clean to prevent it being rejected or being bought at a non-profitable price owing to reduced quality.

Despite the majority of traders (74 %) determining the grade, 26 % of the traders reported that grade was not determined at all. Inspections are time consuming and traders end up buying maize from farmers without inspecting it. Farmers were uninformed on the different grades of maize and therefore did not to determine the grade at all. A government institution responsible for setting and implementing grades and standards for determining the quality of maize was non-existent for the smallholder farmers and the value chains (mainly informal) that they are involved with. The large-scale (commercial) farmers, however, are involved with the formal value chains that have grading institutions, as well as grades and standards (Table 3.3 below) that are well implemented and monitored by the Zambia Bureau of Standards (ZABS). The ZABS is responsible for setting and monitoring the grades and standards for a number of commodities, including agricultural commodities. For maize, the following are the grades and standards specifications (Table 3.3 below):

Table 3.3: Grading standards for white maize in Zambia

	Grade A	Grade B	Grade C
	Maximum percentage (%)		
Defective kernels:			
Discoloured grains	3	6	9
Insect/pest damaged grains	3	6	9
Diseased grain	2	2	2
Immature/shrivelled grain	1	1.5	2
Fungal damaged grains	0.5	1	1.5
Germinated grains	0	0	0
Pass through 6.35 mm sieve	1.5	2	2.5
Total defective kernels	11	18.5	26
Foreign matter	1	1.5	2
Broken kernels	6	7	8
Other coloured grains	3	4	5
Moisture	12.5	12.5	12.5

Source: ZAMACE, 2011

The maize must have a natural colour, contain no live insects, moulds or toxins. It should also be free from odour, be fit for human consumption, and comply with the above requirements for it to be sold (ZAMACE, 2011). Farmers are thereby required to ensure that their maize meets the above requirements, so as to avoid rejection by the buyers. Any matter that passes through a 6.35 mm sieve is considered defective, and maize with such defects will be rejected. The sieve is a grading device which has a bottom (baseplate) perforated with round holes, 6.35 mm in diameter. It is used to separate foreign and defective matter from the grain. The moisture content of maize is also important in avoiding maize rejection by the buyers. The moisture content is determined by a moisture meter, calibrated using the ZABS guidelines of moisture meter calibration (ZAMACE, 2011). Despite the above grading and standards specifications being in place, they are not implemented in the smallholder farmer value chain in Zambia. This is similar to the case in most southern and eastern African countries where grades and standards are implemented and followed in the formal maize value chains where large-scale farmers operate, but there is little or no implementation in the more informal smallholder farmer value chain (Nordier, 2013). Therefore, physical inspections are used to determine the grade (which is not the official ZABS grade) which is then used to determine the price that the private traders will pay for the maize, as the grade affects or rather has an impact on the price paid.

The maize grade determined by traders following physical inspections was found to affect the price that the private traders paid, in the case for 60 % of the traders. Higher quality maize was found to fetch a higher price, and maize of lower quality was bought at lower prices, or in some cases, was rejected. The remaining 40 % of the traders revealed that the grade or quality of maize bought did not affect the price paid. These traders offered a price merely based on the moisture content of the maize and did not look at broken kernels or mixed colours. The moisture content was determined by visually inspecting the maize and touching it to ensure that it had dried completely. This is unlike the grading system in the formal large-scale farmers' value chain in Zambia, where the moisture content is measured using a moisture meter, and maize is checked for broken kernels and mixed colours. Maize which includes broken or mixed-colour kernels, among other defects, (Table 3.3 above) is rejected (MAL, 2013). However, in this study, the private traders were found to conduct only visual or physical inspections when buying maize from the smallholder farmers.

As with the grading that is mostly done by private traders, the weighing of maize was also found to be done by private traders. For the weighing, however, none of the farmers determined the weight, and in as much as they would package the maize in either 50 or 90 kg bags after weighing it at the market or using a friend's scale or bucket, the traders would re-weigh it before buying. A scale was used to determine the weight of maize by 94 % of the traders and this was the most commonly used weighing instrument. The traders who did not own scales borrowed or rented scales from other traders, making the scale the commonly used weighing instrument. Other traders used a bucket for weighing. Standard weighing buckets were owned by some traders and the size of these buckets is about 12 kg. Both the weighing scales and buckets were owned by the traders. They carry these scales or buckets with them when they buy maize from the farmers. The scales cost an average of ZMW 2000 (USD 263.16) and are mostly owned by the wealthy traders. The smallholder farmers cannot afford to buy scales, therefore they do not own scales.

Half (50 %) of the traders reported that standard scales are used, whereas the other 50 % used unstandardised scales. The standardisation of scales is carried out by the Zambia Weights and Measures Agency (ZMWA) and it is a requirement that traders take their scales for standardisation once a year. Despite this being the case, 50 % of the traders reported that their scales were not standardised. The reason given for this was that they trusted the sources where they bought the scales from and that standardising scales at ZMWA was costly.

Unstandardised scales, however, lead to opportunistic behaviour as they can be manipulated. This results in private traders paying the smallholder farmers less for more maize, thereby exploiting the farmers. The reliability of the weighing system was also analysed. Despite only half of the traders reporting that their scales are standardised, all of them reported that the weighing system they used was reliable.

It can be concluded from the above section that the grading and weighing systems used by private traders and smallholder farmers in Zambia are not reliable and this opens up opportunities for opportunistic behaviour. There is therefore a need for the government to support the smallholder farmers and assist them to become more competitive through achieving higher prices for their maize by providing them with grade and standards information, as well as by ensuring that private traders use standardised scales.

3.7 Summary

The majority (58 %) of traders have been found to behave opportunistically. From the hypotheses testing, the conclusions that can be made are that education and experience are the factors that might influence trader behaviour. A trader might, therefore, behave opportunistically by paying lower prices for the maize, depending on the level of education attained and his trading experience. The conclusions were made based on the Chi-squared test and the proportions of traders behaving either opportunistically or in a principled manner, as revealed by the contingency tables of the Chi-squared test. This was confirmed using the measure of the extent of opportunism. These sections therefore attempted to answer the second and third objectives of this study, which were: to determine whether private maize traders behave opportunistically or in a principled manner, and to identify and analyse the factors that influence or shape the behaviour of private traders. However, opportunistic behaviour could not be deduced using price only, the grading and weighing systems supported the cheating (opportunistic behaviour by traders).

In terms of maize pricing, the price at which smallholder farmers sell their maize is mostly determined by private traders. In many instances, farmers have been found to simply accept the prices offered or determined by the traders, as they have difficulty in accessing other marketing channels. Grade determination involved physical inspections of the maize by the traders. Traders owned the weighing instruments (scales and buckets) and are responsible for

weighing the maize. Formal organisations responsible for developing institutions for determining the grade and weight of maize did not exist. This lack of an organisation that determines the grade and weight of maize opens up opportunities for private traders to behave opportunistically. Smallholder farmers end up being exploited through cheating in grades and weights, and this further worsens their livelihoods and that of the community as a whole. The last section of this chapter contributed by attempting to answer the fourth objective of gaining an understanding of the pricing, grading and weighing systems used by the private traders in Zambia. The pricing, grading and weighing systems were investigated and a conclusion can be made that there are loopholes in these systems that lead to private traders behaving opportunistically. The opportunistic behaviour of private traders impacts negatively on the livelihoods of smallholder farmers and the country's overall objective of reducing poverty in the remote rural areas of Zambia through increased agricultural production.

