University of Malawi
Chancellor College

DEPARTMENT OF ECONOMICS

Working Paper No. 2009/03

Determinants of Marketing Channels among Smallholder Maize Farmers in Malawi

Ephraim W. Chirwa

February 2009

Department of Economics
University of Malawi
Chancellor College
PO Box 280
Zomba
Malawi

Tel: +265 (0) 1 524 222 / 1 525 021 (D)
Tel: +265 (0) 1 524 256
Fax: +265 (0) 1 525 021
Email: economics@chanco.unima.mw
Web: http://www.economics.chanco.mw

University of Malawi
Chancellor College

DEPARTMENT OF ECONOMICS

Working Paper No. 2009/03

Determinants of Marketing Channels among Smallholder Maize Farmers in Malawi

Ephraim W. Chirwa

February 2009

Determinants of Marketing Channels among Smallholder Maize Farmers in Malawi *

Ephraim W. Chirwa †
University of Malawi - Chancellor College

Abstract: Following the liberalisation of agricultural markets in 1987, smallholder farmers have alternative market channels for selling their agricultural produce, including maize. These market channels include the state marketing agency, private traders, relatives or neighbours, local markets, associations, cooperatives and private companies. The market channels are offering different prices and sales services, which determine farmers' choice of the channel for marketing their produce. This paper investigates the factors that explain the choice of marketing channel (private traders, local markets or neighbours) for maize among smallholder farmers in rural Malawi using a multinomial logit model. The results show that education, repeated dealing, distance to day markets are positively associated with the choice of private traders while distance to the tarmac road and distance to the post office provide disincentives to the choice of private traders. The results underscore the importance of developing trust and reputation and investment in infrastructure in order to support agricultural marketing liberalisation policies in low income economies.

1. Introduction

Within the framework of structural adjustment programs, many developing countries have sought to liberalize the marketing of agricultural produce or inputs. Proponents of liberalisation of agricultural markets hold the view that state marketing agencies tend to cripple the operation of the market mechanism by restricting competition resulting in inefficiency of state marketing agencies and unrealistic prices to producers. The solution to installing the market incentive system has therefore been the liberalization of agricultural

* The author wishes to acknowledge the financial assistance provided by the World Bank. The views expressed in the study are those of the authors, and the usual disclaimer applies.
† Professor of Economics, Department of Economics, University of Malawi, Chancellor College, PO Box 280, Zomba. Email: echirwa@yahoo.com.

markets ranging from liberalization of marketing services to privatization of state marketing agencies. Others such as Kydd and Dorward (2001), have been more cautious, arguing that liberalising agricultural markets without addressing infrastructure and institutional constraints may not result in the intended benefits of private markets. There has been considerable debate on whether the private marketing system can efficiently operate in developing countries, particularly in food marketing, in ensuring food security for the poor. Cooksey (2003) argues that liberalisation of both inputs and outputs has somehow resulted in market failures. Others have provided evidence that the private marketing system is dominated by petty traders with substantial financial and capacity constraints and inter-seasonal and inter-regional arbitrage does not form part of the activities of this class of traders (Fafchamps and Gabre-Madhin, 2001).

In Malawi, agricultural sector reforms began with the periodic upward adjustments in producer prices on major crops including maize and partial removal of subsidies on fertilizers. This was followed by restructuring of the state marketing agency, the Agricultural Development and Marketing Corporation (ADMARC), through rationalization and divestiture of its investment portfolio away from sectors unrelated to agricultural marketing activities since 1984. In 1987, the marketing of smallholder agricultural produce was liberalized through licensing of private traders, followed by removal of all licensing and registration procedures for private traders in produce and input markets by 1996. ADMARC also restructured its marketing activities by closing down markets that were unable to attain an annual throughput of 60 tons. The first round of closure of such markets occurred in 1988, in which 125 seasonal markets (15 percent of the total) were closed based on their insignificance in the volume of trade, largely in remote rural areas with poor infrastructure (Chirwa, 1998).

The liberalisation of markets has broadened the choice of market channels for produce for smallholder farmers. These marketing channels now include ADMARC, private traders, relatives or neighbours, vending at local markets, associations and cooperatives and private companies. This paper investigates the factors that explain the choice of a particular market channel for maize among smallholder farmers in rural Malawi using a multinomial logit choice model. We explain farmers' choice behaviour using household characteristics, farmer characteristics, buyer characteristics or attributes, the price of maize and commercialization of maize. The rest of the paper is organized as follows. The next section provides an overview of maize marketing and its liberalisation in Malawi. Section 3 presents the methodology and the specification of the

model. Section 4 reports results of regression analysis on the choice of maize market among smallholder farmers in Malawi. Finally, section 5 presents concluding remarks.

2.0 Maize Marketing and Liberalisation in Malawi

Maize is the main staple food in Malawi, and its availability defines the household and national food security. As a result, increasing the production and availability of maize has been a preoccupation of agricultural policy in Malawi. During the fifteen post-independence years, agricultural policy concentrated on the development of the maize sector. Some of the policies towards promotion of maize production included intensive research in maize leading to development of high yielding maize varieties (Smale, 1995); extension services throughout the country which facilitated the adoption of technology (hybrid maize and application of fertilizers); subsidized credit and inputs to the smallholder sector delivered through farmers' clubs linked to the Agricultural Development and Marketing Corporation (ADMARC); and pan-territorial and pan-seasonal guaranteed prices of maize and other smallholder agricultural produce. ADMARC, a state marketing agency, was entrusted to market smallholder food and cash crops and was used as an agent for the implementation of government agricultural pricing policies. ADMARC was mandated to market, process and dispose of agricultural produce; to provide adequate price stability and to provide storage facilities for food reserves (Scarborough, 1990). The government invested substantially in market infrastructure in the rural areas through ADMARC. By 1991, ADMARC had 3 regional offices, 12 divisional offices, 80 area offices, 217 unit (primary) markets and 1,300 seasonal markets across the country (ADMARC, 1990). Although the Agricultural and Livestock Marketing Act of 1964 gave monopsony power to ADMARC to purchase and sell smallholder tobacco and cotton, the extensive network of markets facilitated its dominance in the marketing of other crops. While private trade in commodities produced by smallholder farmers precede official marketing institutions, it had always been accepted; only that most food crops were under price control and trader licensing requirements (Chirwa, 1998).

