Burley Tobacco Clubs in Malawi: Nonmarket Institutions for Exports

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Abstract

This paper studies nonmarket institutions that facilitate exports. In Malawi, as in many other developing countries, farmers face numerous constraints that disconnect them from export markets. We explore the role of a local institution, the burley tobacco clubs, in bridging smallholders to exports. Burley clubs potentially enable farmers to increase their tobacco farming productivity by providing services related to institutional access, collective action, economies of scale, and supporting networks. Using matching methods and instrumental variable techniques, we find that tobacco club membership causes an increase of between 40-74 percent in output per acre and an increase of between 45-89 percent in tobacco sales per acre. Instead, neither the land share allocated to tobacco nor the unit value obtained by the producers is affected by club membership.

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Key Words: institutional access, collective action and economies of scale, supporting networks, tobacco exports, trade facilitation

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1 Introduction

Since production started in the early 1970s, burley tobacco has become Malawi's economic lifeline. It is by far the largest single export commodity of the country, with a share in total export earnings of 53 percent in 2006 and peaks of over 65 percent in the mid-nineties. (The second-largest export commodity, tea, generates only around 7 percent of export earnings.) Tobacco is often considered a sort of "green gold" with the potential to eradicate poverty, especially in rural areas.[1]

Burley tobacco clubs are groups of between 10 and 30 farmers that grow tobacco collectively. The clubs are a recent nonmarket institution in Malawi. They are regulated by their own constitutions—written documents with rights, rules, and regulations— and were designed to turn tobacco into a true green gold through four major explicit or implicit prerogatives.[2] First, burley clubs provide institutional access to auction floors (where tobacco is commercialized in Malawi) and to official extension services. Second, they facilitate collective actions. Club members jointly acquire inputs under group lending, that is under a common loan that is repaid at the time of sales in the auction floors. Collective action takes place in monitoring debt repayment and input use (preventing side selling of fertilizer, for instance), and in accessing higher input quality and lower input prices (via bulk purchases). Third, burley clubs allow for the realization of economies of scale, particularly in transportation services to the selling floors. Finally, the clubs are instrumental in the development of supporting networks by encouraging the interchange of farming advice and the provision of labor assistance.

The services delivered by the burley clubs make them an effective local institution to promote smallholder tobacco production and exports: they provide access to credit and inputs, improve the proper use of those inputs, spread knowledge, reduce labor constraints,

[1] "Green Gold" is an expression often used by local Malawians to refer to burley tobacco.

[2] Tobacco clubs were created as one of the building blocks of the tobacco liberalization. In the early 1990s, the government amended the Special Crop Act, a long-standing legal and institutional constraint that precluded small farmers from growing burley tobacco. After liberalization, smallholders were allocated a higher share of the national tobacco quota. Also, a series of additional facilitating measures were undertaken, including the creation of burley clubs, the introduction of intermediate buyers, and the availability of credit via the Malawi Rural Finance Company.

lower transport costs, secure higher output prices, and promote economic coordination among smallholders in liberalized markets. Tobacco clubs thus provide farmers with the incentives to exert the effort and to maintain the motivation needed for profitable tobacco farming. Our goal in this paper is to quantify some of the benefits associated with burley club membership. To investigate impacts on tobacco production and exports at the farm level, we focus on farming outcomes such as tobacco yields, sales, land allocation, and unit values.

This is a study on local nonmarket institutions for exports and development. There are various strands of related literature. Acemoglu, Johnson and Robinson (2001; 2002) and Acemoglu and Johnson (2005), for instance, establish causality from better large-scale institutions (like legal and political regimes) to development. Rose (2004; 2005) estimates instead the impacts of various large-scale international institutions (like the WTO or the OECD) on the volume of trade. Dollar and Kraay (2003), in turn, study how (domestic) institutions affect trade and growth. There is yet a whole literature that explores how, in low income countries and especially in rural economies where market failures abound, small local institutions can play a fundamental role as bridges towards progress. Examples that are close to our work include Anderson and Baland (2002) and Besley, Coate, and Loury (1993), on ROSCAs; Garg and Collier (2005), on safety nets and employment; Kranton (1996), on cooperatives, Besley (1995), on risk insurance, Banerjee, Gertler, and Ghatak (2002) on tenancy reform.