CHAPTER FOUR

OPPORTUNISTIC BEHAVIOUR FROM AN INSTITUTIONAL ECONOMICS PERSPECTIVE

4.1 Introduction

Private traders, as has been outlined in this study, are an important marketing channel for maize farmers in Zambia. Despite this being the case, little is known of the institutional arrangements that govern the transactions between smallholder farmers and private traders, and of the relationship that exists between them. This chapter highlights the institutional explanations for the opportunistic behaviour of private traders. These include the relationship between farmers and traders and the reliability of the grading and weighing systems that govern interactions between them.

4.2 The role of trust and reputation in smallholder farmer-private trader relationships

There are several enforcement mechanisms that govern transactions and the exchange of goods and services. Among them are trust and reputation. These mechanisms ensure compliance with a law, rule or obligation and they are incentives for honest behaviour in exchange relationships. Honest behaviour further prevents cheating, thereby facilitating better exchange relationships.

The facilitation of exchange relationships requires trust. The perception of risk associated with opportunistic behaviour is reduced by a buyer's trust in the supplier. This trust leads to an increase in the confidence of the buyer or seller that short-term inequities will be resolved (Ganesan, 1994). Trust also reduces the transaction costs that are incurred in an exchange relationship, as there are lower possibilities of opportunism when two parties that trust each other transact with each other (Batt & Rexha, 2000; Lu, 2007). Moorman, Deshpande and Zaltman (1993) define trust as the willingness to rely on an exchange partner in whom one has confidence.

According to Achrol (1997), two trading partners trust each other if there is a belief that the partner will strive for outcomes that benefit both parties in the exchange. Both parties to a transaction can focus on the benefits of the exchange if high levels of trust exist. The opposite is true if there is little or no trust. Buyers and sellers will only focus or engage in short-term transactions or spot transactions involving exchange of goods and payment on the spot (cash-based transactions) which are common in agricultural markets. Outcomes which exceed those based on self-interested behaviour would be achieved once trust is established. The reason for this is that coordinated joint efforts between the buyers and sellers would lead to greater outcomes. This indicates that trust leads to better outcomes for both parties, unlike outcomes where opportunism thrives from a lack of mutual trust. Trust is therefore an important determinant of the kind of relationship that a seller (smallholder farmer) and buyer (private trader) have. It also impacts on the price that the smallholder farmer fetches for his or her product, as it is unlikely for private traders whom he or she trusts, and has a good relationship with, to exploit the farmer by paying lower prices. Trust also impacts on the grading and weighing of maize. Mutual trust prevents traders from using unstandardised scales, thereby exploiting farmers. Trust might also lead to fairer grade determination, as fewer traders might downgrade maize by convincing farmers that the grade of their maize is lower than what it really is.

Trust between growers and market agents (the receivers and distributors) of fresh fruits and vegetables was investigated by Batt (2003). It was found that these growers and market agents did not trust each other. The growers transacted with several market agents and trust was only facilitated in instances where both these parties shared similar goals. Growers preferred to transact with market agents who were prepared to invest in a relationship so as to reinforce trust. Withholding of information by both parties results in opportunistic behaviour, and was found to negatively impact on the development of trust between them. Trust was seen to reduce opportunism. More frequent transactions occurred between growers and market agents who built or developed trust among themselves. This study is similar to the current study, as private traders were found not to exploit smallholder farmers that they had relationships with and trusted. Fairer and higher prices were paid to farmers that they trusted, compared with those that they did not trust.

Similarly, the trustworthiness of transactions that traders are involved in, specifically the weight, quality and presence of illegal trade dimensions in the Ethiopian coffee markets, was

analysed by Woldu and Minten (2015). This study found that cheating by traders was less prevalent in transactions with coffee growers that they trusted. Cheating was also less prevalent on characteristics that are observable (such as weight) than those that are not. Traders were found to cheat more in terms of quality of coffee, as coffee quality is an unobservable characteristic. These findings are unlike those of the current study, as the traders were found to cheat both in terms of the weight and quality. Scales were manipulated and the maize quality was downgraded in the current study. Therefore, both studies indicate cheating by traders, except that cheating was more prevalent in quality in the study by Woldu and Minten (2015), whereas cheating was prevalent in both weight and quality in the current study. The above, therefore, warrants the need for quality and safety standards (that is, requirements, specifications, guidelines or characteristics that can be used consistently to ensure that materials, products, processes and services are fit for their purpose, safe and reliable) to ensure desirable quality levels. Additionally, the standardisation of scales to prevent cheating in weights is also recommended.

The buyer–seller relationships and the chain performance in the supply chains for vegetables in China were examined by Lu (2007). It was found in that study that personal relationships (known as "guanxi" networks) play a significant role in facilitating transactions and information sharing, as well as the provision of technical and financial assistance. This study also revealed that interpersonal trust is an important aspect in buyer–seller relationships and it was found to be an important element for conducting business on the international market. Additionally, both formal (contracts) and informal (such as trust and relational contracting) governance mechanisms were found to be important in enhancing the performance of markets in China (Lu, 2007).

Guanxi, which is a special form of governance, enables buyers and sellers to build long-term relationships, thereby safeguarding both parties to the transaction against opportunistic behaviour. When a long-term relationship develops, the sellers, on the one hand, will ensure that the product, with agreed upon quantity and quality, is delivered. On the other hand, the buyers will offer favourable prices and grading criteria, as they would not want to exploit the people they know and have been trading with for a long time. Relationships, therefore, lead to more honest transactions and both parties work towards maintaining such relations so as to continue benefiting from increased supply chain performance as a result of mutual trust (Lu, 2007).

Similarly, Fafchamps and Minten (1999) found that relationships, trust and reputation are perceived as crucial factors for business success by agricultural traders in Madagascar. Traders were categorised as small-, medium- and large-scale traders. Traders who have better interpersonal relationships with buyers are better able to access price, market condition information and credit. These relationships also prevent failure of contracts, as they trade with people they know and have good quantitative and qualitative relationships with. Large-scale traders were found to have better relationships and were more prosperous. This was attributed to large-scale traders having closer relationships with their suppliers and clients, which eased information access. Small-scale traders, however, are afraid of being cheated and did not trust information from suppliers and clients.

Other than trust, reputation, another enforcement mechanism, plays a role in smallholder farmer–private trader relationships and the prevention of cheating. Reputation is used as an enforcement mechanism in markets where there is easy transmission of information about cheaters and the market actors are willing to collectively punish the cheater (Gabre-Madhin, 2001 in Kirsten *et al.*, 2009). In a study of Ethiopian grain markets, reputation as an enforcement mechanism was analysed (Gabre-Madhin, 2001 in Kirsten *et al.*, 2009). Grain traders used brokers to sell their grain to buyers who were distant from their villages, as they had difficulty covering long distances to reach those buyers. Brokers had the tendency to cheat the traders in terms of prices, as the traders did not have the prevailing market price information. They took advantage of this information asymmetry by being dishonest about the prices that they sold the maize at. However, because there was a free flow of information about broker behaviour among traders, reputation worked in the prevention of cheating. This was so as there was the threat that a broker who cheats one trader will be considered to be a cheat by all traders, as they would all know about the cheating and refrain from hiring such a broker. This, therefore, compelled brokers to be honest in their dealings, for the fear of losing their current and future clients.