The adoption of structural adjustment programs in 1981 initiated reforms in agricultural marketing and maize pricing policy. Within the economic reform programme the government liberalised agricultural produce pricing and marketing in various ways. First, periodic adjustments to the pan-territorial and pan-seasonal prices for agricultural products particularly maize were introduced between 1982 and 1986. In 1982, the government adopted the parity

pricing approach and the producer price of maize was consequently increased by 68 percent. The pricing approach led to annual adjustments in the price of maize in the 1980s. As Harrigan (1988) notes, considerable price increases for a majority of smallholder export crops were announced in 1983/4 and 1984/5 growing seasons such that by 1985/6 prices were close to parity levels. By 1988, prices of most crops were liberalized with the state marketing agency acting as a buyer of last resort at minimum guaranteed pan-territorial and pan-seasonal prices. Private traders were therefore free to determine their own prices for purchase of crops from smallholder farmers, and by 1995 prices of all other crops, except for maize, were fully liberalised and ADMARC was given flexibility in determining the prices of other crops (Chirwa, 1998).

Secondly, government introduced a price band for maize which ADMARC was expected to defend. ADMARC was free to determine the producer price of maize within a fixed band while the consumer price of maize remained pan-territorial and pan-seasonal. However, due to increased marketing of maize by private traders, it had become rather difficult for ADMARC to defend the price band, and consequently the policy was abandoned in 2000 and the price of maize significantly increased (Chirwa and Zakeyo, 2006). However, the government has always intervened in the pricing of maize by setting the price for sale of maize particularly during the lean season and food crises.

Thirdly, there was a reduction in the scope of export licensing except for maize and cassava in 1989/90 and subsequent removal of import and export licensing requirements on all crops. However, the government has continued to impose export bans on maize periodically, particularly in periods of food shortages. This has sent mixed signals to the private sector and has led to the unpredictability of government policy.

Finally, government abolished the monopsony power of ADMARC and liberalised the marketing of smallholder agricultural produce.[1] The marketing of smallholder agricultural crops was deregulated in 1987 through the Agriculture (General Purpose) Act of 1987 which eliminated ADMARC's monopsony power in produce marketing in the domestic market. The Act required private traders to obtain licenses to engage in the marketing of crops. Nonetheless, the requirement for obtaining a license to participate in the trading

[1] Others have argued that the liberalisation of agricultural marketing was hastened by the growing inefficiency of ADMARC and its broadened mandate that extended to investments in profitable enterprises, exacerbated by the inadequate funding to government state-owned enterprises.

of smallholder crops was relaxed over time and private traders unofficially were increasingly trading without licenses. In 1996, licensing was no longer required for marketing of smallholder agricultural crops.

The competition from private traders and the increasing financial constraints experienced by ADMARC has resulted in diminishing role of the state in maize marketing save during the food crisis.[2] FSG (1991) observes that ADMARC's purchases as a proportion of production stabilized at 15 percent of production in the early 1990s, levels which were broadly in line with those prevailing in the early 1980s (see also Harrigan, 2003). However, this role diminished to zero in the past five years. Actually, ADMARC did not purchase any maize in the years 2000 and 2001 (Mvula et al., 2003).

The expectation from the market reforms was that private traders would take up the role of state marketing agencies even in remote areas. However, the empirical results on the effect of food marketing liberalisation are mixed. Jayne et al. (2002) argue that these mixed results have been due to the variations in the implementation of reforms, with reforms largely remaining unimplemented particularly in sensitive products such as maize. In Tanzania, one of the countries that have been decisive in food marketing liberalisation, Baulch (2001) notes that in the case of Tanzania increased competition in the marketing of food produce led to declining profit margins among private traders. Fairhead and Leach (2005) note that marketing liberalisation ignored the way that markets are controlled and socially and politically embedded.

Studies in Malawi have cast doubt on the capacity of private traders to reach the very remote areas that are deemed unprofitable by a state marketing agency. In earlier studies on the performance of private traders in Malawi, Mkwezalamba (1989) and Kaluwa (1992) reveal that most private traders are small-scale entrepreneurs with rural-based enterprises and usually face such constraints as transport facilities, storage facilities, processing facilities, financing and credit facilities. Fafchamps and Gabre-Madhin (2001), using case studies from Benin and Malawi, also find evidence that the efficiency of private traders is constrained by the high transaction costs in form of search and transport costs. Other studies have shown that while private traders have expanded their activities in agricultural produce since 1987, they are heavily concentrated in the Southern Region and to some extent in the Central Region while the

[2] The weak financial base of ADMARC has been attributed to cross-subsidization of its non-performing investment portfolio, inability for the government subsidize loss making parastatals and inefficient management.

Northern Region is generally unserved due to the problem of inaccessibility (Mthindi et al., 1999).

Although over the years, ADMARC market power has been weakened, there may be still concerns about the effect of its continued involvement in the marketing of food crops. For example, Abbott and Poulin (1996) argue that the continued existence of ADMARC as a state marketing agency is hindering the development of the private marketing system. Nonetheless, others identify ADMARC as a very important institution during crisis situations and that the closure of ADMARC markets has the potential to affect the livelihood systems of the poor (Khaila et al., 1999). Dorward et al. (2004) note that those that argue for complete withdrawal of the state fear the policy reversals and price controls and the competitive advantages of the state marketing agencies that depress returns and increase risks to private sector investments. There has been no evidence in Malawi, however, to suggest that ADMARC with its financial constraints is an impediment to private sector trade.[3] Mvula et al. (2003) and Nthara (2002) find that ADMARC plays an important role in crop marketing where it has resources, particularly in the sale of maize to maize deficit households.

The liberalisation of agricultural marketing has broadened farmers' choice of market channels for their produce, albeit offering differential prices and sales services. Baulch (2001) categorizes agricultural marketing enterprises into indigenous private enterprises, transnational corporations, cooperatives and parastatals. In Malawi, in addition to the state marketing agency, ADMARC, the other players in agricultural produce marketing include private traders, neighbours or relatives, associations or cooperatives and large private companies. Mvula et al. (2003) identified four categories of private traders operating in rural areas, namely institutional companies and manufacturers, large wholesalers and other large-scale traders, retailers or vendors, and estates and large scale farmers.

