



TOBACCO CONTRACTUAL ARRANGEMENTS IN MALAWI AND THEIR IMPACT ON SMALLHOLDER FARMERS

Evidence from Burley Tobacco Contracts

Abel Kondwani Shaba, A.-K. Edriss, J.H. Mangisoni, and M.A.R. Phiri

This Working Paper is an output of the Bunda Grant Scheme of the Strengthening Evidence-Based Agricultural Policy (SEBAP) project of IFPRI-Malawi. The Grant Scheme provides selected Masters-level students from the Lilongwe University of Agriculture and Natural Resources (Bunda College) with opportunities to improve, publish, and disseminate the research that they undertook during their MSc training.

Table of Contents

- Abstract2
- 1. Background Information.....3
- 2. Contract Farming and Transaction Costs.....3
 - Justification for analysis4
 - Theoretical and empirical framework5
- 3. Data Sources and Descriptive Statistics.....8
- 4. Results and Discussion.....9
 - Motivation to participate in contract farming9
 - Transaction costs related to contract farming of burley tobacco.....10
 - A transaction cost framework to examine performance of tobacco contract farming in Malawi12
 - Farmers’ perception of the impacts of contract farming.....15
- 5. Conclusions and Policy Implications16
- References17

List of Tables

Table 1. Variables used in the Heckman Selection Model	7
Table 2: Descriptive statistics of analytical variables from cross-sectional survey of smallholder tobacco farmers	8
Table 3: Performance of burley tobacco contracts using a Transaction Cost Framework.....	12
Table 4: Treatment effect model.....	13

List of Figures

Figure 1: Motivation for participating in contract farming, percent of contract farmers reporting factor listed	9
Figure 1: Kernel density distribution of tobacco prices received, non-contract and contracted farmers, USD/kg.	14
Figure 2: Perceived impact of tobacco production on smallholder income for past two years, by whether engaged in contract farming or not	15

ABSTRACT

Contract farming is emerging as an important governance structure in certain agricultural value chains. This study was done with the objectives of understanding the contractual relations between buyers and small-scale growers in the tobacco industry in Malawi and the impact of contract farming on smallholder incomes. Cross-sectional data was collected from 211 contract and 109 non-contract smallholder burley tobacco farmers who sold tobacco in the 2012/13 season. Two analyses were undertaken.

First, the study analyzed the contractual arrangement and the performance factors under contract using analytical methods from transaction costs economics. Commercial banks, through the tobacco buyer, provide farmers with input loans, which farmers use to obtain fertilizer, seed, and extension services, all of which are important to increase tobacco productivity. The results of the contract analysis indicated that side-selling, information asymmetry, moral hazard, and strategic contract default by farmers were some of the transactions costs that affect the success of contract farming. However, the contractual arrangement also contributed to reduced transfer costs and reduced the rejection rate for the tobacco produced by the contract farmers. Moreover, to the buying company, contract farming contributes to reduced monitoring costs, as farmers work in groups and monitor each other's activities, such as baling of the tobacco leaf, which ensures better quality tobacco being offered under contract.

Secondly, for the impact evaluation of contract tobacco farming, a treatment effect model was used. The study analyzed the factors that affect farmers' participation in contract farming and the effect of that participation on net tobacco income. Landholding size, access to extension services, distance to the auction floor, and the gender of the tobacco farmer were found to strongly affect the participation decision. Differences in income between contract and non-contract farmers were found to be strongly influenced by landholding size and monitoring of sales at the auction. Contract participation increases tobacco income by 46.6 percent. This finding justifies making efforts to contractually link more smallholder farmers to tobacco companies. Therefore, a policy needs to be in place to facilitate such contracts between small-scale farmers and companies that buy tobacco leaf in Malawi.

Keywords: contract farming, transaction costs economics, tobacco, smallholder, treatment effect model.

1. BACKGROUND INFORMATION

In recent years, the need to more deeply integrate smallholder farmers into agriculture value or supply chains in Malawi has become an important policy agenda. Agricultural policy analysis in Malawi shows that there is a need to commercialize the smallholder sector. Contract farming, alongside out-grower schemes and cooperatives, are among the strategies that are aimed at increasing smallholder farmers' participation in commercial crop, livestock, and aquaculture production (GoM 2011). In Malawi, the smallholder sub-sector is singled out because of its importance for employment and for agricultural sector performance.

The smallholder subsector makes up the largest share of the agricultural sector in Malawi. Smallholder farmers are the primary producers of food in Malawi and produce some of the cash crops, but operate in a highly resource constrained environment that affects both the production and the marketing of their crops. Smallholder productivity levels are significantly lower than potential yields and those realized by the estate subsector. The major factors adversely affecting productivity in the smallholder farming sub-sector in Malawi, according to the Government of Malawi (GoM 2011), include low input use, over-reliance on rain-fed agriculture, inadequate access to agricultural credit, inadequate access to output and input markets, and limitations in technology development and transfer. This is further exacerbated by erratic rains and droughts.

Within the smallholder subsector, maize and tobacco are important crops. Tobacco alone accounts for 45 percent of the value of all reported exports (NSO 2015). Over the years, tobacco marketing has been dominated by the auction system. Since 2000, however, policy changes have taken place where auction marketing is diminishing in significance for smallholder tobacco marketing. According to da Silva (2005), the once dominant role of spot markets, as a mechanism to harmonize market transactions is being replaced by alternative forms of vertical coordination, including strategic alliances, full ownership, and contracts. Tobacco in Malawi now is legally sold both through auction floors (spot market) and contract farming. Eighty percent of smallholder tobacco in Malawi is now sold under contract, rather than on the auction floor. These changes have taken place with intentions of increasing productivity, matching demand with supply to maintain reasonable prices, reducing cases of child labor, and increasing levels of traceability in the product. While non-contract farmers sell to any buyer, contracted farmers sell directly to the contract buyers.