Formal contracts also indicate the kind of relationship between transacting parties, as buyers have formal contracts with sellers that they trust and have good relationships with. The use of formal contracts is, however, uncommon in African agricultural markets. According to Fafchamps and Minten (2001), 80 % of African agricultural traders did not have contracts with their suppliers. This shows that a lack of trust exists between the traders and suppliers. Due to the fact that the traders and their suppliers did not have good relationships, the traders

did not contract formally with the farmers who sold maize to them. Contracts, therefore, are important in identifying the nature of the relationship between two parties. Contracts also reduce potential opportunistic behaviour, as contracting parties want to maintain their contracts and good relationships by being honest in transactions. If a farmer defaults, for example, the trader will not renew the contract and this entails that the farmer will lose a buyer for his maize.

The studies outlined above show that personal relationships and trust are important for transactions to be successful, hence the need to understand the relationship between traders and farmers in terms of trust and reputation. Additionally, reputation and contracts are important in the reduction of opportunistic behaviour, thereby facilitating honesty and better relationships between transacting parties. Despite showing the important role of trust in relationships, the above studies did not analyse the perceptions of each party to the transaction and the reasons why they did, or did not, trust the other party. The current study analyses the perceptions of both private traders and smallholder farmers in an attempt to fill this gap. The reasons for the trust or mistrust between them are also investigated in the current study.

4.3 A descriptive analysis of smallholder farmers' perceptions of private traders

Smallholder farmers have the perception that private traders exploit them by paying lower prices (Sitko & Jayne, 2014). In their study, Sitko and Jayne (2014) found that private traders were perceived to behave opportunistically by paying smallholders prices that were lower than those paid by grain processors. However, they did not analyse the relationship between the traders and farmers and why farmers had such a perception of the traders. The perceptions that smallholder farmers have of private traders are important in understanding the nature of the relationship that exists between the two parties. Better perceptions are held by farmers who have better relationships with the traders, and vice versa. Trust between the traders and farmers also results in better perceptions and enhances the maize trading and performance of markets. Enhanced maize trading and market performance is important in ensuring that both traders and farmers benefit from the exchange. Traders are able to realise profits and farmers are able to fetch better prices for their maize, hence improving their livelihoods.

Most of the farmers (68.5 %) did not trust the traders at all (Figure 4.1 below). They attributed this to the traders paying low prices, despite the farmers' knowledge of the FRA price. The farmers were aware of the prevailing FRA market price and they expected that the traders would pay at least this price. The traders, however, paid lower prices, leading to the farmers not trusting them.

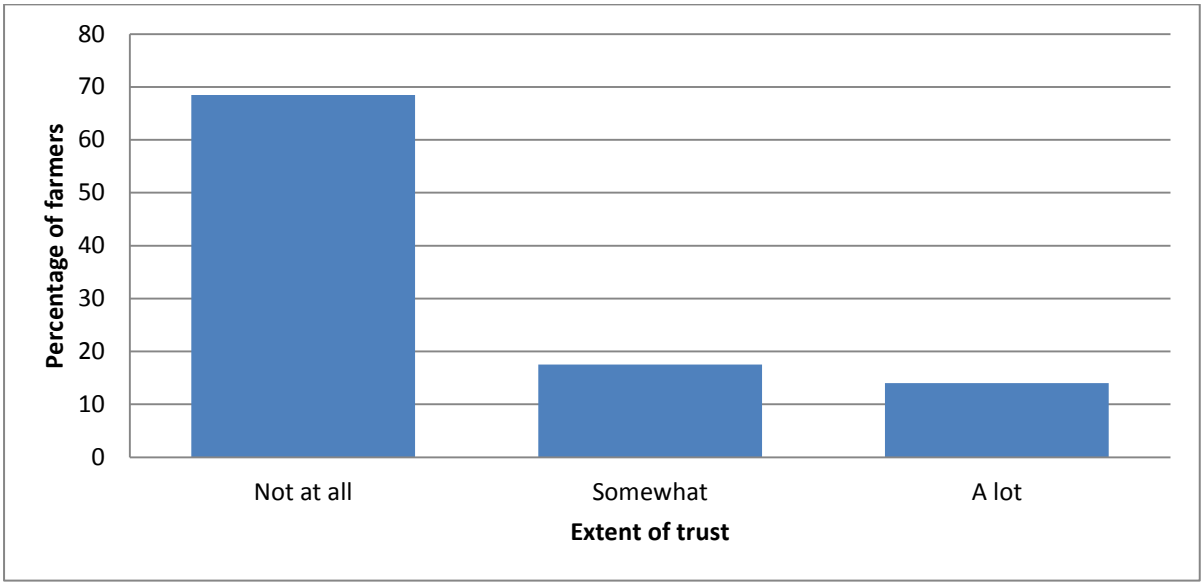

Figure 4.1: Extent to which farmers trust traders
Source: Author's computations, 2015

The farmers furthermore distrust the traders because they are believed to manipulate the scales. Farmers reported that the traders would at times fail to come to the villages, despite promising to do so. Traders were also reported to dictate the prices, with little or no negotiation with the farmers. These were the major reasons why farmers did not trust the traders. Of the farmers surveyed, 17.5 % trusted the traders only to a small extent, and 14 % were found to trust the traders to a large extent. The farmers who trusted the traders revealed that the traders they transacted with were mainly their friends and relatives with whom they had been transacting for a long time, hence there was no incentive for them to cheat.

Reputation, another enforcement mechanism, is also important in understanding the relationship between farmers and traders. The majority of the farmers (71.5 %) would inform other farmers if a trader did not pay them the agreed amount or at the agreed time. This was done as a way of preventing other farmers from selling their maize to traders who do not pay. The other farmers, accounting for 28.5 %, would resolve the matter with the traders without letting others know about it and this led to better future relationships. The low proportion of

farmers (28.5 %) who did not tell other farmers about their disputes with the traders could be attributed to the fact that the majority of farmers (71.5 %) were not concerned about the traders' reputation and told others about their misunderstandings because they did not have good relationships with them, as they paid low, unfair prices.

The majority (94 %) of the farmers reported that the price paid by the traders is not a fair price. This is because the price paid was low, despite the farmers incurring high costs in the procurement of inputs, particularly fertiliser. They revealed that they would end up incurring losses after selling the maize, due to the low prices paid by traders. This is similar to the views of smallholder farmers in Malawi: private traders would persuade those farmers to agree to sell their maize at lower prices by arguing that there was a decline in the maize prices (Jayne, Sitko, Ricker-Gilbert & Mangisoni, 2010). The other reason given for the low profit margins obtained by farmers was that the scales were manipulated, leading to traders obtaining more maize at low, non-negotiable prices. Jayne *et al* (2010) also found that private traders in Malawi were perceived to use weights and other measures that are unreliable. Some of the Malawian private traders did not even allow farmers to see the reading on their scales, thereby perpetuating the perception held by farmers that private traders manipulate their scales and cheat on the weights. Farmers revealed that they sell to the private traders, despite the low and unfair prices paid, because of their urgent cash needs for, among others things, home consumption.

Price determination was also investigated and 93 % of the farmers in this study reported that the price at which maize is bought is determined by traders. The government institution (FRA) and farmers were also found to determine the price, but they accounted for only 5.5 % and 1.5 %, respectively. The traders would offer a price to the farmers and, due to the high costs of transporting the maize to district markets and to the traders being the cheaper selling option, the farmers would end up selling their maize to the traders. Little or no negotiations were found to take place and the traders were seen by farmers to dictate the prices. Farmers were found to determine prices in very few instances, as mentioned above, and these are probably the farmers that have a relationship with the traders. Additionally, the relatively larger-scale farmers had better grounds for negotiating higher prices. The larger-scale farmers might have a better negotiating power in that they sell larger quantities of maize to the traders. Therefore, the traders depended on them for their procurement of larger maize volumes. Traders might then allow room for negotiation when trading with such farmers in

order to maintain good relations to ensure future maize supplies from these farmers, as opposed to when they trade with smaller-scale farmers.