Our contribution is to investigate the role of nonmarket institutions for international trade and, specifically, for exports.[3] Once formal trade barriers came down, transaction costs have become the major deterrence to trade expansion. While in developed countries these costs include customs procedures and infrastructure (transportation), in rural Africa the costs that are closer to the grassroots (such as land and credit constraints, or labor and knowledge barriers) are as, and often even more, important. Our study of burley clubs as nonmarket local institutions for tobacco production and exports advances the view that trade facilitation in Africa should be broaden to include policies to soften those grassroots constraints.[4]

[3]See Greif (1993) for historic accounts of the role of institutions in facilitating trade.

[4]There are many institutional arrangements like the burley clubs in the developing world. In Africa, for

The impacts of burley clubs are gauged by using matching methods and instrumental variables estimators. The matching estimator is based on comparing outcomes for similar households in terms of observable characteristics. Our instrument is an indicator of default risk pertaining to a specific group of unmarried women. These individuals, especially younger ones, are risky for tobacco clubs because of a higher probability of marriage. Marriage can cause the bride to leave the village and renege on her debt. Marriage can also overturn the farming decisions made by women and lead to default. Last, marriage can increase the risk of pregnancy. These are actually prevalent risks in Malawi. In their written "constitutions," a large proportion of clubs explicitly prohibits young unmarried women from being members. While many others implicitly adopt this regulation, only a few are completely open to them.

The main source of data for our analysis is the tobacco module of the Malawi Integrated Household Survey of 2004/2005, a significant effort of the Malawi Statistical Office (with support from the World Bank) to gather comprehensive household data (World Bank, 2006). The survey collected typical demographic, expenditure, income, health, education, and employment information, together with a tobacco module with detailed data on tobacco farming. To complement these data, we deployed the Tobacco Clubs Survey (TCS) in the summer of 2007. This is a small-scale survey with supplementary information on the rules and regulations as well as on services and benefits of the burley tobacco clubs.[5]

We find that the burley clubs are indeed an effective local institution for exports. Tobacco club members are much more productive than non-members—the tobacco club premium in yields (per acre) ranges from 40-74 percent. Members also earn between 45 and 89 percent more (per acre) than non-members via sales. This implies average income gains from burley membership of between 20 to 37 percent. These gains would be equivalent to increases in tobacco prices, for instance due to enhanced foreign market access, lower transportation costs, or better infrastructure, of between 37 to 54 percent. In contrast, members and

instance, there are export programs like the Kilombero Business Linkage Program (sugar cane in Tanzania), Hortico (babycorn and mange-tout in Zimbabwe), Homegrown (vegetables and flowers in Kenya), The Coffee Alliance (Uganda), Kenya Tea Development Authority, NERICA, New Rice for Africa (rice in Guinea), JIB (barley in the Jos Plateau in Nigeria).

[5]See Udry (2003) for a discussion on the role of complementary surveys in research on institutions in Africa.

non-members allocate approximately the same share of land to tobacco and report similar unit values.

The paper is organized as follows. In section 2, we describe the tobacco clubs. Based on data from our Tobacco Clubs Survey (TCS), we list the basic set of rules and regulations that build the constitutions of the tobacco clubs and we assess the services provided to fellow members. Also, using data from the Malawi Integrated Household Survey (IHS), we provide prima facie evidence of the differences in farming outcomes across members and non-members. The empirical strategy and the main regression results are discussed in section 3. Section 4 concludes.

2 Tobacco Clubs in Malawi

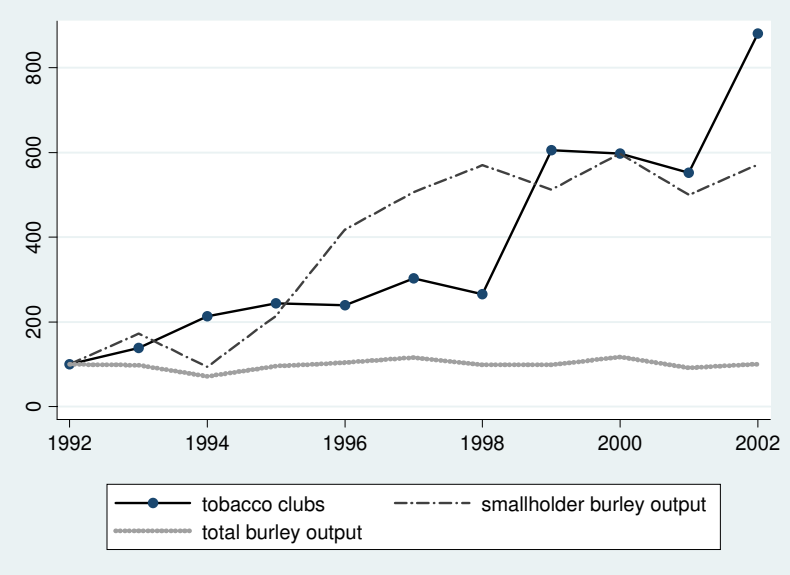
In an attempt to reduce poverty and foster smallholder tobacco production, the Government of Malawi started in the early 1990s a gradual process of liberalization of the tobacco sector, its main export. The reform of such a complex sector, where farmers, estates and exporters interact along various layers of production and processing, comprised several key steps.[6] For our purposes, the major feature of the reforms was the creation of "burley tobacco clubs," groups of 10-30 smallholder that gathered together to grow tobacco and jointly perform critical farming activities.[7]