Table 1 shows the differential service characteristics offered by agricultural marketing enterprises in maize marketing in Malawi. While ADMARC and retailers/vendors offer farmers both purchasing and selling services, large-scale buyers (institutional companies and manufacturers) only purchase maize but do not sell maize in the local communities. Large-scale buyers typically purchase maize for further processing rather than for arbitrage over space and time.

[3] In other countries such as Kenya, where state marketing agencies continue to play a role in the post-liberalisation era, the evidence suggests that private traders do not perceive state marketing agencies as stifling private trade (Karugia et al., 2004).

Another distinguishing feature is that ADMARC markets and retailers/vendors are easily accessible to the farmers while large-scale traders tend to be less accessible. In terms of reliability, small-scale traders/vendors are more accessible, followed by ADMARC when they have resources to purchase maize or stocks of maize for sale. The large-scale traders are less reliable because they do not come back to sale maize to the communities during the lean season.

Marked differences also exist in terms of pricing and payment modes and general business practices. ADMARC offers low but stable prices and does not discriminate between farmers. On the other hand, large-scale traders offer farmers higher but more volatile producer maize prices and do discriminate prices between small and large farmers. Small-scale traders offer outrageous discriminating prices to farmers, which traders largely dictate. With respect to payments, the major advantage that both large-scale and small-scale traders have over ADMARC is that trade is on cash basis due to readily available cash. The business practices of private traders are less favourable to smallholder farmers. Private traders usually use volume measures or scales that are prone to adjustments. In most cases, farmers are not allowed to verify such measures. Private traders typically announce better prices but effectively pay lower prices, and combined with cheating on measurements, this effectively reduces the returns to smallholder farmers.

Table 1 Service characteristics of market channels in the purchase and sale of Maize

Service Characteristic	*ADMARC*	*Private Traders*	
		Large-Scale	*Small-scale/Vendors*
Services offered	○ Buy maize ○ Sell maize	○ Buy maize ○ Do not sell maize	○ Buy maize ○ Sell maize
Accessibility	○ Fixed locations ○ Relatively short distance in active markets	○ Less accessible – a few just come to buy maize ○ Long distance to markets, but others door-to-door purchases	○ Very accessible – tend to live in the same village ○ Door-to-door services for both purchase and sale of maize
Reliability	○ Reliable but lack funds most of the times ○ Have irregular maize stocks ○ Keep maize in the market for resale later in the lean season when unavailable	○ Less reliable - not sure that they will come again ○ Do not resale in the lean season	○ Very reliable because most are located in the village ○ Buy maize and also sell maize in the lean season ○ Sell maize in rural 'day markets'
Pricing and Payments	○ Low maize producer prices ○ Stable producer and consumer maize prices ○ No price discrimination ○ Prices not negotiable ○ Late payments and sometimes buy on credit	○ High maize producer prices ○ Volatile producer maize prices ○ Price discrimination with smaller traders discriminating more ○ Dictated prices ○ Instant cash payment ○ Some do barter trade – especially in border areas	○ Outrageous consumer maize prices ○ High producer maize prices but less than large-scale traders ○ Volatile maize prices ○ High price discrimination ○ Negotiable prices but dictated by vendors ○ Most pay cash instantly ○ Some do barter trade – especially in border areas
Business Practices	○ Buy small quantities ○ Farmers can verify weighing scales ○ Start buying maize late in the season ○ Sometimes sell maize mixed with sunflower ○ Favours selling maize to vendors ○ Price information is displayed	○ Announces better prices but actually pay less ○ Tampers with scale to a large extent and some use volume ○ Do not allow farmers to verify their weighing scales	○ Mostly use volume measures ○ Less cheating when using volume measures ○ Tamper with scales to a large extent – those that use weights ○ Deliberately undervalue crops ○ Farmers cannot verify their weighing scales ○ Sell poor quality maize

Source: Mvula et al. (2003).

3.0 Model Specification and data

3.1 Conceptual framework and econometric specification

The New Institutional Economics (NIE) is a useful framework for understanding liberalized agricultural markets in Sub-Saharan Africa and transitional economics. These liberalized agricultural markets are characterized by asymmetric information (with prices not publicly announced), highly differentiated goods without formal standardization and classification systems, and contracts which are informal (Fafchamps and Gabre-Madhin, 2001). Farmers are typically small and geographically dispersed, giving rise to dispersed small-scale buyers or traders. Thus, smallholder farmers deal with a variety of traders with varying degrees of relationship and trust, with different enforcement mechanisms. As a result, grain markets in sub-Saharan Africa remain risky, informal and cash-based, leading to high transaction costs (Kherallah et al., 2000). In agricultural markets transaction costs arise from information search, negotiating terms, and monitoring and enforcing contracts (Poole et al., 1998). North (1995) notes that incomplete information and limited mental capacity to process information determines the cost of transacting which is the basis for the formation of institutions.[4] Transaction costs analysis is used to explain the existence or non-existence of contracts and relationships and why contracts and relationships vary in the market exchange of goods and services (Toye, 1995). The choice of market channels among smallholder farmers can therefore be understood within the framework of transaction costs, contracts and contract enforcement. Apart from transaction costs, Nwokoye (1981) note that the selection of a market channel, among other factors, will depend on producer characteristics, market or buyer characteristics, product characteristics and the service level of the market channel.

We model the selection of marketing channel among smallholder farmers based on the random utility theory (see Greene, 2000). Thus, for the i^{th} smallholder farmer faced with J alternative markets for maize, the utility of choosing market j can be represented as:

$$U_{ij} = \beta' x_{ij} + \varepsilon_{ij} \qquad (1)$$

where U_{ij} is the utility derived from choosing market j, x_{ij} is the vector of attributes of the choice and characteristics of the farmer, β

[4] Institutions are defined as rules of the game of society comprising of formal rules, informal constraints and the enforcement mechanisms.

is a vector of parameter coefficients and ε_{ij} is the disturbance term. If the smallholder farmer chooses market *j*, then U_{ij} is the maximum among the *J* utilities. Therefore, statistically we need the probability that market *j* will be chosen by the smallholder farmer

$$Prob(U_{ij} > U_{ik}) \text{ for all other } k \neq j \tag{2}$$

If the *J* disturbances are independent and identically distributed, we can specify a conditional logit or multinomial logit model (normalized on $j = 1$) of the probability of choosing a market channel.

