Online First Articles

Determinants of market participation and marketing channels in smallholder groundnut farming: A case of Mudzi district, Zimbabwe

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This paper investigates the factors that are associated with market participation and choice of marketing channels by smallholder groundnut farmers in a semi-arid district of Zimbabwe. It contributes to the existing body of knowledge on groundnuts, especially the marketing aspect. Data was derived from a literature review and a cross-sectional household baseline survey. We applied simple logistic regression framework to determine the factors associated with market participation and choice of marketing channel. Our study findings show that land size, access to transport information, distance to the nearest town, age and education of the household head are among the important factors influencing the decision to participate or not to participate in selling of groundnuts. Choice of a particular marketing channel is influenced by distance to the nearest town, education level of the farmer, access to remittances, and market information. In conclusion, these findings suggest that an adjustment in each of these significant variables can influence the probability of market participation and an informed choice of marketing channels. In terms of policy, this implies that technological changes, infrastructural improvements, agricultural institutional developments, and capacity building of smallholder farmers can help to improve farmers’ market participation and informed market channel choice.

Keywords: capacity building, institutional development, marketing, smallholder farmers, technological change, Zimbabwe

Introduction

After staple cereals, legumes are the most important complementary food and income crops in smallholder farming systems. Legumes (e.g. groundnuts, soybeans, pigeon peas, cowpeas and beans) are relatively more drought-tolerant than cereals (e.g. maize, millet and wheat). They represent a good crop adaptation strategy against the effects of climate variability and change, particularly in semi-arid zones such as Mudzi district of Zimbabwe. Because of its high aridity, the district is not well suited to the cultivation of the country’s staple food crop, maize, and its maize yield is only about 0.5 tonnes/ha (GoZ 2012). Given their drought tolerance, groundnuts (Arachis hypogaea) are one of the most important crops for the district’s farmers. This high-value crop has significant potential to sustain production in smallholder farming systems, and plays multiple roles in terms of cash income, food, and soil fertility improvement in cereal–legume rotations. Since groundnuts might be produced at a lower opportunity cost than cereals, growing groundnuts might assist farmers in Mudzi in alleviating poverty. They could benefit from trade with areas where suitable agro-climatic conditions create a comparative advantage in cereal production (e.g. natural regions I, II and III) (Zamasiya et al. 2014).

However, better access to markets is needed if the production and sale of groundnuts, and hence higher incomes for farmers, are to be facilitated. With better market access, the production of and income from grain legume production could be improved significantly. Markets offer farming households the opportunity to benefit from trade, according to their comparative advantage, as they can sell their surpluses and purchase the goods and services they need (Boughton et al. 2007; Barret 2008).

Market linkages have been identified as key to the successful integration of legumes into the smallholder farming systems of southern Africa. Market participation could be an effective route for rural smallholder farmers to move out of abject poverty and increase their income (IFAD 2003; Omiti et al. 2009). Low market participation by smallholder farmers in developing countries has hampered agriculture-driven economic growth and exacerbated poverty, since farmers have not been able to benefit from the associated welfare gains and income growth. For agriculture to make a meaningful contribution to economic growth, smallholder farmers have to commercialize their farming activities to produce marketable surpluses (Pingali, Khwaja, and Meijer 2005). The question why smallholder farmers, who constitute the majority of the poor in developing countries, self-select out of the remunerative markets remains largely unanswered. It is therefore necessary to assess the key factors that influence their participation in groundnut markets in order to identify key entry points and interventions that might increase such participation and, hence, household income.

Groundnuts production in Zimbabwe

Groundnuts are an important legume crop in most parts of the world. In Malawi and Senegal, for example, they account for 25–60% of households’ agricultural income (Diop, Beighin, and Sewadeh 2003). The crop is also widely cultivated in Zimbabwe, mainly by women, and smallholder production is estimated to account for 60–65% of national groundnut output (Rukuni and Mutungamiri 2000). Groundnuts provide smallholder farmers a range of benefits. In addition, it fixes atmospheric nitrogen in soils and thus improves soil fertility and reduces the fertilizer needs of subsequent crops.
This is particularly important given the rising prices of inorganic fertilizers, which make them hard for farmers to afford. Groundnuts are also an important component of both rural and urban diets, providing valuable protein, edible oil, fats, energy, minerals and vitamins. They are usually consumed as is, roasted or processed into oil. In Zimbabwe, however, peanuts are not usually crushed into cooking oil but are mainly grown for direct consumption and for processing into peanut butter (Esterhuizen 2011). Doctors are also an important component of rural and urban diets, providing valuable protein, edible oil, fats, energy, minerals and vitamins. They are usually consumed as is, roasted or processed into oil. In Zimbabwe, however, peanuts are not usually crushed into cooking oil but are mainly grown for direct consumption and for processing into peanut butter (Esterhuizen 2011).

During the 23 years from 1990 to 2012, the production of groundnuts in Zimbabwe was irregular. Table 1 and Figure 1 below show the total land area harvested in hectares, total production in tonnes, and yields in hectograms per hectare (hg/ha) in this period.