The initiative was a success. According to the Tobacco Control Commission (TCC), the number of clubs grew to 23,843 in the 2006/2007 season from a few thousands in the early 1990s. In turn, smallholder production of tobacco grew hand in hand with the spread of burley clubs. Figure 1 shows that both the number of clubs and the volume of smallholder burley production experienced a steady growth after market liberalization in 1992. Instead, the total quantity of tobacco produced in Malawi underwent little variation over the same

[6] One was the amendment of the Special Crop Act that precluded participation of small farmers by allowing cultivation of tobacco only on leasehold and freehold land, and the allocation of an increasing share of the national burley quota to smallholder farmers. Another was the introduction of a program of intermediate buyers to facilitate the logistics of bringing the smallholder's output to the auction floors.

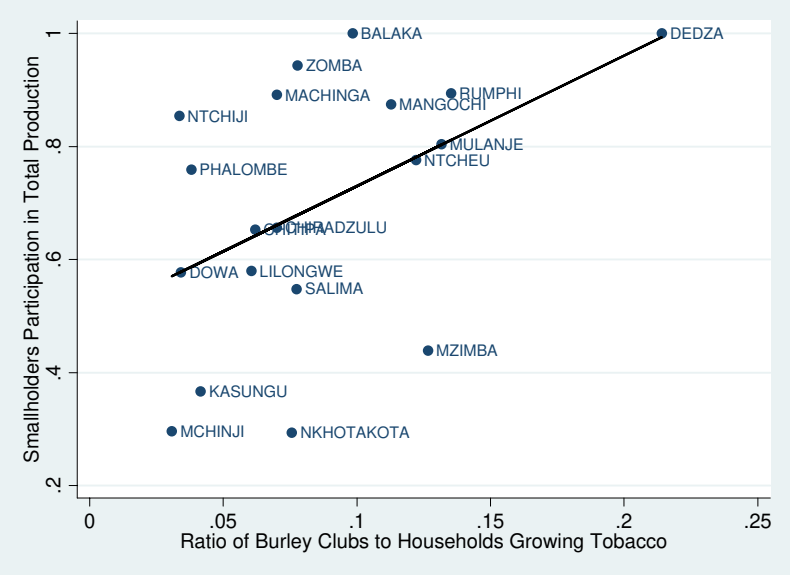
[7] At the same time, groups of around 160 clubs gathered in different associations and formed the National Smallholder Association of Malawi (NASFAM). Another important medium-scale institution is TAMA, the Tobacco Association of Malawi.

Figure 1
Number of Tobacco Clubs and Smallholder Tobacco Production
(1992 - 2002)



Sources: Tobacco Control Commission, National Statistical Office (various issues), Statistical Yearbook, and Government of Malawi (various issues), Economic Report. The variables are expressed as an Index 1992=100.

Figure 2
Smallholder Burley Production and Number of Clubs Across Districts
(2004)



Sources: Tobacco Control Commission (number of clubs) and the Malawi Integrated Household Survey (quantity of burley produced by smallholders)

period. In the end, the participation of smallholders in total production and exports of tobacco grew as well. A similar picture is uncovered by Figure 2, which reveals a positive correlation between the proportion of burley produced by smallholders and the ratio of clubs to tobacco growers in a cross-section of districts in 2004. This implies that the districts characterized by high smallholder tobacco participation are those districts where burley tobacco clubs tend to be more popular among tobacco growers.

Before formally exploring the relationship between burley clubs and smallholder tobacco production, we describe some basic characteristics of this nonmarket institution. Each tobacco club is governed by a set of rules and regulations, and provide various services to abiding members. We discuss these rules, regulations, and services next.