$$\begin{aligned} Prob(Yi = j) &= \frac{e^{\beta_j' x_i}}{1 + \sum_{k=2}^{J} e^{\beta_k' x_i}} \qquad \text{for j = 2, 3, ……, J} \\ Prob(Yi = 1) &= \frac{1}{1 + \sum_{k=2}^{J} e^{\beta_k' x_i}} \end{aligned} \tag{3}$$

We compute the *J* log-odds ratios, where P_j is the probability of market *j* will be chosen, to get the statistical specification of the multinomial logit model and the empirical model respectively as

$$ln\left[\frac{P_{ij}}{P_{i1}}\right] = \beta_k' x_i \tag{4}$$

where the dependent variable in (4) is the log odds that the farmer will choose market *j* relative to market 1 (the base category). The empirical model is specified as follows

$$MKTC_j = \alpha + \beta_k' HFC_{ik} + \delta_k' CRC_k + \psi_k' MCD_k + \lambda_k' OD_k + \varepsilon_{ij} \tag{5}$$

where the dependent variable, *MKTC*, is the market channel chosen by the smallholder farmer (*j = 1,2,…,3*), *HFC* is a vector of household and farmer characteristics, *CRC* is the vector of crop characteristics including price, *MCD* is a vector of market characteristics and *OD* is a vector of other control variables including regional dummies, and ε_{ij} is the disturbance term.

3.2 Data and definition of variables

The data used in this study comes from the second Integrated Household Survey (IHS-2) conducted by the National Statistical Office between 2004 and 2005. Data was collected from a total of 11,280 households from randomly selected 564 enumeration areas using a questionnaire (NSO, 2005). About 9,818 households produced maize using rain-fed cultivation, but only 1,458 households sold some maize (14.9 percent of those that produced maize). Three varieties of maize were produced – local, composite and hybrid and production and marketing data was recorded for each variety. Our analysis focuses on a usable sample of 991 households resulting in 1,006 observations maize variety-household combinations that sold some maize through the various market channe1s. In terms of variety of maize, 56.3 percent of the 1,006 observations are with respect to hybrid maize, 39.7 percent with respect to local maize and 4.1 percent with respect to composite maize. On average the 1,006 households produced 889.9 kilograms of maize and sold only 295.3 kilograms (32.8 percent of production). The questionnaire on sales distinguished the variety of maize, quantity harvested and sold, value of sales, the market channel through which maize was sold and the reason for preferring a specific market channel.

The dependent variable in model (5), MKTC, is the market channel chosen by the smallholder farmer. The marketing channels considered in the study are relatives /neighbours, private traders and local market.[5] We use relative/neighbour as a base category in the analysis. This categorisation is similar to the characterisation of agricultural marketing enterprises in Africa which include indigenous private enterprises, transnational corporations, cooperatives and parastatals embodying different relationships and offering different benefits to the farmers (Baulch, 2001).

The independent variables include household and farmer characteristics, crop characteristics, market characteristics and other control variables. The household and farmer/farming characteristics include sex of the household head (SEXHH), household size (HSIZE), sex of the farmer (SEXFA), age of the farmer in years (AGEFA), education of the farmer, area under maize cultivation and cropping pattern. Headship of the household is

[5] The other market channels used are ADMARC, crop associations or cooperatives and private companies, but are excluded in the analysis due to the small size, they account for less than 1 percent of the market channels. Although ADMARC has units in most parts of the country, it hardly purchased agricultural produce in the 2004/05 season due to cash flow problems.

represented by a dummy variable that takes a value of 1 for male-headed households and zero otherwise. The household size is the total number of persons in the household. The questionnaire also identifies household members that make farming decisions on particular plots of land where different crops are cultivated. The sex of the farmer is represented by a dummy variable that takes a value of 1 for male farmer and zero otherwise. The education of the farmer is represented by three dummy variables: *NONE* equal to 1 if the farmer has no education qualification, *PRIMFA* equal to 1 if the farmer has a primary school qualification, *POSTPFA* equal to 1 if the farmer has post primary secondary qualification. The area under maize cultivation, *MHECT*, is measured in hectares and includes all land on which maize is the main crop. We also include a dummy, *MIXED*, equal to 1 if the farmer uses intercropping on the maize plot.

The crop characteristics include the price of maize and the commercialisation index. The price of maize, *PRICE*, is measured in Malawi Kwacha per kilogram. It is computed as the value of sales divided by the quantity of maize sold.[6] In a competitive market situation, the price is the main variable that will determine the choice of the market channel that a farmer uses. The commercialisation index, *COMEX*, is calculated as the proportion of maize output that is sold.

The market characteristics are inferred from the revealed reasons for preferring a particular market channel by the smallholder farmers. These reasons capture the effects of transaction costs, repeated dealing, reputation and trust and contractual arrangements. The reasons for preferring a market channel are captured by dummy variables that include being close to the buyer (*CLOBUY*), always selling to the buyer (*REPBUY*), buyer that offers best price (*BESTP*), buyer under contract (*CONBUY*) and other reasons (*OTHBUY*). The dummy variable, *CLOBUY,* captures the importance of transaction costs in terms of transport costs and cost of information search and farmers would opt for a buyer within reasonable distance in order to minimize such costs. Farmers and buyers also tend to establish relationships through repeated dealing – thereby building reputation and trust over time. This may also reflect the importance of switching costs for the smallholder farmers. The effect of this relationship on market channel choice is captured by a dummy variable *REPBUY*. Farmers will also be influenced in the choice of a market channel if they believe that the buyer offers them the best price – although the effective price may not be the

[6] This variable was found to have outlier observations which were excluded from the estimation sample.

highest. Studies have shown that private traders tend to cheat on measurements and quality evaluation (Mvula et al., 2003; Peters, 1992) implying that the effective price may be less than the effective price that farmers obtain from a particular market channel. Nonetheless, the belief of higher price, *BESTP*, is expected to strongly influence the choice of the market channel. Finally, contracts are one of the institutional arrangements that tend to minimize transaction costs. The data reveal that some of the maize farmers produce maize on contract – although the exact nature and performance of such contracts are not known. The effect of contract maize farming on the choice of the market channel is captured by the dummy variable, *CONBUY*.

We also include infrastructural services variables that have implications on transaction costs including distance to the tarmac road (*DISTAR*), distance to the district town (*DISTBOMA*), distance to the day market (*DISTDAYM*), distance to the weekly market (*DISTWKM*), distance to the phone service (*DISTPHONE*), and distance to the post office (*DISTPOST*). All these variables are measured in kilometres. Distance to the tarmac road and markets capture farmers' access to markets with different options for the marketing of their produce. On the other hand, distances to phone services and post offices capture access to market information. Private traders and large companies are likely to provide marketing services in areas that have better infrastructure and this affords households close to better roads more options for marketing their maize.