Similar to price determination, weight determination was done mostly by traders (99.5 %) with only one instance found where the farmer and trader determined the weight together. The reason for this was that he was a relatively large-scale farmer who had more negotiating power than the smaller ones had. This sole determination of weight by traders was viewed as exploitation by the farmers. The reason for this was that the farmers felt that the traders manipulated the scales. Farmers reported that traders manipulate the scales, thereby cheating the weights. This is unlike the findings of Woldu and Minten (2015) where traders were relatively trustworthy in terms of observable characteristics, including weights. The current study had a different finding, as scales were not standardised, thereby making it easier to manipulate the scales and cheat on the weights.

Similar to price and weight determination, grade determination was mostly done by private traders, as 64 % of the farmers reported that traders are the ones who determine the grade, with the remaining 36 % reporting that the grade is not determined at all and that the traders buy the maize without any inspections. Grade determination is done through physical inspections by the traders and no formal grading standards are used in smallholder farmer–private trader maize trading in Zambia. It is difficult for the maize trading to get by without informal grades and standards, as there are no penalties if standards are not met. This lack of penalties increase the possibilities for cheating and exploitation, as traders have the knowledge that they will get away with the cheating.

4.4 A descriptive analysis of trader relations with farmers

In addition to understanding the farmers' perceptions of these traders, described in the previous section, this section analysed the private traders' relations with smallholder farmers. This was done so as to understand the relationship between the smallholder farmers and private traders from the perceptions of both parties and to make conclusions on the nature of their relationship, based on that. The study revealed that most of the private traders (46 %) trust farmers and have a good relationship with them, unlike the smallholder farmers' perceptions where the majority were found not to trust the traders (Figure 4.2 below). This is attributable to the fact that private traders have power and therefore dominate in exchanges

with the less powerful smallholder farmers (Lu, 2007). Owing to their powerful status, private traders do not really see trust as an issue. Whether or not they trust the smallholder farmers barely affects the prices they set and pay for the maize.

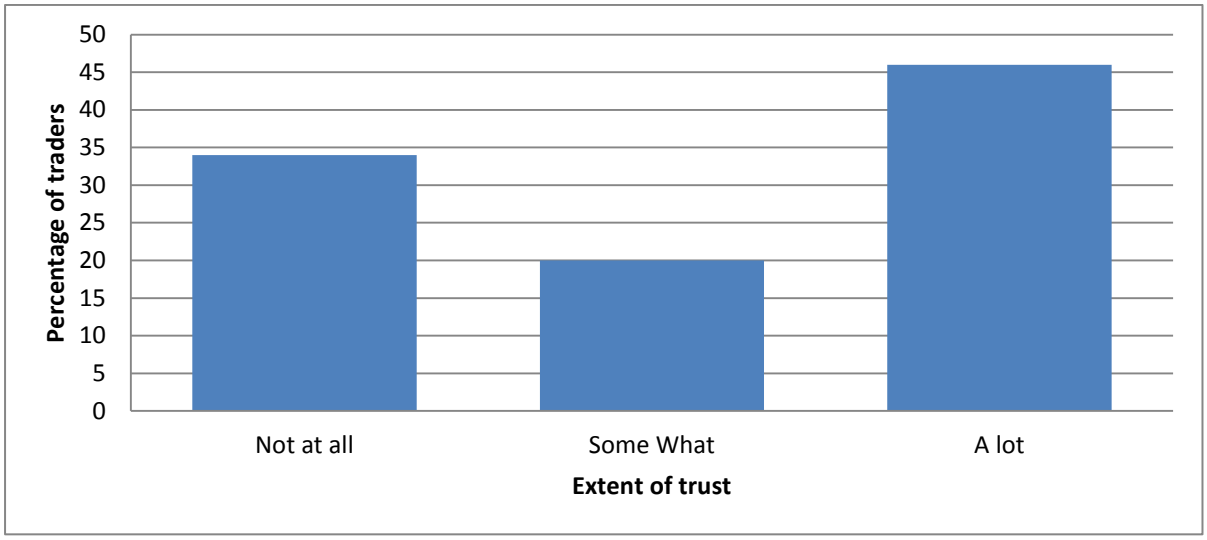

Figure 4.2: Extent to which traders trust farmers
Source: Author's computations, 2015

Although the majority of traders trust the farmers, it was found that 20 % of the traders do not completely trust the farmers and this was due to several reasons. Firstly, the traders reported that there were instances when the farmers would tell them that they had specified quantities of maize to sell, and after the trader travelled to the villages to collect the maize, they would discover that the promised quantities were not available. This is because the farmers would decide to sell to other traders who offered better prices. Secondly, the farmers would agree on a price at which the maize would be bought, only to deny having agreed on the price after the traders travelled to collect it. This has led to traders having doubts as to whether to trust the farmers or not.

Incidentally, 34 % of the surveyed traders (Figure 4.2 above) did not trust the farmers at all. The major reason given by traders for this lack of trust was that farmers would mix white maize with yellow maize so as to average the grade and increase the quantities of maize to be sold. An average grade of maize enables farmers to fetch average prices, as opposed to the case where bad quality maize is sold separately. Failure of farmers to honour their promises in terms of the available quantities was another reason for the lack of trust. Farmers were reported to lead the traders, at times, to believe that they had maize to sell. After the traders travelled to the villages to collect maize, the farmers would either change their minds

concerning the quantities they were willing to sell (as they would have consumed the maize at home) or they would have sold the maize to another trader (side-selling). This makes the traders reluctant to visit the same villages again to buy maize.

In addition to traders' trust of farmers, contracts between farmers and traders were investigated. The majority of the traders (92 %) did not have contracts with the farmers. Only 8 % of the traders were found to have contracts. This is consistent with the findings of Fafchamps and Minten (2001) where 80 %, that is, the majority, of African agricultural traders did not have contracts with their suppliers. In the current study, of those traders who contracted with farmers, 50 % of them had verbal contracts, while the other 50 % had written contracts with farmers. The written contracts specified the quantities to be delivered by the farmer, as well as the amount to be paid by the trader. Both the trader and farmer would endorse their signatures on these contracts. A witness would be present to sign on the contract and this was done so as to have a third party's evidence in case of disputes. These traders preferred written contracts as it was easier to refer to a document in the case of a dispute. These contracts were simple and uncomplicated, owing to low literacy levels of both the farmers and traders, as is evident from the results in the preceding chapters. The duration of the contracts was relatively short, with most (75 %) of the traders having a one-year contract with the farmers. These contracts were valid for that particular season and could only be renewed for the following season if both parties were satisfied with the outcome of the transaction. None of the traders had a two-year contract in place, and only 25 % of the traders with contracts had a contract that was renewable after three years. These longer-term contracts, however, led to side-selling problems, as some farmers would sell to other traders despite their contractual commitment. This is the main reason why most traders preferred one-year contracts. The three-year contracts are generally only used between farmers and traders that have been transacting for a long period of time and trust between them has developed.