2.1 Tobacco Clubs Constitutions: Rules and Regulations

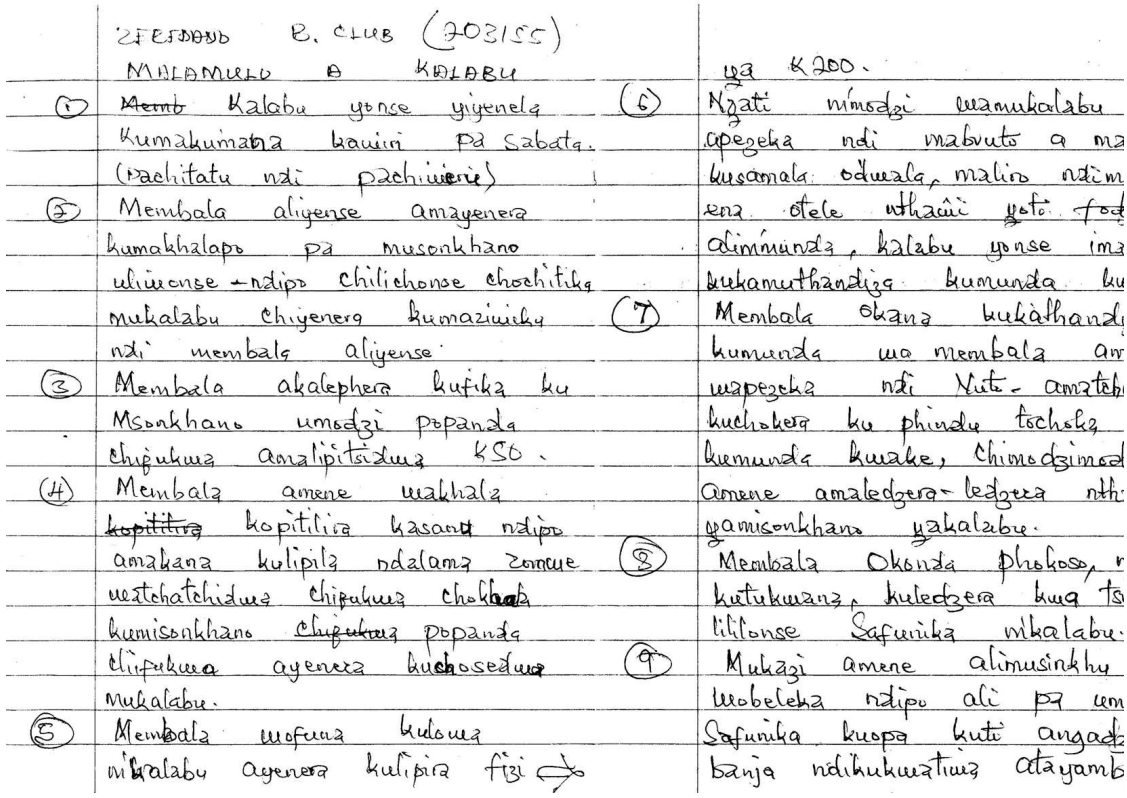
Tobacco clubs are ruled according to their own regulations. These establish the rights and duties of the members, the structure of governance, the acceptance of new members, and the renewal and withdrawal of membership. Often, these regulations can be found in a written document, a club "constitution." One instance of such document is in Figure 3, which displays the written rules of the Zebedayo Tobacco Club. In other cases, the regulations are just part of the common knowledge of the members.[8]

It is important to quantitatively describe the main barriers to club participation. Some of these regulations comprise a sort of eligibility condition that can be exploited to achieve identification in our empirical analysis. In order to document these regulations, we set up the Tobacco Clubs Survey (TCS) in the summer of 2007. The TCS was deployed on 238 clubs nationwide with the aim of collecting basic information on the structure of clubs, their mandate, major problems and constraints, and key services. The TCS is described in Appendix 1.

Table 1 summarizes the main regulations of tobacco clubs in Malawi. Almost all of the clubs interviewed in the TCS have regular meetings, impose fees to members who fail to

[8]Written constitutions exist even in these cases. However, they are usually stored in the bank where the club has an account at the time of registration. The rules are then passed from one member to another by word of mouth.

Figure 3
Zebedayo Tobacco Club
Written Constitution



ZEBEDAYO B. CLUB (203155)
MALAMULO A KALABU

(1) ~~Memb~~ Kalabu yonse yiyenela kumakumana kawiri pa Sabata. (Pachitatu ndi pachiwiri)

(2) Membala aliyense amayenera kumakhalapo pa musonkhano uliwonse - ndipo chilichonse chochitika mukalabu chiyenera kumaziwika ndi membala aliyense.