We also include regional dummy variables to capture the variation in the availability of the various market channels. We distinguish between rural and urban maize farmers by including a dummy, *RURAL*, equal to 1 if the farmer resides in the rural area and zero for farmers that reside in the urban areas. The regional dummies are *NORTH* for farmers in the Northern Region, *CENTRE* for farmers in the Central Region and *SOUTH* for farmers in the Southern Region. The differences in infrastructure development in these areas determine the extent to which the private sector participates in the marketing of food crops.

Table 2 presents descriptive statistics of the variables used in the econometric analysis. In terms of proportion, relatives/neighbours, private traders and local markets account for 48.61 percent, 28.23 percent and 23.16 percent. Hence, most households that sold maize sold it to private traders. We also note that the most households that sold maize are male-headed, with only about 17.5 percent of the households being female headed although about 23 percent of households that produced maize were female-headed. The average household size is 4.5 persons which is similar to

the national average household size according to the 1998 census. We also find that about 24.5 percent of the farmers that sold maize were female. Human capital is quite low among the farmers that are engaged in the marketing of maize. Most of the farmers do not have any educational qualification. Of the farmers that sold maize, about 74.3 percent of farmers do not have any educational qualification, 11.1 percent have primary school qualification and 14.6 percent post-primary school qualification.

Table 2 Descriptive statistics of variables

Variable	Mean	SD	Minimum	Maximum
MKTC				
Trader	0.4861	-	0.000	1.000
Relative/Neighbour	0.2823	-	0.000	1.000
Local Market	0.2316	-	0.000	1.000
SEXHH	0.8250	0.3801	0.000	1.000
HHSIZE	4.5159	2.2745	1.000	16.000
SEXFAM	0.7654	0.4240	0.000	1.000
AGEFAM	39.4367	14.6518	10.000	96.000
PRIMFA	0.1113	0.3147	0.000	1.000
POSTPFA	0.1461	0.3534	0.000	1.000
MHECT	0.9474	0.9638	0.000	9.125
MIXED	0.5308	0.4993	0.000	1.000
PRICE	13.7535	5.9450	5.144	49.582
COMEX	0.3298	0.2171	0.014	1.000
CLOBUY	0.5666	0.4958	0.000	1.000
REPBUY	0.0875	0.2827	0.000	1.000
BESTP	0.2893	0.4536	0.000	1.000
CONTBUY	0.0199	0.1397	0.000	1.000
OTHBUY	0.0328	0.1782	0.000	1.000
DISTAR	19.5416	29.2730	0.001	400.000
DISTBOMA	34.7271	74.6843	0.200	500.000
DISTDAYM	7.4525	10.2119	0.200	76.000
DISTWKM	5.8895	8.2534	0.003	80.000
DISTPHONE	13.0773	16.8713	0.025	225.000
DISTPOST	9.7884	9.7554	0.500	76.000
RURAL	0.9344	0.2477	0.000	1.000
NORTH	0.1829	0.3868	0.000	1.000
CENTRE	0.4423	0.4969	0.000	1.000
SOUTH	0.3748	0.4843	0.000	1.000

More than half of the farmers use mixed farming with maize on average plots of 0.95 hectares. The average price of maize per kilogram is MK13.75, lower than the official price of MK17.00 per kilogram. However, the range in unit price of maize is large, about

MK45. Most of the farmers that sell maize, on average just sell 33 percent of the output and use the rest for subsistence.

Farmers prefer a particular market channel because of its closeness, with 56.6 percent of farmers followed by the channel that offers the best price (28.9 percent). Repeated marketing relationships are important for only 8.8 percent, other reasons account for 3.3 percent and only 2 percent of farmers are motivated by a contract with buyers in their choice of a marketing channel. The farmers who sell on contract have contractual arrangements with neighbours and private traders. The infrastructure services variables show that households are on average 19.5 kilometres away from the tarmac road, 43.7 kilometres away from the district town, 7.5 kilometres away from a daily market and 5.9 kilometres away from a weekly market. Relative to the post office, the phone is far from farming households. Most of the maize farmers that sold maize reside in the rural areas. In terms of regional distribution of those that sold some maize, 18.3 percent are from the Northern Region, 44.2 percent from the Central Region and the rest is from the Southern Region.

4.0 Results and discussion

Table 3 presents marginal effects from multinomial logit regression on the choice of marketing channel. The model explains 15.1 percent of the variation in market choice among smallholder maize farmers in the rural areas. The hypothesis that all the coefficients are zero with the exception of the constants is rejected at the 1 percent level based on the Wald test. We find that none of the household characteristics, sex and age of household head, are significant in determining market channel choices for maize. Similarly, the gender and age of the farmer do not statistically determine the choice of market channel.

Table 3 Marginal effects from multinomial logit model

Variables	Private Traders		Local Market		Relatives/ Neighbours (base category)	
	dy/dx	*t-ratio*	*dy/dx*	*t-ratio*	*dy/dx*	*t-ratio*
SEXHH+	-0.0754	-1.08	0.0187	0.34	0.0566	1.04
HHSIZE	0.0072	0.90	-0.0100	-1.60	0.0029	0.42
SEXFAM+	0.0746	1.17	-0.0175	-0.34	-0.0571	-0.99
AGEFAM	-0.0002	-0.13	-0.0003	-0.33	0.0005	0.49
PRIMFA+	0.1103	2.03**	-0.0415	-0.92	-0.0688	-1.68*
POSTPFA+	-0.0511	-0.95	0.0110	0.27	0.0401	0.89
MHECT	0.0203	0.98	0.0122	0.79	-0.0324	-1.71*
MIXED+	-0.0118	-0.32	0.0111	0.38	0.0007	0.02
PRICE	-0.0023	-0.80	0.0031	1.36	-0.0008	-0.30
COMEX	0.1249	1.49	0.0104	0.17	-0.1353	-1.64*
REPBUY+	0.2364	4.11***	0.0118	0.22	-0.2481	-10.24***
BESTP+	0.0649	1.66*	0.2051	5.90***	-0.2700	-10.58***
CONTBUY+	-0.1430	-1.03	-0.1529	-2.16**	0.2960	2.15**
OTHBUY+	0.1654	1.83*	-0.0938	-1.44	-0.0716	-1.05
DISTAR	-0.0031	-3.79***	0.0019	3.45***	0.0012	2.18**
DISTBOMA	-0.0003	-1.04	0.0001	0.44	0.0002	0.83
DISTDAYM	0.0089	3.86***	-0.0097	-4.41***	0.0008	0.49
DISTWKM	-0.0011	-0.47	-0.0017	-0.91	0.0028	1.39
DISTPHONE	0.0047	3.10***	-0.0029	-2.26**	-0.0019	-1.45
DISTPOST	-0.0051	-2.35**	0.0044	2.68***	0.0007	0.36
RURAL+	0.2414	3.29***	-0.0264	-0.42	-0.2150	-2.56**
REGION1+	-0.1782	-3.12***	-0.0261	-0.64	0.2044	3.72***
REGION2+	0.1217	3.03***	-0.0605	-1.87*	-0.0611	-1.67*
Predicted Probabilities	0.5309		0.2202		0.2489	