In 1990, a total of 195,000 ha of groundnuts was harvested, producing 119,094 tonnes at average yields of 6107.38 hg/ha. The next year, even though the total area harvested increased from 195,000 ha to 200,000 ha, total production and the average yield declined to 107,040 tonnes and 5352 hg/ha respectively. In 1992, the land area harvested dropped by 50,000 ha and both production and the average yield fell sharply (by over 68% and 57%, respectively). Between the 1992/93 and the 1995/96 seasons, the trends were similarly unpredictable. In 1997, the total area harvested rose from 147,200 ha to 206,000 ha, while average yields rose sharply (from 5452 hg/ha to 7587 hg/ha), as did production (from 80,250 tonnes to 156,290 tonnes). The next year saw a slight (7.8%) fall in the area harvested, but an unexpectedly sharp fall in production (61.8%) and average yield (58.6%). The numbers resumed an upward trend until 2000, when yield reached 7120 hg/ha and total production peaked (for these 23 years) at 190,890 tonnes. The variability in production in the decade to 2000 was caused in part by the drought of the 1990s (Munro 2006), a poor choice of varieties, and the cobweb theory of decision-making at time of production. The cobweb theory is an economic theory that explains the reason why agricultural commodity prices may be subject to periodic fluctuations in markets. It describes cyclical supply and demand in markets where amount of produce must be chosen before prices are observed (Ezekiel 1938).

Subsequently, the area under groundnut cultivation increased to 260,000 ha in 2001, 258,000 ha in 2002, and 240,000 ha in 2003. However, production fell by over 10% in 2001 and by over 37% in 2002 (to 171,740 tonnes and 120,000 tonnes, respectively). Yield likewise fell to 6605 hg/ha in 2001 and 4650 hg/ha in 2002. The irregular trend continued until 2012, due in part to variable rainfall; low levels of technology; the post-2000 land resettlement programme, which increased the proportion of land under smallholder farming; the harsh macroeconomic environment, which paralysed the input and output markets; and possibly the cobweb theory of decision-making.

The absence of a production pattern for the 23 years under review is confirmed by a slightly upward linear trend line with a very poor goodness of fit ($R^2 = 0.45\%$). It is therefore impossible to judge whether groundnut production has been increasing or decreasing; the trend was simply irregular and characterized by large fluctuations. Studies suggest that this irregular trend was caused by low adoption rates of improved varieties, soil infertility, the continuous use of retained seed, and marketing problems (Esterhuizen 2011). Of interest to this paper is the limited market participation among smallholder groundnut producers, which affects their ability to increase their production and, hence, incomes.

**Groundnut marketing in Zimbabwe**

In the history of sub-Saharan African countries, the governments used to play a crucial role in assisting farmers with the marketing of agricultural produce. During the 1980s and 1990s, the majority of these countries liberalized their economies in an effort to create open market-led exchanges, aimed at boosting economic growth (Dorward et al. 2005). Whereas some countries have removed government controls, some countries still assist farmers in marketing through the use of Marketing Boards. Zimbabwe, amongst other countries, has reduced government control in agricultural markets. The main reason for Zimbabwe embarking on liberalization programmes was due to the general failure of parastatal marketing boards and donor pressure. Because of the liberalization of agricultural produce markets, smallholder farmers have been faced with a variety of possible marketing channels for their produce. In Zimbabwe, for example, farmers can sell their produce through the following channels: the Grain Marketing Board (GMB), at farm gate, through private traders, agro dealers in distant or local towns, or through other informal channels e.g. by the road side.

Although marketing is important, smallholder farmers still do not participate in markets, especially when faced with pressures from market liberalization. The questions of whether or not to participate in markets and which

| Year | Production (tonnes) | Yield (hg/ha) | Area harvested (ha) |
|------|--------------------|--------------|-------------------|
| 1990 | 119,094            | 6107.38      | 195,000           |
| 1991 | 107,040            | 5352.00      | 200,000           |
| 1992 | 34,032             | 2268.80      | 150,000           |
| 1993 | 66,795             | 5874.67      | 113,700           |
| 1994 | 66,361             | 4945.52      | 134,184           |
| 1995 | 52,300             | 3198.78      | 163,500           |
| 1996 | 80,250             | 5451.77      | 147,200           |
| 1997 | 156,290            | 7586.89      | 206,000           |
| 1998 | 59,700             | 3142.11      | 190,000           |
| 1999 | 113,250            | 5067.11      | 223,500           |
| 2000 | 190,890            | 7120.10      | 268,100           |
| 2001 | 171,740            | 6605.38      | 260,000           |
| 2002 | 120,000            | 4649.92      | 258,069           |
| 2003 | 146,727            | 6113.63      | 240,000           |
| 2004 | 64,157             | 4811.57      | 133,339           |
| 2005 | 57,754             | 2879.18      | 200,592           |
| 2006 | 83,170             | 4720.31      | 176,196           |
| 2007 | 125,000            | 4543.80      | 275,100           |
| 2008 | 80,000             | 4444.44      | 180,000           |
| 2009 | 78,570             | 4621.96      | 176,196           |
| 2010 | 106,147            | 4143.02      | 256,207           |
| 2011 | 85,700             | 4285.00      | 200,000           |
| 2012 | 92,850             | 4220.45      | 220,000           |

Source: FAO (2012)
marketing channel or channels to follow are an important part of smallholder farmers’ decision-making processes. Decisions on market participation have implications for smallholders’ returns and the livelihood security of their households. Therefore, this research theme warrants further study. Studying factors that influence market participation behaviour can be a positive move in trying to answer the hanging questions such as whether to participate in markets, and which marketing channel or channels to follow.