2. CONTRACT FARMING AND TRANSACTION COSTS

Malawi's agriculture sector faces several challenges, including price and production uncertainty. Tobacco buyers want high quality leaf, while smallholder farmers lack adequate inputs, such as fertilizer, to produce the desired product. Despite market liberalization, smallholder farmers have limited access to finance. Consequently, most smallholder farmers cannot afford to purchase adequate inputs, particularly fertilizer. Moreover, tobacco, as with other export crops like cocoa, vegetables, and coffee, involves considerable transaction costs in both production and marketing that make it challenging for independent smallholder farmers to produce (Delgado 1999). Tobacco prices are influenced by various factors, including quality. Tobacco buyers need to meet the compliance and traceability requirement of their customers, all of which starts with the grower. At the same time, tobacco in Malawi is marketed within a specific period from March to September. If it is not sold, it cannot be consumed or otherwise used by the farmers. It is very difficult to store the commodity without losses in quality, especially under smallholder farmer conditions.

Contract farming for smallholder production of tobacco in Malawi has been developed to overcome missing markets. The contract arrangement provides farmers with access to credit, as the contract is used as bank collateral. With the access to inputs the credit provides, farmers can achieve higher productivity and income levels than if they produced tobacco without a contract (FAO 2001; Glover 1987). However, some analysts have criticized contract farming arrangements for taking advantage of farmers. Farmers have low bargaining power in the contractual relationship (Key and Runsten 1999), so may not realize significant benefits to their income and welfare. Empirical studies of contract farming by smallholder farmers across sub-Saharan Africa and in other developing countries have been done to better understand the determinants of participation and impact of contract farming on participants' income and welfare (Guo and Jolly 2008; Hu 2013; Miyata, Minot, and Hu 2008).

The tobacco company studied for the research described in this paper, referred to as "the buyer", is a major global leaf tobacco buyer that sells to many of the world's leading cigarette manufacturers. The buyer's Malawi operations include the Integrated Production System, a contract farming system that includes both contract growing and contract marketing. Contract farming was originally introduced in Malawi to increase flue-cured tobacco volumes, which rapidly declined at the end of the 1990s. Under contract growing, contracted farmers are provided with both physical and technical inputs. These include tobacco seed and fertilizer, but also maize inputs so that farmers can meet their food security needs without adversely affecting their tobacco production and to avoid diversion of tobacco inputs to maize or other food crops. Included in the inputs provided by the buyer is systematic monitoring of the crop of contracted farmers by the buyer's agronomists and extension agents, providing the firm with greater control over the production system by specifying the timing of various crop management operations and methods of land preparation and cultivation. The buyer has introduced incentives, such as monthly cash payments, to stabilize farmers' livelihoods during the hungry season between January and March. The farmers sign a contract form with the buyer either as a club or as individuals. The buyer retains the full right to purchase all the tobacco a contracted farmer produces, if the farmer follows the agreed contract terms and conditions.

Justification for analysis

Malawi's agriculture sector is dominated by smallholders cultivating less than two hectares, but who, at the same time, rely heavily on the production of field crops that require substantial inputs of labor, fertilizer, and improved seed. There is limited direct involvement of the private sector in supporting smallholder agricultural production and agricultural extension support by government agencies to farmers is on the decline. The Government of Malawi acknowledges these weaknesses and advocates contract farming and cooperatives as important strategies to foster private sector led growth in the agriculture sector. Contract farming has been identified as a potentially important mechanism for enhancing the efficient functioning of agricultural markets in Africa, including Malawi (NEPAD 2003). Research has shown that contract farming improves farmers' incomes, while firms choose the arrangement as it helps reduce transactions costs as compared to buying from spot markets (Abebe et al. 2013).

In Malawi's tobacco sub-sector, for the past 15 years prices on the auction floors in real terms have been sliding (Nsiku and Botha 2007). Falling prices have adversely affected farmers' incomes. In consequence, there have been policy discussions in Malawi on whether to continue implementing or even expanding the contract farming focused Integrated Production System in the tobacco industry. The research reported upon in this paper was

undertaken to understand the benefits Malawi smallholder tobacco farmers obtain from existing contractual arrangements from a behavioural economics perspective. The study examines the contract between the farmer and the tobacco buyer as to whether it has attributes that encourage compliance with and fulfilment of the contract to improve performance. The research further sought to understand how contract farming reduces transaction costs for producer and buyer, an economic barrier in the market.

Theoretical and empirical framework

The common theoretical explanation for contract farming is based on Transaction Cost Economics, a branch of New Institutional Economics. Central to the foundations of New Institutional Economics is the idea that transactions between economic actors involve costs. Transaction costs relate to finding a market or customer, negotiating and signing a contract, controlling contract compliance, switching costs in case of premature termination of the contract, and all other cost opportunities (Bijman 2008). New Institutional Economics relaxes some of the key neoclassical economics assumptions, such as perfect information, a complete set of markets (credit, labor, input, and output markets), zero transaction costs, full rationality, and homogeneous products of the same quality and size. However, the assumption of self-seeking behavior attempting to maximize an objective function subject to constraints still holds (Kherallah and Kirsten 2002). The underlying argument is that the problems that economic actors face because of imperfect information in market transactions and institutions play a significant role in how those transactions and institutions are organized and operate (Kirsten, Karaan, and Dorward 2009). Transaction costs are determined by human behavior and by attributes of the transaction in question. Human behavior is characterized by bounded rationality and opportunism (Bijman 2008). Contract farming is an institutional arrangement that seeks to minimize these transaction costs. Conceptual and measurement challenges related to transaction costs are the main stumbling block to generating more empirical evidence on the strengths and weaknesses of contract farming arrangements (Kirsten, Karaan, and Dorward 2009; Wang 2003, Kherallah and Kirsten 2002; Hobbs 1997; Buckley and Chapman 1997).

A treatment effect model was used to evaluate the impact of contract farming on the income of smallholder burley tobacco farmers in Malawi. The model is built with understanding from Heckman's model, which mainly deals with selection bias. Before observing the impact of the treatment, contract farming, the farmer decides whether to participate in contract farming. So, the decision to participate is modelled first, because it is endogenous. Without modelling the decision to participate in contract farming, the regression on farmer income to show the impact of contract farming would be biased, regardless of whether or not covariates, such as socioeconomic factors, were controlled for. Unlike a sample selection model which estimates the outcome equation for participants only, the treatment effect model analyses outcome data for both participants and non-participants. In addition, the treatment effect model is intended for program evaluation, while the sample selection model focuses on selection bias.