N = 1006, Wald $\chi^2 = 235.27$, Prob > $\chi^2 = 0.000$

Pseudo $R^2 = 0.1513$, Log Likelihood = -893.453

Note: The standard errors of the multinomial logit model are heteroscedastic-consistent. + Marginal effects are for discrete change of dummy variable from 0 to 1, *** significant at 1 percent level, ** significant at 5 percent level, * significant at 10 percent level

The educational level of the farmer is an important determinant of market channel choice among maize farmer, although this varies from one channel to another. The results show that those that attained the primary school qualifications more likely to sell to private traders and less likely to sell to neighbour/or relative. The marginal effects imply that attaining primary school qualification increases the probability of selecting a private trader by 11 percent and decreases the probability of selling to neighbours/relatives by 6.9 percent. However, possession of a post-primary school qualification does not statistically influence the choice of maize marketing.

Although the size of the plot under maize cultivation is positively associated with private traders and local markets, it is not statistically significant in the choice of marketing. However, the marginal effects for the base category, neighbours/relatives, show that a unit increase in the plot under maize cultivation decreases the probability of selling to the market channel. The relationship between effective maize price and the choice of market channel is not statistically significant in all market channels. Maize commercialisation is positively associated with private traders and local markets, but the relationships are statistically insignificant. However, the marginal effect for neighbours/relatives (base category) is statistically significant and implies that a unit increase in commercialisation reduces the probability of selling to neighbours/relatives by 13.5 percent. Thus, farmers that sell a greater proportion of their harvest are unlikely to sell to neighbours/relatives.

Transaction costs in marketing of agricultural markets can be minimized by establishing relationships and contracts between producers and buyers. The effect of such transaction costs on the choice of markets can be inferred from the reasons why maize sellers opt for particular markets. The regression results reveal that repeated transactions, perceptions on price offered, contractual arrangements and other reasons statistically influence the choice of markets. However, there are variations in the magnitude and the signs from one channel to another. Repeated transactions, REPBUY, are positively related to the choice of private traders and local markets but negatively related to relatives/neighbours. The marginal effects show that repeated transactions are particularly important in the choice of private traders in which the probability of choosing this market channel increases by 23.6 percent and decreases by 24.8 percent for relatives/neighbours. What is not known is whether such repeated transactions are also bundled with input or/and credit provisions.

Farmer's belief about prices offered by various marketing enterprises are positively related to the choice of maize marketing channels and the coefficients are statistically significant across all the channels, except for relatives/neighbours. The belief that the channel offers the best price has stronger influence on the decision to market maize at local markets and the probability increases by 20.5 percent. This is followed by the choice of private traders in which the probability increases by 6.5 percent due to the belief that the market channel offers the best price. Maize farmers are unlikely to sell to their relatives/neighbours due to perceptions about the price. The best offered price belief reduces the probability of selling to relatives/neighbours by 27 percent.

Contractual arrangements in the sale of maize are a disincentive to the choice of private traders and local market, but an incentive to the choice of relatives/neighbours. The marginal effects are statistically significant at the 5 percent level only with respect to local markets and relatives/neighbours. The marginal effects show that selling maize under contract reduces the probability of choosing local markets by 15.3 percent and increases the probability of selling to relatives/neighbours by 29.6 percent. Smallholder farmers are more likely to sell maize under contract to their relatives/neighbours. Hence, they engage in contractual farming with people that they have known for some time.

Among the infrastructure services variables, distances to the tarmac road, distance to a daily market, distance to the phone and distance to the post office significantly influence the choice of markets for maize. The distance to the tarmac road is negatively associated with the choice of private traders and positively related to the choice of local markets and relatives/neighbours. The farther away farmers are from a good road, the less likely they are to sell to private traders. The marginal effects are statistically significant at the 1 percent level and suggest that the probability of selling to the private traders falls by 0.31 percent due to a unit increase in distance. Evidently, those farmers that are far from a tarmac road are likely to sell to local markets and relatives/neighbours with a unit increase in distance increasing the probability by 0.19 percent and 0.12 percent, respectively. These do reflect the relative presence of private traders in remote areas, confirming studies that private traders tend to operate more in areas where the road infrastructure is good. The results, therefore, suggest the importance of road infrastructure in promoting private marketing systems.

Farmers that are far from the daily markets are likely to sell to the private traders but are unlikely to sell to local markets with the marginal effects of a unit increase in distance increasing the probability by 0.89 percent and reducing the probability by 0.97 percent, respectively. Surprisingly, distance to the phone service is positively associated with selling to private traders but negatively associated with selling to local markets. These perverse results may be due to the fact that the presence of a phone does not reflect usage by the farmers to get the relevant market information. Farmers that live far from the post office are unlikely to sell to private traders, but likely to sell to local markets. The marginal effects show that a unit increase in the distance reduces the probability of selling to private traders by 0.51 percent and increases the probability of selling to the local market by 0.44 percent.

The residence of the farmer has influence in the choice of markets, with rural farmers more likely to sell to private traders –

the probability increases by 24.1 percent. Hence, private traders do not necessarily operate in the urban areas. Farmers in the Northern Region are unlikely to sell to private traders while those in the Central Region are likely to sell to private traders. The negative relationship with private traders may just reflect the relative significance of infrastructure services, such as road network, in the region compared either to the Central and Southern regions. On the other hand, farmers in the central region are more likely to sell to private traders and less likely to sell to local markets, an indication of the relative number of private traders in the region (Nthara, 2002).