Unlike contracts where traders and farmers agree on the quantities and price of maize to be exchanged at a later date, credit sales enable buyers (traders) to collect the product and pay at a later or future date. Investigating whether or not traders buy maize on credit is vital in the understanding of the existence of trust between traders and farmers. Credit is, however, not common in most agricultural markets in Africa. Cheques are almost unheard of and the most common method of payment is by cash. The current study confirmed the above, as 96 % of

the traders did not buy maize on credit; they paid cash instead. This could be attributed to the lack of trust by either party or the infrequent trading between them. Of the traders surveyed, only 4 % of them bought maize on credit and this was only from the farmers that they knew and trusted; mostly their friends and family. None of the traders used cheques to pay for the maize bought from farmers.

Reputation also plays a role in understanding the relationship between farmers and traders. In order to find out if reputation played a role in the farmer–trader relationship in terms of information about farmers' behaviour circulating among traders, traders were asked if they would let other traders know if a farmer were to give them maize that is of bad quality. It was found that 80 % of the traders would not tell the others, but would rather confront the farmer and resolve the issue between the two of them. This is unlike the farmers, who would inform the others if a trader did not pay for the maize. This illustrates the closely knit community of farmers. In the case of poor quality maize, the trader would allow the farmer to either replace the maize with better quality maize, or the trader would resort to not trading with that particular farmer again. The 20 % of traders who reported that they would inform the others about any bad trait portrayed by the farmer, bad attitude inclusive, did so to prevent the other traders from purchasing poor quality maize. Although it would seem that the farmers do get away with selling poor quality maize (80 % of the traders do not inform the others), the farmers destroyed the relationship and trust they had with that specific trader. Furthermore, by destroying relationships because of supplying poor quality maize, farmers end up reverting to selling maize to strangers, where a lack of trust once again leads to lower prices and possible opportunistic behaviour.

This section showed that trust, reputation and contracts do play an important role in relationships which further impacts positively in reducing opportunistic behaviour. Trust between smallholder farmers and private traders reduces opportunistic behaviour, as the gains from cheating are low. This is because they have been transacting for a long time and have built relationships, hence they do not see the need to cheat. Most of the farmers (61.5 %), however, did not trust the traders, and 34 % of the traders did not trust the farmers, showing the lack of trust between them. This lack of trust contributes to opportunistic behaviour arising. Opportunistic behaviour is exacerbated by the paucity of contracts (8 % of traders had contracts with the farmers). Due to the non-specification of the price and quality in contracts, opportunities for opportunistic behaviour were increased.

4.5 Reliability of the grading and weighing systems

Like contracts and reputation, the reliability of the grading and weighing systems plays an important role in the mutual trust and relationship between farmers and traders. The majority (93.5 %) of farmers revealed that the grading system was not reliable. They attributed this unreliability of the grading system to the lack of standards against which to measure the quality of maize. An organisation responsible for developing and determining the grade of maize would address this concern. This will ensure that there are institutions or "rules" and procedures to be followed before the grade or quality is determined by both the farmers and the traders. The weighing system was also not reliable, according to the farmers, as all the surveyed farmers were found not to rely on the weighing system in place. This was because all the weighing instruments used in the maize exchange belonged to the traders, making them responsible for determining the weight. Because of this, the farmers did not trust that the weights arrived at by the traders were accurate. The farmers were of the view that the scales used by the traders were manipulated as they were not standardised; the weight readings are therefore believed to be lower than the actual weight.

Similar to the farmers, 66 % of the traders reported that the grading is not reliable (which is quite unusual as one would expect that the traders responsible for the grading would feel that the grading is reliable) as only visual or physical inspections are conducted. This, in the traders' view, does not ensure proper quality verification as it is subjective and not an efficient means of quality determination. Each trader would have their own standard of what good or bad quality is, despite there being an "average" quality for the season or the village. This is cumbersome on the part of the farmers, as they would ensure that their product looked like what the previous trader had said was good quality, but unfortunately, the next trader would not be satisfied with the quality given to him (as different traders from different markets require different quality) and end up rejecting the maize or paying a low price. Because there are no dependable standards for grade (quality), traders are not motivated to pay a higher price for the good quality maize, since the standards for quality maize is unknown. On the other hand, there is no motivation for the farmers to produce and sell high quality, whole maize kernels, that are pest and disease-free, as an objective way of determining the grade (quality) does not exist (Kollock, 1994).

Unlike the farmers, all the surveyed traders were of the opinion that the weighing system used is reliable. The weighing system used is very important in determining the relationship between farmers and traders. A reliable system enables trust and good relationships to be built between them. Despite most of the traders having scales in Zambia, farmers were still suspicious of the volumes of maize obtained by the traders. According to a study by Fafchamps and Gabre-Madhin (2001), it was found that most of the trading in Malawi and Benin takes place by volume, as very few traders had proper weighing equipment. The value of an agricultural product was seen to be measured more accurately by volume, rather than by weight. The reason for this was that the addition of water to a crop, grains inclusive, can artificially inflate its weight and volume. Traders revealed that they insured themselves against most storage losses by trading by volume, as opposed to weight, and in the control of the moisture content of maize by ensuring that it dried completely. In this study by Fafchamps and Gabre-Madhin (2001), the measures of volume used were burlap (a strong woven fabric made of fibre or hemp used to make bags) and plastic bags. These burlap and plastic bags tended to stretch over time. Due to the fact that stretched (older) bags registered more volumes, this could be the reason why the Malawian and Benin traders preferred to use them to ensure they obtained more maize for less money from the farmers. Fafchamps and Gabre-Madhin (2001) also found that the sealing of the bags would also determine the volume bought and sold; the traders would seal at the top of the bag, for instance, so as to get more maize, whereas the farmers would seal below the top of the bag, so as to sell less maize for more money. These measures were thus subjective and led to mistrust between farmers and traders. This is similar to the findings of the current study, as the farmers would collect the maize in 50 and 90 kg bags, but traders would transfer the maize into their own bags and then add more as the contents of sellers' bags did not fill the traders' overstretched 50 and 90 kg bags. This process of the traders transferring maize into their own bags led to farmers becoming suspicious of the scales and bags used, and thus they did not trust the traders.

4.6 Summary

The results from the study clearly indicate that the smallholder farmers and private traders had different perceptions about the levels of trust between them. The majority (68.5 %) of the farmers did not trust the traders, as they were of the view that the traders manipulate the scales and pay low prices. On the other hand, 46 % of the traders did trust the farmers and were of the view that the farmers do sell good quality maize, of the recommended moisture

level. The traders who did not trust the farmers attributed this to the farmers who did not provide the agreed-upon quantities, despite the traders travelling to the villages for maize collection. The grading system was found to be unreliable by both the farmers and traders, although this was not the case for the weighing system. The farmers were of the view that the weighing system was unreliable, while the traders reported that it was reliable. This further emphasises the need for properly developed, enforced and monitored pricing, grading and weighing systems to be put in place so as to ensure the standardisation and reliability of these systems. These systems would increase the levels of trust, thereby improving maize trading in Zambia. Improved maize trading would reduce the opportunistic behaviour of traders, increasing the profits realised by smallholder farmers.

CHAPTER FIVE

CONCLUSIONS AND POLICY IMPLICATIONS

5.1 Summary

Private traders have typically been considered to exploit smallholder farmers through their opportunistic behaviour. There has been little evidence to prove and understand whether private traders actually do behave opportunistically and what factors might influence their behaviour. There is also a paucity of empirical evidence on the pricing, grading and weighting systems used by traders, as well as on trader relationships with farmers. This study therefore contributed by looking at trader behaviour, measured in terms of whether a trader behaves opportunistically, or in a principled manner. The relationships between traders and farmers are also analysed. The objectives of the study were (i) to identify the characteristics of smallholder maize farmers and private traders transacting with each other, (ii) to determine whether maize private traders behave opportunistically or in principled ways, (iii) to identify and analyse the factors that influence or shape the behaviour of private traders, (iv) to understand the pricing, grading and weighing systems used by the private traders, (v) to evaluate the relationship between smallholder farmers and private traders, and (vi) to give policy recommendations to reduce opportunistic behaviour and thus improve the relationship between farmers and traders, thereby improving informal maize trading.