The treatment effect model estimates two equations: the selection equation estimates the probability of participating in contract growing and marketing, while the outcome equation estimates net income as a function of various household characteristics, the contract dummy variable, and the Inverse Mills Ratio (IMR). The participation or adoption decision is usually estimated using a probit or logit model as follows

$$p(C_i) = \Phi(\beta'Z_i) \tag{1}$$

Where $C_i = 1$ if the farmer engaged in contract farming of burley tobacco; otherwise $C_i = 0$. $\Phi(\cdot)$ is the standard normal *cdf*, Z_i is an $R \times 1$ vector of personal and farm characteristics for farmer i and β is a vector of coefficients. However, the probit model was not used in the study. Rather, a single equation model was used as the treatment effect model.

Treatment effect models use the participation probit model to calculate the Inverse Mills Ratio and includes this ratio as a regressor in the income model. There are some characteristics of the farmer that are observable, while others are not. Standard regression analysis can control for the effect of observable characteristics, such as age and education of the farmer, but to eliminate the bias associated with unobservable characteristics, it is necessary to use a Heckman selection-correction model or an instrumental variable (Miyata, Minot, & Hu, 2009). The main argument is that the use of contract farming production arrangements is generally not randomly distributed throughout the farming population.

To evaluate the effect of contract farming, a system of equations involving an outcome of interest (y) and a selection equation for treatment (t) over observation i can be stated as follows:

$$y_{1i} = x_i' \beta_1 + u_{1i} \quad (2)$$

$$y_{0i} = x_i' \beta_0 + u_{0i} \quad (3)$$

$$t_i = 1(Z_i' \beta_1 + v_i > 0) \quad (4)$$

Where y_{1i} refers to the outcome (farm income) for treated (contracted farmers) respondents ($t_i = 1$) and y_{0i} for the control group; u_{ki} are the error terms. The above equations can be summarised in the following switching model

$$y_i = x_i' \beta_0 + t_i x_i' (\beta_1 - \beta_0) + u_{0i} + t_i (u_{1i} - u_{0i}) \quad (5)$$

The extent to which contract farming influences farmer income is reflected in the difference in the regime between contract farmers (participants) and non-contract farmers (non-participants) referred to through the joint outcome equation. Because of the similarities that exist between the control and treatment groups, equation (4) collapses, as the coefficients are restricted to $\beta_1 = \beta_0 = \beta$, excluding the intercept terms.

$$y_i = x_i' \beta + t_i \alpha + u_{0i} + t_i (u_{1i} - u_{0i}) \quad (6)$$

Where α captures the treatment effect given by the difference in intercepts of equations (2) and (3). The model is estimated in a two-step procedure, as in sample selection and Maximum Likelihood Estimation (MLE) procedures.

To determine the factors that influence a farmer's decision to undertake contract farming, a reduced form econometric model is developed. The variables included in the model were identified based on the theoretical framework and previous empirical research. Alene et al. (2008) proposes that where it is difficult to measure a variable, such as actual information or communication costs, observable factors that explain or mitigate transactions, such as distance to markets or ownership of transport and communication assets and membership in marketing groups, can be used. For the research here, indeed it was difficult in certain circumstances to measure the actual variable, e.g., the number of phone calls made or text messages sent to track missing bales. The respondents hardly recalled these factors, leading to a problem of missing values in the analytical data set.

The hypothesis is that socioeconomic and other household characteristics influence farmers' decision to participate in contract farming. A dummy variable (0/1) for engaging in contract farming is the dependent variable for the selection equation, while the dependent variable for the outcome equation is net tobacco income before tax. The following variables were used as independent variables. These are summarized in Table 1:

Table 1. Variables used in the Heckman Selection Model

Variable	Expected Sign	Reference
Distance	-	Voors and Haese 2010; Alene, et al. 2008; Staal, Delgado, and Nicholson 1996
Gender	-/+	Alene, et al. 2008
Land	+	Alene, et al. 2008; Bolwig, Gibbon, & Jones 2009, Rao and Qaim 2011
Age	-	Alene, et al. 2008
Time to sell tobacco	-	Hobbs 1997
Education	+	Alene, et al. 2008
Monitoring of sales	+	Hobbs 1997

Source: IFPRI MDG costing analysis

Distance: One of the observable factors that help explain a farmer's decision to participate in burley tobacco contract farming is proximity to the market. Long distance from the market influences farmers to participate in contract farming to reduce transportation and other related costs. By increasing travel time and transport costs, market distance is expected to have a negative influence on market participation and the quantity of commodities traded. Voors and Haese (2010) studied the determinants of milk marketing channels and found that distance affects the choice of marketing channel and the type of product to sell. Because milk is a bulky product and spoils rapidly, it cannot be transported without cooled transport. Consequently, remote farmers more often produced and sold cheese. Shorter distance to market could enhance sales with formal contracts, since proximity arguably reduces both transport costs and other costs. Distance to the market is taken as a single indicator of such costs (Takeshima, Adeoti, and Salau 2010; Alene et al. 2008; Staal, Delgado, and Nicholson 1996).

Time to transport tobacco: Hobbs (1997) estimated the effort to organise transportation to bring commodities to the market by asking farmers whether it was problematic to organise transportation of stock to the market. The responses were ranked between 1 and 5. This opportunity cost can be seen as a proxy measure for the amount of time spent organising transport.

Age and education: Other factors that influence farmers' choice to participate in a market, according to Alene et al. (2008), include age and education, which are proxy measures of human capital. Market participation declines with age, indicating that characteristics of older farmers, such as risk aversion, reluctance to adopt technology, and, hence, inability to produce for the market, dominate their expected greater market contacts and trust with other market actors that would allow them to trade at lower costs. Pingali, Khwaja, and Meijer (2005) also argued that variables like age, gender, education; and intrahousehold interaction influence the costs of information seeking, negotiating, monitoring, and enforcement in arranging market transactions.

Gender: Possible differential market access by male and female farmers may affect marketing behavior. In the study by Alene et al. (2008), female-headed households had a greater likelihood of participation in maize markets than male-headed households, with an average male headed household being 10 percent less likely to participate than a female-headed household.