According to IFAD (2003) and Omiti et al. (2009), market participation can be an effective route for rural smallholder farmers to move out of abject poverty and increase income. Studies show that market participation by smallholder farmers in developing countries is very low, a development which has slowed down agriculture-driven economic growth and exacerbated poverty levels. Moreover, choice of an appropriate marketing channel is considered one of the key ingredients for the successful marketing of both agricultural and non-agricultural products, as different channels are characterized by different benefits (profitability) and costs. According to Tsourgiannis, Errington, and Eddison (2008), the marketing channel used when selling the product has a bearing on the profit farmers may make. Therefore, marketing channel choice decisions are very important, especially in a liberalized market economy like Zimbabwe where sellers can choose from a range of market channels.

Understanding factors that influence smallholder farmers’ choice of a marketing channel for their produce is of paramount importance, as findings can be useful in helping smallholder farmers to reap maximum benefits from the markets. In addition, such studies are even more vital in legumes because the legume sub-sector (groundnut, soybean, cowpea, and beans) has high potential to help diversify the economy, eliminate nutrition problems, improve food security status and, therefore, alleviate poverty in rural communities (Pokhrel 2013; Zamasiya et al. 2014).

According to Barker (1981), marketing management should be of the utmost importance to the individual farmer. If the aim is to make a profit from transactions, marketing considerations should be included in all decision-making processes; from short-term storage versus immediate sale considerations, through to long-term planning of the structure of farming enterprises (Barker 1981).

Smallholder farmers often face difficulties in both input and output markets. They usually face difficulties in enforcing contracts and meeting stringent food safety norms. They lack professional marketing skills, and some are located in remote areas and mostly rely on middlemen (Barret 2008). Furthermore, they frequently have to deal with poor physical infrastructures and weak institutions in markets (Kherallah and Kirsten 2001; Makhura 2001). Understanding such challenges for the production and

![Figure 1: Groundnut production trends in Zimbabwe, 1990–2012.](Image)
The sales process of smallholder farmers is important in identifying areas that need focus and direction for improvement. In the light of these challenges, suggestions can be made on how to improve smallholder farmers’ participation in output markets. Marketing literature argues that aiming to increase market participation through trade and price-based market interventions is not enough to provide the necessary conditions to induce improved participation. In addition to these policies, households need to have access to productive assets, adequate private and public investment, and institutional and physical infrastructure to access remunerative markets. As such, smallholder farmers with access to productive assets, private and public sector goods, properly functioning institutions and well-developed physical infrastructure tend to actively participate in markets, contrary to their counterparts.

The main objective of this study is to identify and assess those factors (technical, socioeconomic and institutional) influencing agricultural market participation behaviour and choice of marketing channels amongst smallholder groundnut farmers in the Mudzi district of Zimbabwe. The study focuses on the factors that compel smallholder farmers to make certain marketing decisions. Thus, it considers factors that guide farmers in deciding whether or not to sell produce, and also focuses on those factors that influence the choice of marketing channels when selling groundnuts.

The rest of the article is arranged as follows. The next section deals with the research methodology which includes the description of the study area, sampling and data collection, and econometric model and data analysis. This is followed by the results and discussion in the section thereafter. The final section then presents the conclusions and policy implications of the study findings.

**Research methodology**

**The study area**

The study was conducted in Mudzi district, which is in Mashonaland East Province of Zimbabwe (see Figure 2). The district is linked to the main groundnuts market (Harare) by a 250 kilometre tarred road. The study sites lie in natural farming zone IV, which is a semi-arid zone at an altitude of 500–900 metres above sea level. This natural farming region is an agro-ecologically low potential zone with high incidence of droughts and frequent long mid- and in-season dry spells. The mean annual rainfall in Mudzi district ranges from 450–500 mm while the mean annual temperature is 23°C. The predominant soil type is the Ferric Luvisols, which is ideal for groundnuts. Due to the high aridity, maize (the country’s staple food crop) yield in Mudzi district is about 0.5 tonnes/ha which is better than the national average of 0.45 tonnes/ha (GoZ 2012). Groundnut (*Arachis hypogea*) is one the most important legume crops grown in the area and the bulk of the population depends heavily on it for survival.