Primary data was used in this study which involved interviews and direct observations with both private traders and smallholder farmers. The sample sizes for private traders and smallholder farmers were 50 and 200, respectively. The data was collected in Kalomo District of Zambia between June and August, 2015. Only those farmers who transact with private traders or use assembly traders as the marketing channel were included in this study. The data collected was analysed using the Chi-squared test and the measure of the extent of opportunistic behaviour, as well as by means of descriptive statistics, to achieve the study objectives.

5.2 Conclusion

The characteristics of smallholder farmers and private traders transacting with each other were identified in this study. The findings show that the majority of both smallholder maize farmers and private traders were male, accounting for 70 % and 90 %, respectively. This shows that maize trading is mostly done by males and the reason for this could be that females trade in products other than maize. Both smallholder farmers and traders were also found have attained similar levels of education, as 42 % of smallholder farmers and 32 % private traders (accounting for the majority of smallholder farmers and private traders, respectively) attained an education level of lower primary (that is, up to the fifth grade). Therefore, generally smallholder farmers and private traders have attained low levels of education. The smallholder farmers who transact with private traders had an average age of about 43 years, whereas the private traders had an average age of about 37 years. This entails that the smallholder farmers that transact with private traders are relatively older, while the private traders are relatively younger. The average farming and trading experience was 13 years and about 5 years, respectively.

Further, the behaviour of private traders, as well as whether they behaved opportunistically or in principled ways, was analysed. The factors that influence the behaviour of traders were also analysed. The mean price paid by traders was found to be ZMW 0.989 (USD 0.13) per kg of maize. The majority of traders (58 %) behaved opportunistically by paying prices that were lower than the mean price of the surveyed traders for a kilogram of maize. This analysis was done using the t-test where the difference in the means of the opportunistic and the principled groups were calculated. The t-test also showed the proportions of traders in each group (opportunistic and principled). Due to the fact that the majority of traders, accounting for 52 %, behaved opportunistically, the farmers who sold to private traders obtained lower prices than those who sold to the FRA, millers and other marketing channels. The level of education and experience of traders were the characteristics found to influence trader behaviour. This entails that private traders either behaved opportunistically or in principled ways, depending on their education level and their years of experience in the trading sector.

Less educated (those who attained primary level of education) and less experienced private traders were found to behave opportunistically, whereas those with higher levels of education and more trading experience were principled.

In addition to analysing whether private traders behaved opportunistically or in principled ways, together with the factors that shape and influence trader behaviour, the pricing, grading and weighing systems used by the traders were investigated. Private traders were found to determine the prices at which maize was bought, with farmers having little negotiating power. The prices paid were not uniform and varied among farmers. Private traders also determined the grade and did the weighing of maize upon purchase. Organisations responsible for setting institutions for determining grades and standards and for ensuring that scales are standardised and calibrated did not exist for the smallholder farmers' maize value chain. This non-existence of institutions entails that smallholder farmers are susceptible to being cheated and have a challenge in obtaining higher prices owing to increased opportunities for opportunistic behaviour.

This study also evaluated the relationship in terms of trust between smallholder farmers and private traders, and the results show that most of the farmers (68.5 %) were found not to trust the traders and they reported that scales used to weigh maize were manipulated by the traders. The prices paid by traders were low, which fuelled the farmers' mistrust of traders. However, a few farmers (14 %) trusted the traders and these were mostly those who had family members or friends as traders. These buyers were often the ones that they had been transacting with for long periods of time, leading to trust being built between the two parties. Of the traders surveyed, less than half (46 %) were found to trust the farmers. This is an indication that the levels of trust are low between traders and farmers. This is confirmed by the majority (68.5 %) of the farmers who did not trust the traders at all. Trust, therefore, can be seen to be lacking between private traders and smallholder farmers. Traders found the grading system not to be reliable, whereas the weighing system was viewed differently by farmers and traders. The traders were found to rely on the weighing system and the scales that they used. The farmers, on the other hand, did not, as they were of the view that the traders manipulated the weighing instruments (scales).

The use of contracts was minimal between smallholder farmers and private traders, and the major reason for this was that one party to the transaction would not trust that the other would honour their part of the agreement. Furthermore, credit provision for payments by traders was limited to only those few farmers that they have relationships with. Transactions between farmers and traders were mostly cash-based, with only a few deferred payment transactions being reported, but no cheque-based transactions were reported at all. The above indicates

that little or no trust exists between private traders and smallholder farmers, highlighting the poor relationships that exist between them.

5.3 Policy Implications and Recommendations

Private traders who behaved opportunistically have been found to be those with less experience. Those with more experience were found to behave in principled ways. The more-experienced traders had built relationships with the smallholder farmers over time, therefore they did not have an incentive to cheat, thus leading to their principled behaviour. Less-educated private traders were also found to behave opportunistically compared with more-educated ones. It is therefore recommended that monitoring of the maize trading to ensure that less-experienced and less-educated traders do not cheat would reduce opportunistic behaviour.

Based on the findings, it can be concluded that there are loopholes in the current institutions governing maize markets. This has a significant impact on the way a trader behaves and transacts with a farmer. The fact that there are loopholes is taken advantage of by traders to gain monopoly profits from farmers by behaving opportunistically. The grading system was found to be not reliable, as only physical inspections are done. This is subjective and does not reflect the standard grade or quality, as each trader would have their own quality measures. It is therefore recommended that an organisation responsible for developing and enforcing a grading system should be put in place so that there are standards against which every farmer and trader determines the grade. The grading system developed should have regulations stating what defective and discoloured maize is, as these regulations will be used by both parties to achieve uniformity. This organisation would be more effective if it is an independent party, controlled by neither the farmers nor the traders. Having organisations and institutions in place for more reliable grading and weighing systems among smallholder farmers and private traders has the potential to reduce the possibility for opportunistic behaviour.

There are conflicting views held by the farmers and the traders on the reliability of the weighting system. Farmers are of the view that the traders manipulate the scales, leading to them getting more maize than stated, whereas the traders refute these claims. The traders revealed that their scales are bought from trusted sources and they do not tamper with them at

all. It is therefore recommended that the government, through the Zambia Measures and Weights Agency (ZWMA), should conduct regular inspections of all the scales that are used to ensure that they are standardised and calibrated. This will go a long way in reducing possible exploitation and opportunistic behaviour and would furthermore increase the levels of trust between smallholder farmers and private traders.

The above recommendations are important as they will reduce the possibilities of opportunistic behaviour and exploitation of smallholder farmers. Due to the fact that this study is in line with Zambia's poverty reduction plan to reduce poverty levels through increased agricultural production and improved maize trading among smallholder farmers, the recommendations given will help improve maize trading and the livelihoods of smallholder farmers. This is because they will be able to sell their maize at higher prices, due to reduced opportunistic behaviour of private traders, thus realising greater profits. The development of a grading system will lead to a better trading environment for both smallholder farmers and private traders, as both parties will be certain of the maize quality. This is unlike a situation where a grading system does not exist and private traders are afraid that the smallholder farmers will mix the maize with that of bad quality, while smallholder farmers are afraid that the private traders will cheat them by stating that their maize is of a lower grade.