Land size: Whole farm size is positively associated with gross crop revenue (Bolwig, Gibbon, and Jones 2009). As a farmer increases his or her cropped acreage, production and revenue is also expected to increase.

Therefore, the selection model used can be summarised as follows

$$CF_i = \beta_0 + \beta_1 EXT_i + \beta_2 AGE_i + \beta_3 EDC + \beta_4 GENDER + \beta_5 TDAYS_i + \beta_6 FARMSIZE_i + \beta_7 \ln DIST_i + \beta_8 \ln MINC_i + \varepsilon_i, \quad (7)$$

while the outcome equation is as follows:

$$INC_i = \beta_0 + \beta_1 AGE + \beta_2 EDUC_i + \beta_3 FARMSIZE + \beta_4 TDAYS_i + \beta_5 HHSIZE_i + EXT + IMR + \varepsilon_i \quad (8)$$

3. DATA SOURCES AND DESCRIPTIVE STATISTICS

A cross-sectional survey of smallholder burley tobacco farmers was conducted between July and August 2014 for the 2012/13 production and marketing season in Kasungu District in central Malawi. The buyer was not involved in the survey sample selection process beyond providing field guidance for identifying their contracted farmers. The survey sample was divided into two groups: contract and non-contract farmers. The two groups were comparable, in that all sample farmers were smallholder burley tobacco farmers, belonged to a farmers club, sold their produce through formal channel, and were all resident in the study area. The survey obtained information on socioeconomic and demographic characteristics and on agricultural production and marketing. Data was collected on demographic characteristics, price, quantity, transaction costs related to monitoring, screening, transportation, and enforcement of the contract. The study did not use the most recent season, 2013/14, as most farmers had not yet sold the tobacco that they had produced in this more recent season. Since the study was based on recall, cost-related data was supplemented with secondary data collected from records.

Table 2: Descriptive statistics of analytical variables from cross-sectional survey of smallholder tobacco farmers

Variable	Non-contract farmers	Contract farmers	All farmers	t-test of difference	
				t-stat.	Prob. > t
Age of the farmer	45.6	43.7	44.4	1.36	0.18
Total transportation days	44.8	21.7	29.6	8.85	0.00
Land size owned (ha)	0.87	1.57	1.33	-3.65	0.00
Quantity of tobacco produced (kg)	861	1,597	1,346	-4.74	0.00
Price per kg (US\$)	1.80	2.15	2.03	-6.95	0.00
Price per kg (MK/kg)	629.3	753.6	711.2	-6.95	0.00
Total revenue ('000 MK)	562.1	1,166.1	960.3	-5.94	0.00
Net tobacco income ('000 MK)	416.8	677.7	588.8	-2.72	0.01
Time to receive payment (days)	12.3	11.6	11.8	0.48	0.63
Number of observations	109	211	320		

Source: Analysis by authors of cross-sectional survey of tobacco producers, 2014.

Table 1 compares the mean values of some of the selected variables for the survey sub-samples of 211 contract farmers and 109 non-contract farmers from the total sample of 320 smallholder burley tobacco growers. The hypothesis is that there is no significant difference in the means for these variables between the contract and non-contract farmers – $H_0: diff = 0$. However, the results indicate that generally the means for these variables between the two samples are statistically different from each other. The contract farmers on average owned a larger area of land, received higher prices, produced more tobacco, and took fewer days to transport from home to the market and sell their tobacco bales. On average, a contract farmer owned 1.57 ha compared to 0.87 ha

for their non-contract counterpart. The other key difference is the number of days it took to transport and sell the tobacco. On average, a contract farmer sold their tobacco within a period of 22 days compared to 45 days for non-contract farmers. Farmers under contract farming were more likely to earn a higher price than when selling directly through the auction and incomes were higher for contract farmers than non-contract farmers. Tobacco revenues for contract farmers averaged MK1.17 million, which was about double the revenue for non-contract farmers. In terms of net income, contract farmers earned about MK261,000 more than what non-contract farmers earned. This however does not reflect whether contract farming is more economically efficient than non-contract farming. The t-tests showed that the differences between the means for all variables considered were significant, except for the average age of the farmers and the time required to receive payment after sale.

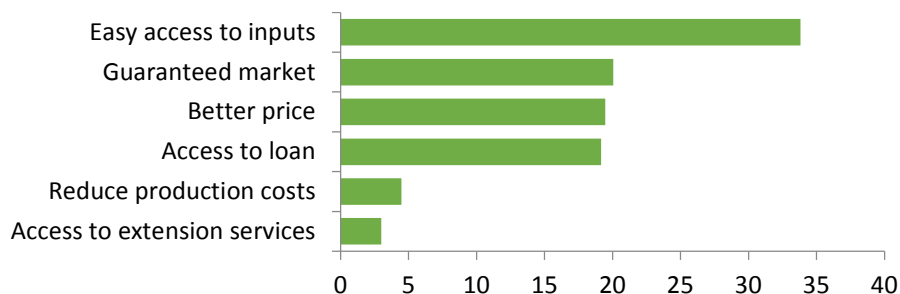
Most the smallholder tobacco farmers surveyed, 89 percent, were male. Similarly, a majority, 96 percent, had attended school, whether formal or informal. The non-contract farmers interviewed were slightly more likely to have attended school than the contract farmers. 89 percent of the contract farmers read and write either Chichewa or English, while 86 percent of the non-contract farmers are literate. Literacy is important in the context of contract farming, since farmers need to be able read and understand the contract, even if their club and the contractor take the initiative to inform the farmers on the contents of the contract. Almost all the survey participants depend on farming as their principal source of income. Other income sources reported include salaried jobs, such as teaching; business; and temporary *ganyu* wage labor. Most the farmers, 95 percent, reported being dependent on tobacco for their income from agriculture.

4. RESULTS AND DISCUSSION

Motivation to participate in contract farming

When asked why they decided to participate in contract farming, the contract farmers reported several incentives, including easier access to inputs, better prices, access to credit, a guaranteed market for their tobacco leaf, and access to extension services (Figure 1).

Figure 1: Motivation for participating in contract farming, percent of contract farmers reporting factor listed



Source: Analysis by authors.