**Sampling and data collection**

This study uses cross-sectional household data from a baseline survey that was conducted through structured interviews under the auspices of the ‘Increasing smallholder farm productivity, income, and health through widespread adoption of Integrated Soil Fertility Management (ISFM) in the Great Lake Regions and Southern Africa’ project, and data from the ‘Putting Nitrogen to work for smallholder farmers in Africa’ project. Simple random sampling was used to select the wards from a list of wards obtained from Mudzi district, while the households for interviewing were selected from lists that were provided by resident agricultural extension officers. A total of 120 households were selected for in-depth interviews. Data collection for this study was done in December 2011 through face-to-face administration of questionnaires.

The data collection involved a household survey that was conducted by using a questionnaire with semi-structured and structured questions. Two focus group discussions were conducted separately with smallholder groundnuts farmers who sold their groundnuts and those who did not sell them, in order to establish the factors that affect their market participation. We support findings

![Figure 2: Map of Zimbabwe showing Mudzi district (Mango et al. 2014).](image-url)
from our regression with notes from the focus group discussions. Through the survey, information was collected on household demographics and socioeconomic characteristics, transaction costs, groundnut production and marketing, problems encountered with buyers, and household asset ownership.

**Econometric modelling and data analysis**

**Conceptual framework**

We developed a simple model of market participation for groundnut farmers in Mudzi district of Zimbabwe. Apart from growing groundnuts, each farmer studied also grows other crops for both consumption and sales. However, in this paper, we placed our focus on the production and sale of groundnuts. Each farmer is considered a utility maximizer, that is, he or she derives some utility from either selling or not selling crops. We think of the decision-making process as taking place in two stages. At the first stage, the farmers decide whether to sell or not sell their groundnuts. If they decide not to sell, we assume that there is some utility associated with holding on to their groundnuts, i.e. they may either consume their groundnuts, or give them to their relatives as a gift, or use them as seed for the next season. Without loss of generality, we normalized this utility associated with not selling to zero. In the second stage, conditional on deciding to sell, the farmer chooses the type of market to sell to. They either choose to sell at the farm gate, or local village roadside market, or local town or a combination of the markets mentioned. We summarize this decision-making process in Figure 3:

**Econometric model**

We modelled the decision to sell groundnuts and the choice of market in a simple logistic regression and report the odds ratios. Our empirical specification takes the following form:

\[ S^*_i = \beta X_i + \epsilon_i \]  

where \( S^*_i \) is the unobserved probability that the farmer either sells or does not sell his or her groundnuts. If the farmer decides to sell the groundnuts, \( S^*_i \) also measures the propensity or likelihood of selling either at the farm gate, local village roadside market or nearby town (local town). The vector \( X_i \) controls for the household and farmer-related characteristics and \( \epsilon_i \) is an error term that follows a logistic distribution. The farmer sells whenever \( S^*_i > 0 \). Since \( S^*_i \) is not observable, the data we use asks the farmers whether they sold or did not sell their produce, as well as to which market they chose to sell. The farmers sampled were asked a specific question on market participation, to which they could answer whether they sold their groundnuts or not with ‘yes’ or ‘no’. We constructed an indicator variable to represent this decision:

\[ S_i = \begin{cases} 1 & \text{enters market} \\ 0 & \text{otherwise} \end{cases} \]  

Additionally, the farmers were asked where they had decided to sell their groundnuts with the following possible responses; farm gate, local village roadside market and local town. We also constructed individual indicator variables to represent these choices as formalized below:

\[ S_{ji} = \begin{cases} 1, & \text{if farmer sold to the market } j \\ 0, & \text{otherwise} \end{cases} \]  

where \( i = 1, \ldots, 120 \) farmers, and market choices are represented by \( j = \{ \text{farm gate, local town or local market} \} \). One of the reasons why farmers might decide to sell to either the local town or local village roadside market or at the farm gate might be the distance to that particular market, the quality of their product (whether graded or ungraded, clean or sorted), the prevailing market prices per kg, and the availability of customers, among others. We treat the three available markets as independent. This we did because farmers could sell produce to more than one marketing channel in the same season. It, therefore, suggests that certain factors could influence the farmer’s decision to sell to each of the markets without necessarily making reference to other markets available. This study was therefore interested in identifying such factors. For example, what in fluences the farmer to sell groundnuts at the farm gate, in the local town or the local roadside market without necessarily making other available markets as reference points? In other words, our aim was to estimate the individual probability for each category (marketing channel). We therefore adopted separate logit models to explain this phenomenon. An alternative technique could have been adopting the multinomial

![Figure 3: Farmers’ decision-making process.](image-url)
logit model, but according to Agresti (2007) if the objective is to find individual probabilities for each category (marketing channels) using individual binary logit models is justified.

We ran four different logit specifications. The first specification models the decision to sell groundnuts with age, agess, male, hsize, landsize, markinfo, remit, d2town, transpinfo, hybmaize, educ, and ownstorage as explanatory variables (see Table 2 for a description of these variables). In model 2, 3 and 4 we made an attempt to determine the factors associated with selling at the farm gate, local village roadside market or local town, respectively. Different combinations of the explanatory variables were utilized to determine the factors associated with the choice of the market. We further made use of the Variance Inflation Factor (VIF) command in STATA to detect possible multi-collinearity (correlation between predictors) problems in our logistic regressions. We found no to minimal collinearity, as the variance inflation factors ranged between 1 and 4.