Therefore a trading environment where organisations and institutions are in place to enforce, monitor and ensure reliable grading and weighing systems, will help improve maize trading by smallholder farmers and private traders in Zambia. The improved maize trading will be the result of reduced opportunistic behaviour. This will ultimately increase the welfare of smallholder farmers and improve their livelihoods, which will contribute towards the reduction of the poverty levels in Zambia as a whole.

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APPENDIX A: TRADER PRICES AND GROSS MARKETING MARGINS

Market price (FRA price)	Farm-gate price (Trader price)	Gross marketing margin
1.4	1.2	14.29%
1.4	1.2	14.29%
1.4	1.2	14.29%
1.4	1.2	14.29%
1.4	1.15	17.86%
1.4	1.15	17.86%
1.4	1.15	17.86%
1.4	1.15	17.86%
1.4	1.15	17.86%
1.4	1.1	21.43%
1.4	1.1	21.43%
1.4	1.1	21.43%
1.4	1.1	21.43%
1.4	1.1	21.43%
1.4	1	28.57%
1.4	1	28.57%
1.4	1	28.57%
1.4	1	28.57%
1.4	1	28.57%
1.4	1	28.57%
1.4	1	28.57%
1.4	0.9	35.71%
1.4	0.9	35.71%
1.4	0.9	35.71%
1.4	0.85	39.29%
1.4	0.85	39.29%
1.4	0.85	39.29%
1.4	0.85	39.29%
1.4	0.85	39.29%
1.4	0.85	39.29%
1.4	0.8	42.86%
1.4	0.75	46.43%
1.4	0.75	46.43%
1.4	0.75	46.43%
1.4	0.75	46.43%
1.4	0.75	46.43%
1.4	0.75	46.43%
1.4	0.75	46.43%
1.4	0.75	46.43%
1.4	0.75	46.43%
1.4	0.74	47.14%

1.4	0.74	47.14%
1.4	0.72	48.57%
1.4	0.7	50.00%
1.4	0.6	57.14%
1.4	0.6	57.14%
1.4	0.6	57.14%
1.4	0.6	57.14%
1.4	0.6	57.14%
1.4	0.6	57.14%

APPENDIX B: FARMER QUESTIONNAIRE

Questionnaire No: _____

Date of Interview: _____

THE MAIZE MARKETING SYSTEM IN ZAMBIA: FARMER CHARACTERISTICS AND TRADER-FARMER RELATIONSHIPS

LEK 890 Dissertation (Sombo Makeche)

Department of Agricultural Economics, Extension and Rural Development

University of Pretoria

Dear Respondent,

You have been randomly selected as part of a sample to fill in this questionnaire on the topic stated above. You are kindly requested to answer this questionnaire as truthfully as possible. Be assured that the information you provide will be treated confidentially.

SECTION 1: FARMER CHARACTERISTICS

1.1 District name District Code **dist** **[ ]**

1.2 Farmer code **fam** **[ ]**

1.3 (a) When was the farmer born? _____/_____/_____ f**age** **[ ]**

(b) Gender of the farmer (0=Female; 1=Male) **Gender** **[ ]**

1.4 What is the education level of the farmer? _____ **fedu [ ]**

0. None 1.Lower primary 2.Upper primary 3.Junior secondary 4.Senior secondary 5. Tertiary

Household Composition								
	Under 5		**Children (6-17)**		**Adults (18-59)**		**Elderly (60+)**	
	M	**F**	**M**	**F**	**M**	**F**	**M**	**F**
1.5 No. of people living in homestead: **hhsz**								
1.6 No. of chronically ill **hhci**								

"living" is defined as someone who stays there at least for three months in a year) chronically ill is defined as, *sick and unable to work for a total of 3 months over the last 12 months*

1.5 What is the marital status of the farmer? _____ **fmsta [ ]**

1. Never married 2.Married 3.Divorced 4. Widowed 5.Separated

1.6 How long has the farmer been farming (years of experience)? ____ Years

exp [ ]

SECTION 2

2.1 What is your major source of information on maize prices? **PM01 [ ]**

1. Extension Agents 2. Farmer/neighbour 3. Radio Program 4. Pamphlet/Newspaper 5 .FRA 6. Field Day 7. ZNFU SMS 8. NGO 9. Other traders 10. Out growers 11. Retail/ wholesale shops 12. Headman 13. Television 14. Market place 15. Farmer group – cooperative 16. Other (specify)……

2.2 How many times did you receive information from the above source in the last 12 months? …… **PM02 [ ]**

2.3 ASSETS OWNED BY FARMERS

Does household possess any of the following physical assets? FAST01 (tick all that apply)	**Quantity Owned *(Skip this section if none)* FAST02**	**How much would you sell a unit for? (Estimated current value) FAST03**
1. ☐Cattle		
2. ☐Goats		
3. ☐Poultry		
4. ☐Pigs		
5. ☐Donkeys		
6. ☐sheep		
7. ☐Ox drawn ploughs		
8. ☐Ox carts		
9. ☐ Knapsack sprayers		
10. ☐ Motorbikes		
11. ☐Mobile phones		
12. ☐Bicycles		
13. ☐Radios		
14. ☐TV set		

2.3 What is the area of your farmland? ……. **AVC01** [ ]

2.4 What is the total area of maize cultivated? …… **ACV02 [ ]**

2.5 How much maize is harvested per hectare (tons)? ..... **AVC03 [ ]**

2.6 Does the household or any member of the household belong to any farming related group?

1= Yes 2= No (if No, go to table 2.5)

2.7 If Yes, What is the main purpose of the organisation? _____

2.8: Non-farm/ non-agricultural Income

Does household receive income from the following livelihood strategies? (tick all that apply)	**Approximate how much per year (ZMW)** – use the last 12 months period
1. ☐ Petty trading (Shop/ Kantemba)	
2. ☐ Remittances	
3. ☐ Non-agricultural part-time job	
4. ☐ Other non-farm business	
5. ☐ Piece work	
6. ☐ Sale of charcoal	
7. ☐ Other (Specify)	

2.9 Did you have access to credit? (If No, go to 2.13)

1. Yes 2. No

2.10 What were your sources of credit?

1. Family 2. Friend 3. Microfinance Institution 4. Bank 5. Credit Union 6. Trader

2.11 How much credit did you get?

……..

2.12 What did you use the credit for? [ ]

1. Food 2. Livestock 3. Inputs (Seed, Fertiliser) 4. Equipment 5. Other

2.13 What is the distance to the main satellite depot or district market/boma? [ ]

……

SECTION 3: FARMER PERCEPTIONS OF TRADERS

3.1 Do you think the price offered by the traders is good? **Ptrd1 [ ]**

1. Yes 2. No

3.2 Please explain your answer. **Ptrd2 [ ]**

_____

_____

_____

3.3 Who determines the price at which you sell the maize? **Ptrd3 [ ]**

1. Farmer 2.Trader 3.Government Institution

4. Other (Specify) ……

3.4 (a) Who determines the weight at which you sell the maize? **Wtrd1a [ ]**

1. Farmer 2.Trader 3.Government Institution

4. Other (Specify) ……

(b) Is the weighting system reliable? 1. Yes 2. No **Wtrd1b [ ]**

3.5 (a) Who determines the grade at which you sell the maize? **Gtrd1a [ ]**

1. Farmer 2.Trader 3.Government Institution 4. Grade not determined at all

(b) Is the grading that is done reliable? 1. Yes 2. No **Gtrd1b [ ]**

3.6 Do you have a contract with any of the traders? (1=yes; 2= no) **CT01 [ ]**

3.7 How long is the contract? _____ **CT02 [ ]**

3.8 Is the contract verbal or written? (1.Written 2.Verbal) **CT03 [ ]**

3.9 If a trader/ buyer does not pay you, do other farmers get to know about it?

1. Yes 2. No **TR01** [ ]

3.10 To what extent do you trust the people you sell maize to (traders)?

1. Not at all 2. Somewhat 3. A lot **TS01 [ ]**

4.8 Explain your answer **TS02 [ ]**

……

……

……

End of Questionnaire- Thank You!