Access to inputs is a challenge for smallholder farmers in Malawi. To improve their access to almost all the necessary inputs to produce quality tobacco was the main reason contract farmers in the study chose to participate in contract farming. Kirsten and Sartorius (2009) argue that credit market failures limit the use of modern inputs on crops and affects the quality of products produced. The findings from our study confirm this.

By independently selling their tobacco directly to the auction floors, tobacco farmers have difficulty in obtaining credit and, so, struggle to purchase all the required inputs for their tobacco, such as certified seed and the recommended types and amount of fertilizer. Through contract farming, farmers have access to at least the main recommended inputs, such as certified seed.

Anticipation of higher prices for the tobacco they produce and guaranteed markets for that tobacco were the other principal reasons farmers gave for joining contract farming. Related to the availability of a market, the farmers that sold tobacco directly to the auction floors revealed that they experienced high tobacco rejection rates. Access to transport also is a factor in the improved access to market for contract farmers. Contract farmers were also motivated because it did not take as long to sell their contracted tobacco at the auction floors as it would have taken if they had sold it independently.

Although not listed in Figure 1, farmers were also motivated to join contract farming in order to benefit from the allowances the buyer provided—which in actual sense are a part of the loan package. The allowances provide the contract farmer with income for the months of January, February, and March, which are the most difficult months in terms of food and income availability for many rural households. With the allowances, growers are better able to cope with the lean period to buy food, as well as to pay labourers and to buy poles for making tobacco barns. With the allowance funds, farmers have significantly less incentive to side sell their contracted tobacco to unauthorized buyers in order to meet immediate household expenses.

The motivation factors found in our study are similar to what studies elsewhere in developing countries found. For example, Masakure and Henson (2005) found that small-scale vegetable farmers in Zimbabwe were motivated to join contract farming arrangements in order to overcome problems of market uncertainty regarding price and demand, to reliably obtain inputs, to access transport to take their produce to market, to benefit from otherwise scarce extension services, and to gain extra income.

Transaction costs related to contract farming of burley tobacco

There are several costs that the buyer faces in implementing a contract arrangement with smallholder farmers in Malawi for the production of burley tobacco. Several of these are discussed here in turn.

Monitoring costs: The tobacco-related activities of non-contract tobacco farmers are not monitored by tobacco buyers. On the other hand, however, the activities of contract farmers are monitored by the buyer's extension workers starting from land tillage through to planting, fertilizer application, harvesting, baling, and transportation of the burley tobacco. However, the extension workers could not monitor all farmers at all times. To make sure that farmers adhered to the tobacco production and management procedures established in their contract and to minimize losses and costs, farmers in clubs of contract farmers monitor each other. Farmers in these clubs apply fertilizer, bale their tobacco, and transport the bales together. The economies of scale associated with these joint activities within the clubs and the comprehensive monitoring that results helps reduce costs for both the buyer and the producer, including those related to monitoring whether the contracted farmer is producing his or her tobacco according to the requirements stipulated in the contract with the buyer.

Side-selling: Side-selling by the contracted farmer of the tobacco produced or of the inputs provided by the buyer for tobacco or maize production was potentially important major non-compliant behavior by farmers. Contracted farmers were willing to take the risk of side-selling their tobacco or the inputs because the associated costs of doing so were not entirely borne by them. The major cost was that a contracted farmer

would face in side-selling would be that they would be dropped from the contract farming program and not be registered for the next season.

Strategic contract default: A key challenge for agri-businesses contracting farmers to produce a commodity is how to overcome the threat of farmers defaulting on those contracts. Defaults can occur because of production failure or because the farmer side-sold the produce to competing buyers, partly to avoid repaying the credit the farmer had obtained from the buyer with whom he or she was under contract (Coulter et al. 1999). On the side of the buyer, our study found that, at times, the buyer infringed their contract with the farmers by failing to deliver the inputs at the correct time and in the right quantities. The absence of a strong legal system to handle contract disputes, the lack of collateral held by smallholders, and weak insurance services create considerable risk for companies entering into contracts with smallholder farmers in Malawi.

Some of the contract farmers strategically defaulted on their contracts in order to avoid having to repay the loan they received from the buyer. At the end of the season, after selling the tobacco they produced, farmers are supposed to pay back the loan. Some of the farmers took advantage of the weak identification system in Malawi to not pay back the loan. Even stronger mechanisms to force repayment were avoided. For example, when both the buyer and the bank whose funds were loaned to the farmer placed a standing order at the tobacco auction floor to force proceeds from the sale of the farmer's tobacco to first go to satisfying the repayment of the loan, farmers would sell their produce through the auction system under the name of other farmers.

Transfer costs: On average, the tobacco produced by non-contract farmers stayed for more than two months from the time of baling before finally being sold at the auction floor. These farmers spent time and money visiting or calling transporters to follow up on when the tobacco would finally be transported to the auction floor. Non-contract farmers transported their tobacco through Tobacco Association of Malawi (TAMA). The tobacco was stored at TAMA depots until sufficient consignment became available to justify transportation to the auction floor. Because of this arrangement, the tobacco tended to stay long at the depot, hence decreasing in weight and quality. Poulton, Kydd, and Kabambe (1997) found a similar pattern of tobacco being allowed to deteriorate in quality while in storage, often because of disagreement with TAMA depot owners. Contract farmers had much lower transfer costs due to arrangement by the buyer for transportation of the baled tobacco to the auction floors being part of the contractual arrangement.

Enforcement costs: The penalty for non-tobacco related materials (NTRM) being found in any tobacco bale presented for sale is clearly stipulated to the contract growers. The buyer does not buy tobacco found with non-tobacco related materials. Bales containing such materials may be confiscated by the Tobacco Control Commission. Every bale found with non-tobacco related materials is returned for re-grading and the grower pays a penalty of MK 25.00 per every kg for every bale rejected to the inclusion of such materials. On top of the penalty, there is also the costs of re-grading and of transport for sending the tobacco to the grader. About 10 percent of non-contract farmers in the study survey had their tobacco rejected compared to about 2 percent of contract farmers.

Additional costs include those arising due to cheating on the part of the contracted farmers due to the buyer having insufficient information about growers' behavior. Further, growers who break or otherwise violate their contracts might be prosecuted in the court of law, which entails additional costs for both the buyer and the

farmer. A major challenge in this regard is that there is no legal framework in Malawi that specifically guides how disputes under contract farming arrangements are to be resolved.