Results and discussion
Socioeconomic attributes of the sample
Table 2 displays the general socioeconomic characteristics of the sampled population. Statistics show that about 46% of the sampled groundnut producers participated in the groundnut market at the time of the survey. Three main channels were reported to be used as destinations for groundnut output for those who participated in the market at the time of the survey: farm gate, local village roadside market and local town (Kotwa or Mutoko). In terms of marketing opportunities information, survey results show that only 34% of the sampled groundnut producers had access to marketing opportunities information. Access to transport information was very low as well with only 26% of the groundnut producers noted to have access at the time of the survey. Another important observation was that most of the groundnut producers had access to storage facilities. About 92% of the groundnut producers either rented or owned a grain storage facility at the time of the survey.

Generally, the sample was composed of middle-aged farmers with an average age of 52.2 years. In terms of education, about 86% of the groundnut producers had attained at least primary level education at the time of the survey. Important to note as well is that the sample was dominated by male household heads who have an influence on decision-making concerning groundnut production and marketing. Furthermore, survey results show that on average each household had about six family members at the time of the survey.

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Generally landholding per household was very low in the area. On average, each household owned 2.98 acres (1.2 hectares) of land. Apart from growing groundnuts, most farmers also grew hybrid maize, though maize yields were reported to be dismally low (below 0.5 tonnes/ha). contrary to the yield reported by the government (GoZ 2012) as 0.5tonnes/ha. In terms of off-farm income sources, some groundnut farmers in Mudzi (40%) were reported to have access to remittances. Another important observation was that on average, farmers travelled 133 km to reach the nearest town. More information on the statistics means, standard deviations, minimum and maximum is shown in Table 2.

| Variable | Variable definition | Mean | Std dev | Min | Max |
|----------|---------------------|------|---------|-----|-----|
| sellgnut | Indicator variable: market participation; 1 = sell, 0 = otherwise | 0.46 | 0.50 | 0 | 1 |
| fgate    | Indicator variable: sold groundnuts at the farm gate | 0.23 | 0.42 | 0 | 1 |
| lmarket | Indicator variable: sold groundnuts at local village roadside market | 0.06 | 0.23 | 0 | 1 |
| ltown    | Indicator variable: sold groundnuts in local town | 0.17 | 0.37 | 0 | 1 |
| age      | Age of household head | 52.23 | 14.94 | 23 | 99 |
| agesq    | Age squared | 2950.77 | 1676.29 | 529 | 9801 |
| male     | Indicator variable for male farmer | 0.78 | 0.42 | 0 | 1 |
| hsize    | Household size | 5.91 | 2.42 | 1 | 17 |
| landsize | Total land size | 2.98 | 2.10 | 0 | 13 |
| markinfo | Indicator variable: market opportunities information access | 0.34 | 0.47 | 0 | 1 |
| remitt   | Indicator variable: farmer receives remittances | 0.40 | 0.49 | 0 | 1 |
| d2town   | Distance to nearest town | 133.21 | 103.75 | 3 | 290 |
| transpinfo | Indicator variable: availability of transport information | 0.26 | 0.44 | 0 | 1 |
| hybmaize | Indicator variable: grew hybrid maize during 2010/11 season | 0.94 | 0.23 | 0 | 1 |
| educ     | Household head education: 0 = none;1 = primary;2 = secondary or higher | 1.32 | 0.71 | 0 | 2 |
| ownstorage | Indicator variable: farmer owns or rents groundnut storage facility | 0.92 | 0.28 | 0 | 1 |
| numtons  | Amount of groundnuts kept for consumption | 267.75 | 368.49 | 0 | 1800 |

Market participation and marketing channel choice
Table 3 presents logit regression results on groundnut marketing decisions by smallholder groundnut producers in the Mudzi district of Zimbabwe. As previously stated, Model I, Model II, Model III, and Model IV are four separate logistic regression models for groundnut market participation (sell or not sell), sell at farm gate, sell at local village roadside market or sell in local town, respectively. Models II, III, and IV present results on factors influencing choice of the available marketing channels (farm gate, local village roadside market and local town).

We report and discuss model results in detail in the subsections that follow. Market participation and marketing channel choice results are interpreted and discussed in separate sections. Reported in the four (4) logistic regressions are odds ratios, as our main thrust was to reveal chances of households making those decisions. Odds ratios estimate the changes in odds of membership...
in the target group for a single unit increase in the predictor.

Market participation

Results in Table 3 show that for the logistic model (I), transport information access, education, age, land size and distance to town were significant in influencing groundnut market participation. The odds of participating in the groundnut market for farmers who had access to transport information were 5.7 times the odds of those without transport information access. The result was significant at the 1% level of confidence. This is probably due to the fact that transport information has a huge bearing on marketing in general. Households with access to transport information are more likely to secure means of delivering their produce in time to markets of their choice as compared to farmers without access to transport information. According to Barret (2008), access to such information reduces smallholder farmers risk perceptions and improves the likelihood of participating in the groundnut market.