APPENDIX C: TRADER QUESTIONNAIRE

Questionnaire No: _____

Date of Interview: _____

THE MAIZE MARKETING SYSTEM IN ZAMBIA: ANALYSIS OF TRADER BEHAVIOUR

LEK 890 Dissertation (Sombo Makeche)

Department of Agricultural Economics, Extension and Rural Development

University of Pretoria

Dear Respondent,

You have been randomly selected as part of a sample to fill in this questionnaire on the topic stated above. You are kindly requested to answer this questionnaire as truthfully as possible. Be assured that the information you provide will be treated confidentially.

SECTION 1: TRADER CHARACTERISTICS

1.4 District name District Code **dist** **[ ]**

1.5 Trader code **trd** **[ ]**

1.6 (a) When was the trader born? _____/_____/_____ **age** **[ ]**

(b) Sex of the trader **Sex [ ]** (0=Female; 1=Male)

1.4 What is the education level of the trader? _____ **tedu** **[ ]**

0. None 1.Lower primary 2.Upper primary 3.Junior secondary
4.Senior secondary 5. Tertiary

1.5 What is the marital status of the trader? _____ **mstat [ ]**

1. Never married 2.Married 3.Divorced 4. Widowed 5.Separated

1.6 How long has the trader been in the trading sector (years of experience)? _____ Years

exp [ ]

SECTION 2: TRADER MARKETING ASSETS/IMPLEMENTS

Please tell us about the type and number of assets in working condition owned by the household.

Table 2.1 Maize traders' assets

Type of Assets		Do you own.....? *1 = Yes* *2 = No –>* ***go to next asset***	How many.....do you have in working condition? ***(Enter 0 if none)*** **AST02**	How much would you sell it for? (Estimated current value) **AST03**
	ASSET	**AST01**		
Storage Shed	1			
House	2			
Pick up vehicle	3			
Truck	4			
Bicycle	5			
Wheelbarrow	6			
Shop	7			
Mobile phone	8			
Market stand	9			
Radio	10			
TV	11			
Weighing scale	12			
Car	13			
Farmland*	14			

*for farmland, put size in Hectares (ha) in AST02

SECTION 3: PRICING, GRADING AND WEIGHTING SYSTEMS

3.1 (a) What are your sources of information on maize prices? **P01 [ ]**

1. Extension Agents 2.Farmer/neighbour 3.Radio Program 4.Pamphlet/Newspaper
5 .FRA 6.Field Day 7.ZNFU SMS 8.NGO 9.Other traders 10 .Out growers
11.Retail/ wholesale hops 12.Headman 13. Television 14 .Market place
15. Farmer group – cooperative 16. Other (specify)……

(b) Is this information reliable? 1. Yes 2. No **P02 [ ]**

3.2 Who determines the price at which maize is bought? **P03 [ ]**

1. Farmer 2.Trader 3.Government Institution 4. Other (Specify) ……

3.3. Do you offer a uniform maize price to all farmers in the same village? Explain if NO_____ 1. Yes 2.No **P04 [ ]**

3.4 Do you ever hire workers to buy maize from farmers? **CM01 [ ]**

1. Yes 2.No→ go to 3.7

3.5 If yes to (3.4) above, how much/ what percentage of sale is given to them as commission? _____ **CM02 [ ]**

1. Less than 10 % 2.Between 10-20 % 3.Between 20-50 % 4. Over 50 %

3.6 (a) Who determines the grade at which maize is bought? **G01a [ ]**

1. Farmer 2.Trader 3.Government Institution 4. Grade not determined at all

(b) Is the grading that is done reliable? 1. Yes 2. No **G01b [ ]**

3.7 Does the grade affect the price of maize? **G02 [ ]**

1. Yes 2. No

3.8 What is the price of maize (ZMW/Kg) ? _____ **G03 [ ]**

3.9 What weighing instrument is used to weigh the maize? _____ **W01 [ ]**

1. Scale 2. Bucket 3. 4. Other (Specify)……..

3.10 (a) Who determines the weight of maize sold/ bought?

1. Farmer 2. Trader _____ W02a [ ]

(b) Is the grading system reliable? 1. Yes 2. No _____ W02b [ ]

3.11 Who usually owns the weighing scales? _____ **W03 [ ]**

1. Farmer 2.Trader 3.Government Institution 4. Other (Specify) …….

3.12 Are there any standard scales used to determine the weight? **W04 [ ]**

1. Yes 2. No

3.13 What is the volume of maize traded per season? _____ **vol 01 [ ]**

3.14 What is the major commodity traded? **MC01 [ ]**

1. Maize 2.Soyabeans 3.Sorghum 4.Rice 5. Other (Specify)……

3.15 Are there any other commodities traded? (1=yes; 2= no) **MC02 [ ]**

3.16 Is there any value added to the maize? (1=yes; 2= no) **VA01 [ ]**

3.17 What kind of value addition do you perform? **VA02 [ ]**

1. Repacking 2.Processing 3.Removing damaged grains 4. Other (Specify)

……

SECTION 4: MEMBERSHIP AND GOVERNANCE SYSTEMS

4.1 Are you a member of a traders' association? (1=yes; 2=no→*Section 7*) **M01 [ ]**

4.2 Do you have a contract with any of the farmers? (1=yes; 2= no) **C01 [ ]**

4.3 How long is the contract? _____ **C02 [ ]**

4.4 Is the contract verbal or written? (1.Written 2.Verbal) **C03 [ ]**

4.5 To what extent do you trust the people you procure maize from? **T01 [ ]**

1. Not at all 2.Somewhat 3.A lot

4.6 Do you buy maize on credit? (1=Yes; 2=No*)* **cred [ ]**

4.7 If a seller/ farmer gives you bad quality maize, do other traders get to know about it? **Pdef [ ]**

1Yes 2.No)

4.8 What is your main source of capital? **cap [ ]**

1. Other traders 2.Friends and family 3.Financial institution 4. Own capital

5. Other (Specify) ……..

SECTION 5: TRADER PERCEPTIONS OF THE TRADING ENVIRONMENT

Table 5.1 Constraints faced at different stages and solutions suggested

Stage	Do you face any constraints at any of the following stages? 1=Yes 2=No→*next row*	**Constraint**	**What can be done**	**By who**
	CN01	**CN02**	**CN03**	**CN04**
1=Procurement				
2=Transportation				
3=Storage				

5.2 How important do you consider the following when buying maize from farmers? (1.very important; 2.important; 3.not important)?

(a). Insect, pest, disease free **PCP01 [ ]**
(b). Variety **PCP02 [ ]**
(c). Minimal damage/breakage **PCP03 [ ]**
(d). Price **PCP04 [ ]**
(e). Colour **PCP05 [ ]**
(f). Grain size **PCP06 [ ]**
(g). Volume **PCP07 [ ]**

End of Questionnaire – Thank you!