A transaction cost framework to examine performance of tobacco contract farming in Malawi

To summarise how the tobacco contract farming arrangement between smallholder farmers and the buyer has performed, a simple transaction cost framework was used. Table 3 assesses such contract farming using different indicators in an *a priori* manner. The argument is that farmer behaviour or sources of transaction costs can affect the performance of the contract. Contract farming can be expected to help reduce some of the transaction costs associated with producing and buying burley tobacco in Malawi. For example, delivering the tobacco to the auction floors or simply paying the farmers on time reduces implicit costs. The positive and negative signs in Table 3 show positive and negative relationship, respectively, with type of farming, either under contract or not.

Table 3: Performance of burley tobacco contracts using a Transaction Cost Framework

	Contract	Non-contract
Collateral	-	+
Tobacco rejection	-	+
Access to price information	+	-
Disagreement on price	-	+
Number of days to bale tobacco	+	-
Number of days to transfer tobacco	+	-
Monitoring of tobacco sales	+	-
Number days to transfer tobacco from home to satellite depot	+	-
Missing bales in transit	-	+
Number of days it takes to receive payment	+	-
Default	-	+

Source: Analysis by authors.

Table 4 shows econometric estimates of the effects of contract farming on farmer income from tobacco. Two methods of estimation were used: maximum likelihood and two-step estimation. The model tests for correlation between error terms for unobservables in the selection and outcome equations. The maximum likelihood estimation model was used given the smaller standard errors reported by this estimation method relative to the two-step estimation method.

Table 4: Treatment effect model

Variable	Maximum Likelihood			Two-step		
	Coefficient	Robust standard error	P>z	Coefficient	Standard error	P>z
Selection equation <i>Dependent variable: Contract dummy</i>						
Extension visit	1.051	0.15	0.00***	1.044	0.11	0.00***
Age of the farmer	-0.021	0.01	0.03**	-0.020	0.01	0.04**
Education dummy 1	-0.230	0.25	0.35	-0.240	0.25	0.34
Education dummy 2	0.714	0.52	0.17	0.746	0.70	0.28
Gender of the farmer	-0.715	0.25	0.00***	-0.711	0.35	0.04**
Landholding size	0.263	0.09	0.00***	0.244	0.08	0.00***
Monthly income	-0.003	0.11	0.98	-0.022	0.10	0.83
Distance to auction	-0.687	0.21	0.00***	-0.799	0.24	0.00***
Constant	3.363	1.48	0.02**	4.018	1.55	0.01***
Outcome equation <i>Dependent variable: log net tobacco income</i>						
Age of the farmer	0.008	0.03	0.78	0.010	0.03	0.75
Age squared	0.000	0.00	0.65	0.000	0.00	0.64
Education dummy 1	-0.055	0.12	0.66	-0.054	0.13	0.67
Education dummy 2	0.032	0.17	0.85	0.039	0.27	0.89
Household size	-0.052	0.16	0.75	-0.049	0.17	0.78
Landholding size	0.150	0.04	0.00***	0.152	0.04	0.00***
Transportation	-0.084	0.07	0.25	-0.086	0.07	0.24
Monitoring dummy	0.217	0.13	0.10*	0.219	0.12	0.08*
Contract dummy	0.466	0.17	0.01***	0.433	0.17	0.01***
Constant	12.491	0.78	0.00***	12.483	0.75	0.00***
ath(rho)	-0.339	0.14	0.01			
Lambda	-0.313	0.12		-0.274	0.13	0.04**
Rho	-0.326	0.12		-0.286		
Sigma	0.960	0.05		0.958		
Wald test of independent equation						
Chi-square (1)	5.98					
Prob > Chi-square	0.014					
Log pseudolikelihood	-528.41					
Wald Chi-square	56.23			70.59		
Prob > Chi-square	0.00			0.00		

Source: Analysis by authors.

Note: Sample size is 320 farm households. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

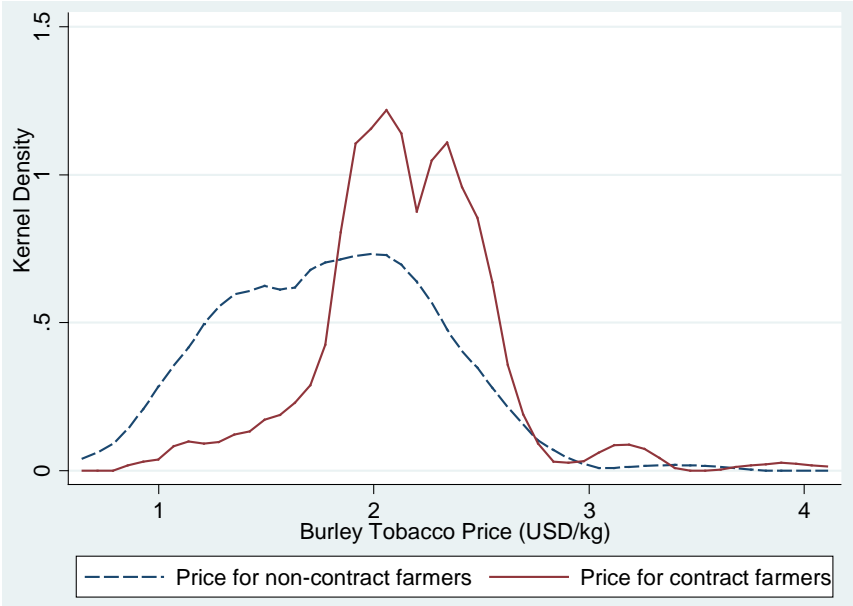
The results show that engagement with extension service providers, landholding size, the gender and age of the farm household head, and distance to the tobacco auction floors affect the decision to participate in contract farming. These results were statistically significant. The model predicts that farm size is positively related to participation in contract farming—farmers with larger pieces of land are more likely to participate in contract farming. This result is in line with qualitative results that showed that farmers with smaller pieces of land were likely not have a contract with the buyer, as the buyer would only arrange for loans for farmers producing 0.5 ha of tobacco or more. Farmers that were not able to meet the land requirement but were willing to engage in contract farming and had the financial capacity to rent-in more land did so. The rented-in land generally was used for tobacco production.