The odds of participating in the groundnut market for farmers who had attained either primary or secondary school level were approximately three times as high as the odds of farmers who had not attained either of the two educational levels. The result was significant at the 10% level of confidence. This can be explained by the fact that formal education enhances managerial competence and the successful implementation of improved production, processing and marketing practices. Furthermore, a higher level of education has an implication for the ability to understand and interpret extension information. Thus, education levels affect the interpretation of market information and, hence, the market participation level of farmers (Jari 2009). These results are consistent with the findings of Jari (2009) on institutional and technical factors influencing agricultural marketing channel choices amongst smallholder and emerging farmers in the Kat River valley.

In terms of age, a one-year increase in age of the household head is associated with a 27% increase in the odds of participating in the groundnut market. The result was significant at the 5% level of confidence. Age of the household head has been shown to be synonymous with farming experience in some studies (Matungul, Lyne, and Ortmann 2001). This observation could imply that older farmers, due to numerous years of experience gained in groundnut farming, are more likely to realize the benefits of participating in markets than young, inexperienced farmers. Moreover, the results show that as farmers grow older, their physical energy declines. Hence, they take their produce to the market to compensate for their inability to produce other crops, and, consequently, they tend to have a better income. However, these results are in contradiction with the findings of Randela, Alemu, and Groenewald (2008) who, in general,

| Independent variables | Model I (market participation) | Model II (sell at farm gate) | Model III (sell at local village roadside market) | Model IV (sell at local town) |
|------------------------|--------------------------------|-----------------------------|-----------------------------------------------|-------------------------------|
| age                    | 1.265** (0.09)                 | 0.937 (0.12)                | 1.124 (0.21)                                | 1.156 (0.14)                 |
| agesq                  | 0.998** (0.00)                 | 1.000 (0.00)                | 0.999 (0.00)                                | 0.999 (0.00)                 |
| male                   | 0.725 (0.24)                   | 2.853 (2.02)                | 0.229 (0.19)                                |                              |
| hsize                  | 1.104 (0.07)                   | 0.821* (0.08)               | 0.817 (0.15)                                | 1.395*** (0.13)              |
| landsize               | 1.445*** (0.12)                | 0.840 (0.08)                | 0.717 (0.13)                                | 1.256** (0.11)               |
| markinfo               | 1.039 (0.39)                   | 2.122 (1.34)                | 0.0583** (0.06)                             | 1.195 (0.71)                 |
| remitt                 | 0.580 (0.18)                   | 8.604*** (4.74)             | 0.194 (0.17)                                | 0.401 (0.19)                 |
| d2town                 | 0.995** (0.00)                 | 1.007** (0.00)              | 0.987** (0.00)                              | 0.995** (0.00)               |
| transpinfo             | 5.690*** (2.55)                | 0.209* (0.14)               | 5.856 (5.68)                                | 1.257 (0.80)                 |
| hybmaize               | 0.761 (0.41)                   | 0.352 (0.33)                |                                              |                              |
| _Ieduc_1               | 3.082* (1.50)                  | 0.286 (0.26)                |                                              |                              |
| _Ieduc_2               | 2.998* (1.66)                  | 0.0410** (0.05)             |                                              |                              |
| ownstorage             | 1.341 (0.70)                   |                             |                                              |                              |
| gnutcons               |                                 |                             | 0.999* (0.00)                               |                              |

Notes: Exponentiated coefficients; Standard errors in parentheses

*p < 0.05.

**p < 0.01.

***p < 0.001.
concluded that older farmers tend to be more subsistent and regard farming as a way of life rather than as a business. Consequently, they face low market participation.

Land size also significantly influenced farmers’ decision to participate in the groundnut market. A one-acre increase in land size of the household is associated with a 45% increase in the odds of participating in the groundnut market. The result was significant at the 1% level of confidence. A possible explanation is that the larger the size of arable land a household uses, the higher the production levels are likely to be, and the higher the probability of market participation. These results are consistent with the findings of Randela, Alemu, and Groenewald (2008) on factors enhancing market participation by small-scale cotton farmers who also found land to be a significant factor in market participation decisions.

Distance to the nearest town also had a significant influence on market participation. An increase in the distance to the nearest town by one kilometre is associated with a 0.5% decrease in the chances of farmers participating in the groundnut market. The result was significant at the 5% level of confidence. This is probably due to the fact that an increase in the distance travelled to the market increases marketing transaction costs. As a result, farmers are discouraged from participating in distant markets. Although prices for shelled and unshelled groundnuts are higher in Harare (distant market) compared to Mudzi, the high transport and marketing costs make it unattractive to sell in distant markets. These results are consistent with the findings of Alene et al. (2008) and Omiti et al. (2009) who also argued the same with regards to the effects of increased transaction costs associated with more distance travelled to access produce markets.