5.0 Conclusions

This study set out to explore factors that determine the choice of marketing channels among smallholder maize farmers in Malawi using a national household survey data. Only 14.9 percent of smallholder farmers that cultivated maize sold part of their maize harvest. We find that those that sold their maize, on average, sold only 33 percent of the maize output. Since liberalisation of agricultural produce marketing, various players have emerged providing marketing services to smallholder farmers, competing with the state marketing agency. Smallholder maize farmers appear to have several channels for marketing maize mainly neighbours/relatives, private traders and vending at local markets. ADMARC, associations, cooperatives and large companies play a very negligible role in the marketing of maize. The choice of agricultural marketing enterprises is determined by differential services and prices offered to farmers. The marketing channels also embed different relationships aimed at reducing the transaction costs and maximizing returns to smallholder farmers. The dominant market channel is sale of maize to private traders accounting for 48.6 percent of the sample, followed by relatives/neighbours (28.2 percent) and local markets (23.2 percent).

The econometric analysis suggests that household characteristics and gender of household and farmer are not important determinants of the choice of market channels among smallholder maize farmers. Farmers that completed primary school education are more likely to sell their maize to private traders while those that have post primary qualifications are unlikely to sell to private traders. The effective price of maize is not the main driving force for the choice of marketing channels although the perceptions about the prices are important determinants of market choices. However, if farmers feel that the market channel offers the best price, they are likely to select that particular market channel. The perception that the channel

offers the best price strongly influences the choice of the local market, followed by private traders. Other factors, with implications on transaction costs, which influence the choice of markets, include repeated transactions between the smallholder farmer and the buyers and contractual arrangements. Repeated transactions embody trust between the parties and reputation of the buyer through repeated interaction over a period of time. Repeated transactions are important in the choice of private traders. Some of the factors that build the reputation of private traders include the cash transactions, door-to-door service and early entry into the marketing season which outweigh their business mal-practices (Mvula et al., 2003). Private traders are known to start purchasing produce early, and during times when the farmers need the cash most. Contractual arrangements are not common in maize trading and are negatively related to the choice of local markets but important in the choice of relatives/neighbours.

The findings also suggest the important role played by infrastructural services in determining the choice of the market channel, although the marginal effects are low. Farmers that live far from the tarmac road are unlikely to sell to private traders, suggesting the importance of road infrastructure in providing options for marketing agricultural produce. Since most private traders have transport constraint, they are likely to operate in areas in which the road infrastructure is good. The farther the distance to the day market, the more likely households are to private traders and the less likely they are to sell to the local market. Hence, households tend to minimize transaction costs by selling to private traders who typically offer door-to-door services. Those located far from the telephone services are likely to lack information about prices in other markets and are therefore likely to sell to private traders and less likely to sell to local markets.

References

ADMARC (1990) **ADMARC Annual Report and Accounts 1990**, Blantyre: ADMARC.

Baulch, B. (2001) Food Marketing, in S. Devereux and S. Maxwell (eds.) **Food Security in Sub-Saharan Africa**, London and Pietermaritzburg: ITDG Publishing and University of Natal Press.

Chirwa, E. W. (1998) Fostering Private Food Marketing and Food Policies after Liberalisation – The Case of Malawi, in Seppala, P. (ed.) **Liberalized and Neglected? Food Marketing Policies in Eastern Africa**, Helsink: United Nations University/WIDER.

Chirwa, E. W. and Zakeyo, C. (2006) Malawi, in H. Thomas (ed.) **Trade and Food Security: country Case Studies and Synthesis**, Rome: Food and Agriculture Organisation.

Cooksey, B. (2003) Marketing Reform? The Rise and Fall of Agricultural Liberalisation in Tanzania, **Food Policy, 21 (1)**, 67-91.

Dorward, A., Kydd, J., Morrison, J. and Urey, I. (2004) A Policy Agenda for Pro-Poor Agricultural Growth, **World Development, 32 (1)**, 73-89.

Fafchamps, M. and Gabre-Madhin, E. (2001) Agricultural Markets in Benin and Malawi: Operation and Performance of Traders, World Bank Working Paper Series No. 2734 (Washington, D.C).

Fairhead, J. and Leach, M. (2005) The Centrality of the Social in African Farming, **IDS Bulletin, 36 (2)**, 86-90.

Food Studies Group (FGS) (1991) The Impact of Pricing and Marketing Policies on the Development of Private Sector Trading, A Report on the Study of the Impact of the Liberalization of Smallholder Agricultural Produce Trade in Malawi, International Development Centre, University of Oxford.

Greene, W. H. (2000) **Econometric Analysis**, 4th Edition, Englewood Cliffs, New Jersey: Prentice-Hall.

Harrigan, J. (1988) Malawi: the Impact of Pricing Policy on Smallholder Agriculture, 1971-1988, **Development Policy Review, 6,** 415-433.

Harrigan, J. (2003) U-Turns and Full Circles: Two Decades of Agricultural Reform in Malawi 1981–2000, **World Development, 31 (5)**, 847-863.

Jayne, T. S., Govereh, T., Mwanaumo, A., Nyoro, J. K. and Chapoto, A. (2002) False Promise or False Premise? The Experience of Food and Input Market Reforms in Eastern and Southern Africa, **World Development, 30 (11)**, 1967–1985.

Kaluwa, B. M. (1992) 'Malawi Food Marketing: Private Trader Operation and State Intervention', in J. B. Wyckoff and M.

Rukuni (eds.) **Food Security Research in Southern Africa: Policy Implications**, proceedings of the Sixth Annual Conference on Food Security Research in Southern Africa, University of Zimbabwe/ Michigan State University Food Security Research Project.

Karugia, J. T., Wambugu, S. K. and Oluach-Kosura, W. (2004) The Role of Infrastructure and Government Policies in Determining the Efficiency of Kenya's Maize Marketing System in the Post-Liberalisation Era, IFPRI Eastern Africa Food Policy Network, Network Paper 6, Kampala: IFPRI.

Khaila S., Mvula P. and Kadzandira J. (1999) 'Consultations with the Poor – Country Report for Malawi'. A qualitative study done on behalf of the World Bank, Poverty Reduction Group, Washington D.C.