On the other hand, the farther away a farmer is located from the auction floors the less likely they are to participate in contract farming. This was an unexpected result, as the buyer facilitates transportation of the tobacco bales of contracted farmers to the floor, providing incentives for farmers who might face transport problems due to their location far from the auction floors to engaged in a contract with the buyer.

Turning to the results of the outcome equation on net tobacco income obtained, the results in Table 4 indicate that participation in contract farming increase tobacco income by 46.6 percent. Farmers engaged in contract

farming receive technical assistance from the buyer, access to credit to purchase inputs, and work together in groups, all of which are important factors to increase their tobacco productivity. Moreover, there is observed difference in the tobacco prices that contract and non-contract farmers received, respectively, as shown in Figure 1. Contract farmers received higher prices for their tobacco leaf. Moreover, income differences also can be attributed to differences in the landholdings of contract and non-contract farmers.

Figure 1: Kernel density distribution of tobacco prices received, non-contract and contracted farmers, USD/kg



Source: Analysis by authors.

Figure 1 shows that most non-contract farmers received less than USD 2.00 per kg, as the graph is skewed to the left of 2.0. On the other hand, the graph for contract farmers is skewed to the right of 2.0, indicating that the majority of the farmers received more than USD 2.00 per kg. The buyer provided a price premium to farmers that produced higher quality leaf, fulfilled their contracts fully, and managed to pay back the loan that they had received within the first few months of the selling season.

However, there was evidence of opportunistic behaviour by contract farmers. The qualitative interviews revealed that some contract farmers side-sold their tobacco, strategically defaulting on loan repayment, and diverted the inputs, especially fertilizer, that they had received for contract tobacco production to other crops. The farmers were willing to take the risk of side-selling tobacco or divert the inputs they received because the costs of such actions were not borne entirely by them. The other reasons for side-selling were the relatively low prices offered by the buyer and in order to meet pressing financial needs and other immediate cash-related constraints. The cost of monitoring all the farmers to prevent side-selling and other opportunistic behavior was exceedingly high and almost impossible for the buyer because of the large scale of their operations. To reduce such costs, the buyer encouraged the contracted farmers to organize themselves into clubs in part to monitor each other.

More broadly, the study points to problems for both parties in contract farming arrangements that arise through not having a legal framework in place to guide contract farming in Malawi. For farmers, their price expectations are often frustrated. While for the buyer, they have little legal recourse when faced with opportunistic behavior by the farmers with whom they have a contract.

Farmers’ perception of the impacts of contract farming

The growers were asked to state whether over the last two years their income from tobacco had increased, decreased, or did not change. When income increased significantly it meant the farmer could recover their costs of production, allowing them to remain with significant disposable income. If the income increased, but not significantly, it meant the farmer could recover the costs of production, but only had limited additional disposable income to buy a few things. A weakness in this measure is that, as a subjective measure, it does not tell us the actual income changes over the two years.

Figure 2: Perceived impact of tobacco production on smallholder income for past two years, by whether engaged in contract farming or not



Source: Analysis by authors.

Figure 2 shows that that a higher percentage of contract farmers (18.7 percent) reported that income increased significantly compared to 2.9 percent of non-contract farmers; 29.2 percent of the contract farmers reported that their income had increased, but not significantly so, compared to 19.2 percent of non-contract farmers; 19.2 percent of the contract farmers said there was no change compared to 9.6 percent of non-contract farmers. However, 41.3 percent noncontract farmers reported that their incomes had decreased over the past two years. Qualitatively, contract farmers attributed their improvements in income to increased productivity or the improved quality of their leaf and the consequent better prices they received. The farmers that reported increases in tobacco income, reported having bought assets, such as bicycles or livestock, or even built houses.

5. CONCLUSIONS AND POLICY IMPLICATIONS

Overall, contract farming has positive impact on the net tobacco income of contracted farmers. The institutional economics approach used in the analysis of their contractual arrangements showed that such farmers benefit from contract farming. However, the opportunistic behavior of both parties to the contract limits the success of contract farming. The lack of a legal framework in guiding contract farming in Malawi is a drawback in the implementation of contract farming, as it raises uncertainties about pricing, which also affects farm-level decision making regarding the level of inputs to use and the amount of land to allocate to tobacco, ultimately affecting the quantity and quality of tobacco produced. A legal framework will also be important for guiding the resolution of conflicts or disagreements between growers, buyers, and the financiers who provide loans for inputs. Reductions in transportation costs will be important to increasing net incomes from contract farming of tobacco. Land was an important factor in determining participation in contracts and the net income obtained from tobacco. This suggests that government policy should seriously consider smallholder farmers' access to land. Contract farming provides an important avenue for improving farmers' income. However, more effort needs to be put in to addressing the challenges that might derail the successes that can be achieved.