**Choice of marketing channel**

**Selling at farm gate:** Logit model (II) results shown in Table 3 demonstrate that access to remittances, education level attained by head of household, distance to nearest town, household size, transport information access, and quantity of groundnuts kept for consumption bear a significant influence on farmers’ decision to sell at farm gate.

Conditional on selling groundnuts, results confirm that the odds of selling at farm gate are 8.6 times higher for households that receive remittances as compared to those who do not. The result was found to be significant at the 1% level of confidence. This could imply that households who receive remittances are less motivated to bring their produce to distant markets so that they earn more, since they have remittances as an additional source of income and direct cash.

Given that the groundnut farmer sells his or her crop, results reveal that the odds of a groundnut farmer selling produce at farm gate are about five times less likely if he or she has access to transport information, as compared to a scenario where the farmer has no access to transport information. The result was significant at the 10% confidence level. This could imply that farmers without transport information face challenges in finding ways of delivering their produce to distant markets. As a result, they are forced to, or it becomes convenient for them to sell their produce at farm gate. Moreover, access to market information reduces the farmer’s transaction costs. This encourages participation in distant markets at the same time as it discourages selling at farm gate.

Results also show that conditional on selling groundnuts, the odds of selling groundnut produce at farm gate for farmers with at least secondary education are approximately 24 times less likely as compared to those farmers with a lower level of education. The result was found to be significant at the 5% confidence level. People with higher educational levels are more able to interpret information than those who have less education or no education at all (Mather, and Adelzadeh 1998). Thus, education levels affect marketing channel choice, and, hence, marketing channel choice by farmers. Highly educated farmers seem to realize that selling to more lucrative markets results in higher profits, and therefore tend to rely on distant (more lucrative) markets than the less educated, *ceteris paribus*.

Furthermore, results reveal that conditional on selling groundnuts, an increase in distance by one kilometre to the nearest town increases the odds of selling groundnut produce at farm gate by about 0.7%. Result to be significant at the 5% confidence level. This could be explained by the fact that an increase in distance travelled to the nearest town raises marketing costs incurred by the farmer. This could discourage the farmer from selling produce in distant markets, and therefore he or she opts to sell at farm gate. These results are consistent with findings of Dorward et al. (2003) who also argued for transactions costs associated with distance to markets as important covariates of marketing decisions.

Household size also significantly influenced farmers’ choice to sell at farm gate. Results reveal that an increase in household size by one member decreases the odds of selling at farm gate by 18%. The result was found to be significant at the 10% confidence level. Household size has an influence on marketing, since it affects consumption and production patterns (Randela 2005). A larger household size discourages selling because the household needs to supply household consumption first. Alternatively, this could be explained by the fact that as household size increases, more profitable options by the household head should be explored to sustain the added family responsibility. As a result, farmers tend to search for more profitable output markets than selling at the farm gate, so as to increase earnings from the sale of groundnut.

The amount of groundnut kept for consumption was found to influence decision to sell at farm gate as well. Logit regression results reveal that a kilogram increase in the amount of groundnut kept for consumption by the household decreases the odds of selling output at farm gate by 0.1%, *ceteris paribus*. This implies that as the amount of groundnut produce kept for the household own consumption increases, less produce is left for sale and the household is discouraged from selling surplus at farm gate. Results comply with findings of Sunga (2011), who found that farmers left with small quantities of produce have little opportunity to sell, and are more
likely to sell to other households within village than to private traders.

Selling at local village roadside market: Model (III) results reveal that the decision to sell to local village roadside markets was influenced by market information access and distance to the nearest town.

Conditional on selling, results reveal that for farmers with access to market information the odds of selling groundnut produce at local village roadside markets (‘musika1’) are 17 times lower than for farmers without access to market information. The result was found to be significant at the 5% confidence level. This could imply that well informed farmers tend to rely less on local village roadside markets as they know they can benefit from more lucrative markets. With market information farmers can weigh the pros and cons of the available market options, and as result make well informed choices on which markets they rely on. These results are consistent with findings by Jari (2009) in his study on the analysis of institutional and technical factors influencing agricultural marketing amongst smallholder farmers in the Kat River Valley, Eastern Cape Province, South Africa.

Given that the farmer sells his or her groundnuts, results also reveal that a kilometre increase in distance to the nearest town decreases the odds of selling groundnut produce at local village roadside markets by 1.3%. The result was significant at the 5% confidence level. This result could imply that farmers sold their produce at distant markets e.g. at the local town market maybe in search for better marketing margins or at farm gate to reduce cost associated with transporting their produce to the available roadside markets relative to selling at farm gate.

Selling at local town: Model (IV) results, as shown in Table 3, reveal that the decision of farmers to sell their groundnut output in the nearest town was conditioned by household size, land size and distance to the nearest town.