Kherallah, M., Delgado, C., Gabre-Madhin, E., Minot, N. and Johnson, M. (2000) The Road Half Travelled: Agricultural Market Reforms in Sub-Saharan Africa, *IFPRI Food Policy Report No. 10*, Washington: International Food Policy Research Institute.

Kydd, J. and Dorward, A. (2001) The Washington Consensus on Poor Country Agriculture: Analysis, Prescription and Institutional Gaps, **Development Policy Review, 19 (4)**, 467-478.

Mthindi, G.B., Chilowa, W. R., Milner, J. A. G. and Ntata, P. (1999) Social Policy in the Context of Economic Reforms in Malawi: The Survival and Adaptive Strategy of Vulnerable Groups, First, Second and Third Monitoring Survey Reports, Southern African Regional Institute for Policy Studies.

Mkwezalamba, M. (1989) The Impact of Liberalisation of Smallholder Agricultural Produce Pricing and Marketing in Malawi. Report submitted to Ministry of Agriculture, Lilongwe.

Mvula, P. M., Chirwa, E. W. and Kadzandira, J. (2003) Poverty and Social Impact Assessment in Malawi: Closure of ADMARC Markets, Report submitted to World Bank and GTZ.

National Statistical Office (NSO) (2005) Malawi Second Household Survey (IHS-2) 2004 – 2005: Basic Information Document, Zomba: National Statistical Office. Available at http://www.nso.malawi.net.

North, D. C. (1995) The New Institutional Economics and Third World Development, in J. Harris, J. Hunter and C. M. Lewis (eds.) **The New Institutional Economics and Third World Development**, London and New York: Routledge.

Nthara, K. (2002) What Needs to Be Done to Improve the Impact of ADMARC on the Poor, Phase II Final Report prepared for the Joint Oxfam Programme in Malawi, Blantyre.

Nwokoye, N. G. (1981) **Modern Marketing for Nigeria**, London and Basingstoke: Macmillan Publishers Limited.

Peters, P. E. (1992) Monitoring the Effects of Grain Market Liberalisation on the Income, Food Security and Nutrition of Rural Households in Zomba South, Malawi, Report submitted to AID/Malawi and World Bank.

Poole, N. D., Del Campo Gomis, F. J., Julia Igual, J. F. and Gimenez, V. (1998) Formal Contracts in Fresh Produce Markets, **Food Policy, 23 (2)**, 131-142.

Scarborough, V. (1990) Domestic Food Marketing Liberalization in Malawi: A Preliminary Assessment, ADU Occasional Paper 13, London: Wye College, University of London.

Smale, M. (1995) "Maize is Life": Malawi's Delayed Green Revolution, **World Development, 23**, 819-831.

Toye, J. (1995) The New Institutional Economics and its Implication for Development Theory, in J. Harris, J. Hunter and C. M. Lewis (eds.) **The New Institutional Economics and Third World Development**, London and New York: Routledge.

Other DOE Working Papers Series

2005

2005/01 **Pro-poor Growth in Agriculture and the Land Question in Malawi** by Ephraim W. Chirwa, April 2005

2005/02 **Evidence against Static Asset Pricing on the JSE Securities Exchange of South Africa** by Ronald D. Mangani, May 2005

2005/03 **Gender and Performance of Micro and Small Enterprises in Malawi** by Ephraim W. Chirwa, May 2005

2005/04 **Household Consumption of Complementary Infants' Foods in Malawi: The Case of Zomba and Chiradzulu Districts** by Levison Chiwaula and Ben Kaluwa, July 2005

2005/05 **Role of Migrants' Remittances in an Unstable Low-Income Economy: A Case Study of Malawi** by Chinyamata Chipeta and Willie Kachaka, July 2005

2005/06 **Macroeconomic Policies and Poverty Reduction in Malawi: What Can we Infer from Panel Data?** by Ephraim W. Chirwa, July 2005

2005/07 **Cash Crop Liberalization and Poverty Alleviation in Africa: Evidence from Malawi** by Winford H. Masanjala, August 2005

2005/08 **Agricultural Marketing Liberalisation and the Plight of the Poor in Malawi** by Ephraim W. Chirwa, Peter M. Mvula and John Kadzandira, September 2005

2005/09 **A Rough and Lonely Road to Prosperity: A Re-examination of the Sources of Growth in Africa using Bayesian Model Averaging** by Winford H. Masanjala and Chris Papageorgiou, October, 2005

2005/10 **Expected Returns and Volatility on the JSE Securities Exchange of South Africa** by Ronald Mangani, November, 2005

2006

2006/01 **Determinants of Child Nutrition in Malawi** by Ephraim W. Chirwa and Harold Ngalawa, January 2006

2006/02 **Technical Efficiency of Smallholder Farmers in Southern Malawi: A Study of Adopters and Non-adopters of Integrated Aquaculture-Agriculture** by Richard Mussa, February 2006

2006/03 **Farm-Level Productivity in Smallholder Tea Farming in Malawi: Do Contractual Arrangements Matter?** By Ephraim W. Chirwa and Jonathan Kydd, March 2006

2006/04 **Commercialisation of Food Crops in Rural Malawi: Insights from the Household Survey** by Ephraim W. Chirwa, January 2006

2006/05 **The Poverty - HIV/AIDS Nexus in Africa: A Livelihoods Approach** by Winford H. Masanjala, March 2006

2007

2007/01 **Monetary, Financial and Real Sector Interrelationships in South Africa** by Ronald Mangani, August 2007

2007/02 **The Demand for Private Health Insurance in Malawi** by Donald Makoka, Ben Kaluwa and Patrick Kambewa, August 2007

2008

2008/01 **A GARCH Representation of Macroeconomic Effects on the JSE Securities Exchange** by Ronald Mangani, March 2008

2008/02 **What Explains Variations in Access to Land in Malawi?** By Ephraim W. Chirwa, March 2008

2008/03 **The Effectiveness of Anti-smoking Policies in Poor Countries: Evidence from Kenya**. By Ben Kaluwa, Scholastica A. Odhiambo and Felix Maoni, December 2008

2009

2009/01 **The Rates of Return on Education in Malawi** by Ephraim W. Chirwa and Mirriam M. Matita, January 2009

2009/02 **The Impact of Education on Self-Employment, Farm Activities and Household Incomes in Malawi** by Mirriam M. Matita and Ephraim W. Chirwa, February 2009