REFERENCES

- Abebe, G.K., J. Bijman, R. Kemp, O. Omta, and A. Tsegaye. 2013. "Contract farming configuration: Smallholders' preferences of contract design attributes." *Food Policy*, 40: 14-24.
- Alene, A.D., V.M. Manyong, G. Omany, H.D. Mignouna, M. Bokanga, and G. Odhiambo. 2008. "Smallholder market participation under transactions costs: Maize supply and fertilizer demand in Kenya." *Food Policy* 33: 318–328.
- Bijman, J. 2008. *Contract Farming in Developing Countries: An Overview*. Working Paper. Wageningen, The Netherlands: Wageningen UR.
- Bolwig, S., P. Gibbon, and S. Jones. 2009. "The economics of smallholder organic contract farming in tropical Africa." *World Development* 37 (6): 1094–1104.
- Buckley, P.J., and M. Chapman. 1997. "The perceptions and measurement of transaction costs." *Cambridge Journal of Economics* 21 (2): 127-145.
- Coulter, J., A. Goodland, A. Tallontire, and R. Stringfellow. 1999. *Marrying Farmer Cooperation and Contract Farming for Service Provision in a Liberalising Sub-Saharan Africa*. Natural Resource Perspectives 48. London: Overseas Development Institute.
- da Silva, C.A.B. 2005. *The Growing Role of Contract Farming in Agri-Food Systems Development: Drivers, Theory and Practice*. Rome: Food and Agriculture Organisation of the United Nations.
- Delgado, C. 1999. "Sources of growth in smallholder agriculture in sub-Saharan agriculture: The role of vertical integration of smallholders with processors and marketers of high value-added items." *Agrekon* 38 (special issue): 165-189.
- FAO (Food and Agriculture Organisation of the United Nations). 2001. *Contract Farming Partnerships for Growth*. FAO Agricultural Services Bulletin 145. Rome: FAO.
- Glover, D.J. 1987. "Increasing the benefits to smallholders from contract farming: Problems for farmers' organizations and policy makers." *World Development* 15 (4): 441-448.
- Government of Malawi. 2010. *The Agriculture Sector Wide Approach (ASWAp) – Malawi's Prioritized and Harmonized Agricultural Development Agenda*. Lilongwe: Ministry of Agriculture and Food Security.
- Guo, H., and R. W. Jolly. 2008. "Contractual arrangements and enforcements in transition agriculture: Theory and evidence from China." *Food Policy*, 33(6): 570-575.
- Hobbs, J. E. 1997. "Measuring the importance of transaction costs in cattle marketing." *American Journal of Agricultural Economics*, 79 (4): 1083-1095.
- Hu, W.-Y. 2013. "Effect of contract farming on the U.S. crop farmers' average return". *Agricultural Economics / Zemedelska Ekonomik*, 59 (5): 195–201.
- Key, N., and D. Runsten. 1999. "Contract farming, smallholders, and rural development in Latin America: The organization of agroprocessing firms and the scale of outgrower production." *World Development* 27 (2): 381-401.
- Kherallah, M., and J.F. Kirsten. 2002. "The New Institutional Economics: Applications for agricultural policy research in developing countries." *Agrekon* 41 (2): 111-134.
- Kirsten, J.F., M. Karaan, and A.R. Dorward, 2009. "Introduction to the Economics of Institutions." In J.F. Kirsten, A.R. Dorward, C. Poulton, and N. Vink (eds.). *Institutional Economics Perspectives on African Agricultural Development*. Washington, D.C.: International Food Policy Research Institute. 35-74.
- Kirsten, J., and K. Sartorius. 2002. "Linking agribusiness and small-scale farmers in developing countries: Is there a new role for contract farming?" *Development Southern Africa* 19: 503–529.

- Masakure, O., and S. Henson. 2005. "Why do small-scale producers choose to produce under contract? Lessons from nontraditional vegetable exports from Zimbabwe." *World Development* 33 (10): 1721–1733.
- Miyata, S., N. Minot, and D. Hu. 2009. "Impact of contract farming on income: Linking small farmers, packers, and supermarkets in China." *World Development* 37 (11): 1781–1790.
- NEPAD (New Partnership for Africa's Development). 2003. *Comprehensive Africa Agriculture Development Programme*. Midrand: NEPAD.
- Nsiku, N., and W. Botha. 2007. *Tobacco Revenue Management: Malawi Case Study*. Winnipeg, Manitoba: International Institute for Sustainable Development.
- NSO (National Statistical Office). 2015. *Trade Map - Malawi*. Zomba: NSO
- Pingali, P., Y., Khwaja, and M. Meijer 2005. *Commercializing Small Farms: Reducing Transaction Costs. The Future of Small Farms*. ESA Working Paper No. 05-08. Agricultural and Development Economics Division. Rome: The Food and Agriculture Organization of the United Nations (FAO).
- Poulton, C., J. Kydd, and D. Kabambe. 1997. *All-Africa Review of Experiences with Commercial Agriculture: Case Study on Malawi Tobacco*. Wye, Ashford, Kent, UK: Centre for Environmental Policy.
- Rao, E.J.O., and M. Qaim. 2011. "Supermarkets, farm household income, and poverty: Insights from Kenya." *World Development* 39 (5): 784–796.
- Staal, S., C. L., Delgado, and C. F. Nicholson. 1997. "Smallholder dairying under transaction costs in East Africa." *World Development*, 25 (5): 779-794.
- Takehima, H., A.I. Adeoti, and S. Salau. 2010. "Measuring the effect of transaction costs for investment in irrigation pumps: Application of unobserved stochastic threshold model to the case of Nigeria." *The African Journal of Agricultural and Resource Economics*, 6 (2): 118-143.
- Voors, M.J., and M.D. Haese. 2010. "Smallholder dairy sheep production and market channel development: An institutional perspective of rural Former Yugoslav Republic of Macedonia." *Journal of Dairy Science*, 93: 3869–3879.
- Wang, N. 2003. *Measuring Transaction Costs: An Incomplete Survey*. Ronald Coase Institute Working Papers, no. 2. St. Louis, USA: Ronald Coase Institute.

About the Authors

Abel Kondwani Banda is a final year MSc candidate in the Department of Agriculture and Applied Economics at Lilongwe University of Agriculture and Natural Resources (LUANAR). The paper draws on the student's MSc thesis written under the supervision of **Professor Abdel-Khalil Edriss**, **Professor Julius Mangisoni**, and **Associate Professor M.A.R. Phiri**, all at LUANAR.

Acknowledgments

This Working Paper is an output of the Bunda Grant Scheme of the Strengthening Evidence-Based Agricultural Policy (SEBAP) project of IFPRI-Lilongwe. The Grant Scheme provides selected MSc students from the Lilongwe University of Agriculture and Natural Resources (Bunda College) with opportunities to improve, publish, and disseminate the research that they undertook during their MSc training. The SEBAP project is made possible by the generous support of the American people through the United States Agency for International Development (USAID). (The views expressed in this working paper imply no endorsement by IFPRI-Lilongwe, USAID, or any other party than the authors.)

INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

1201 Eye Street, NW, Washington, DC 20005-3915 USA | T. +1.202.862.6496 | F. +1.202.862.5606 | ifpri@cgiar.org | www.ifpri.org

IFPRI-LILONGWE

P.O. Box 31666, Lilongwe 3, Malawi | T. +256.1.771780 | ifpri-lilongwe@cgiar.org | www.massp.ifpri.info

Copyright remains with the authors. To obtain permission to republish, contact ifpri-copyright@cgiar.org.