Logit regression results show that an increase in the household size by one member raises the odds of selling groundnut produce to the nearest town by 40%. A possible explanation is that with the household head facing increased responsibility, he or she is more likely to search for competitive prices for his/her groundnut produce in nearby towns, so as to meet the demands of his/her growing family. In other words, this implies that an increase in the size of the household and the consequential need to feed more mouths enhances farmers’ dedication to marketing their produce for higher profits. Hence, the farmers strive to fetch competitive prices in distant markets. Alternatively, the result could imply the importance of family labour in promoting selling at distant lucrative markets. Labour availability is also an important and necessary variable that influences farming decisions including marketing (Wollni and Zeller 2007).

The results also show that an increase in land size by one acre increases the odds of selling groundnut output in nearby towns by 26%. The more arable land the household has, the higher the production levels are likely to be, which tends to lead to a higher probability of participating in distant markets. With an increase in land size, considering the suitability of the groundnut in drier areas as compared to other crops, farmers might devote more land to groundnut production, leading to a higher produce. More surpluses in groundnut output encourage farmers to sell their produce in more competitive markets, so that they earn more. Considering the increase in production costs with large area grown to groundnuts, farmers will tend to approach competitive markets in order to get higher returns that will cover their production costs. These results are consistent with findings of Machethe, Jagwe, and Ouma (2008). The major conclusion in their paper was that larger land sizes raise the probability of market participation for sellers, since land is a critical production asset having a direct bearing on production of a marketable surplus, ceteris paribus. This implies that those farmers with large tracts of land are more likely to participate in markets, especially in larger ones.

Finally, an increase in distance to the nearest town by one kilometre was found to decrease the odds of selling groundnut output to the nearby town by 0.5%. The result was significant at the 5% confidence level. In general, farmers are discouraged to go to distant markets due to an increase in marketing costs associated with increased travelling distance. For farmers in very remote rural areas, e.g. in Mudzi, geographic isolation through distance creates a wedge between the farm gate and market prices. This discourages farmers to participate in distant markets. These results are consistent with findings by Gebremedhin and Jaleta (2010) who also found distance to be an important determinant of farming households’ marketing decisions.

Conclusion and policy implications

In this paper, we have attempted to identify factors influencing groundnut marketing decisions amongst smallholder farmers in the Mudzi district of Zimbabwe. The paper gave an overview of identified factors that influence groundnut market participation (sell or not sell), and factors that influence marketing channel choice. Only 45.8% of those smallholder farmers that cultivated groundnuts sold part of their harvest. We found that for those that sold their groundnut produce mainly three channels were used: the farm gate (50.9%), local village roadside markets (36.4%), and markets in nearby towns (12.7%).

The econometric analysis suggests that statistically significant variables influencing market participation are land size, transport information access, distance to nearest town, age of household head, and level of education of household head. Age of household head, land size, transport information access, and level of education of household head were found to have a positive influence on the likelihood of households participating in the groundnut market, whilst distance to the nearest town had a negative influence on the likelihood of households participating in the groundnut market.

Conditional on selling groundnuts, factors influencing marketing channel (farm gate, local village roadside market or local town) choice were found to be as follows:

Household size, access to remittances, distance to nearest town, access to transport information, education
level of household head, and amount of groundnut kept for household consumption were found to influence the farmer’s decision to sell his/her groundnut produce at farm gate. Household size, access to transport information, level of education of household head, and amount of groundnut kept for household consumption were found to have a negative influence on the likelihood of farmers opting to sell at farm gate, whilst access to remittances and distance to nearest town were found to have a positive influence on the probability that farmers sell groundnut produce at farm gate.

Factors influencing the likelihood of smallholder farmers selling their produce in local village roadside markets, e.g. village markets, were found to be access to market information and distance to nearest town. Both factors were found to have a negative influence. Household size and land size were found to have a significant positive influence on the likelihood of the farmer selling his/her groundnut output in the nearest town. However, distance to town had a negative influence.

These findings suggest that an adjustment in each of the significant variables can influence the probability of market participation and an informed choice of market. That is to say, deliberate focusing or targeting by agricultural development practitioners of strategies that directly improves the noted variables will improve marketing decisions amongst groundnut producers in Mudzi. Improving market linkages of the farmers, groundnut market upgrading, access to information (transport, extension and market), amongst other things could help in improving marketing decisions in groundnut farming.

Considering that smallholder farmers generally cannot individually compete on the market with commercial farmers, and that it is difficult for them to get individual contractual agreements because of their small marketable surpluses, beneficial institutional improvements in the form of cooperatives or marketing groups could be implemented. We would recommend farmers, possibly with the help of local extension personnel, to form marketing groups based on trust and commitment in order for them to compete on the market with commercial groundnut producers. Through farmer marketing groups, social capital is likely to be widened and farmers will be linked to other market chain actors. This development will raise market participation and stimulate farmers to make informed choices on marketing their output.

In terms of policy, we recommend that the Zimbabwean government should support smallholder groundnut producers as well, mainly through technical innovations. In addition, improvement in public investment facilities could lead to improved roads, transport systems, and telecommunication systems that would eventually lead to better access to lucrative market places.

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Note
1. ‘Musika’ is the Shona word for local village markets

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