(3) Membala akalephera kufika ku Msonkhano umodzi popanda chifukwa analipitsidwa K50.

(4) Membala amene wakhala ~~kopititra~~ kopitilira kasanu ndipo amakana kulipila ndalama zomwe watchatchidwa chifukwa chokhala kumisonkhano chifukwa popanda chifukwa ayenera kuchosedwa mukalabu.

(5) Membala wofuna kulowa mkalabu ayenera kulipira fizi ⇨ ya K200.

(6) Ngati mmodzi wamukalabu apezeka ndi mabvuto a ma kusamala odwala, malilo ndim ena otele wthawi yoto ~~fod~~ olimunda, kalabu yonse ima kukamuthandiza kumunda ku

(7) Membala okana kukàthandi kumunda wa membala am wapezeka ndi Xuto - amateb kuchokera ku phindu tochoka kumunda kwake, Chimodzimod amene amaledzera - ledzera nth yamisonkhano yakalabu.

(8) Membala Okonda phokoso, r kutukwana, kuledzera kwa to lililonse Safuuka mkalabu.

(9) Mukazi amene alimusinkhu wobeleka ndipo ali pa um Safuuka kwopa kuti angach banja ndikukwatiwa atayamb

Note: The Document lists the set of rules from the Zebedayo Tobacco Club. These constitutions were obtained through the Tobacco Clubs Survey (TCS). See Appendix 1 for details.

1. The Club meets twice per week
2. Members must be present at Club meetings and be up to date with club business
3. There is a 50 Kwacha fee for failing to be present at a meeting (without good cause)
4. Member who are present at club meetings for 5 times and do not pay the necessary fees can be expelled from the club
5. Membership entry fee is 200 Kwachas
6. If a member is sick, looking after a sick relative, or attending funerals or other related activities, other club members must provide assistance
7. Members who refuse to provide assistance to other fellow members in problems are penalized
8. Drunk and violent persons are not allowed in the Club
9. Any woman who is in the bearing age but is not married is not accepted in the club

Table 1
Regulations of the Tobacco Clubs
(percentage)

Which of the following rules apply to the Club?	Yes
- Club members may incur a penalty if they do not attend or send a representative to club meetings	99
- Members are not allowed to belong to more than one tobacco Club at the same time	99
- New members are expected to pay registration	96
- No member should have prior cases of default	100
- Club members are expected to sell their tobacco as a team (or at least the first bales)	96
- Club members are not allowed to sell their tobacco to intermediate buyers or any other outlet outside the Auction Floors	100
- Club members are required to assist colleagues with farming activities and to provide other social support in case of sickness	99
- The Club explicitly denies membership to never-married women, widows, or divorced women	40
- The Club imposes restrictions to unmarried women	67

Source: Tobacco Clubs Survey (2007). Weights based on the number of clubs in each district were used in the tabulations. See Appendix 1.

show up at those meetings, do not accept members with previous default history, do not allow members to belong to other clubs, require members to assist colleagues with farming activities, and expect members to provide other social support in case of sickness. The vast majority of clubs (over 95 percent) charges a registration fee and expects members to sell their tobacco as a team (or at least the first bales) so that the club debt is canceled using tobacco belonging to all members. Finally, while 40 percent of clubs explicitly deny membership to unmarried women, an additional 27 percent accept them only under a series of very restrictive requirements. Overall, thus, over 67 percent of the clubs restrict access to unmarried women in one way or another. This last regulation will be important for our empirical analysis below.

The set of regulations uncovered by the Tobacco Clubs Survey is consistent with the general regulations described in Peters (1997) and Takane (2005). Other rules often found in club constitutions include: i) members are expected to be sober, particularly during club

meetings; ii) members are expected to be punctual during meetings (or face a monetary penalty); iii) membership is often denied to regionally mobile applicants; iv) in some clubs, members should have the means to procure their own inputs.

2.2 Tobacco Clubs: Services

To better understand the benefits behind the services provided by tobacco clubs, we begin with a brief description of tobacco farming in Malawi. Burley tobacco farming is a very labor intensive activity and requires four times more labor than maize and twice more than groundnuts. The tobacco production cycle begins with the rainy season in September-October. Seeds are first sown in seedbeds for about two months, when they are transplanted to the field. Before transplantation, the soil is usually sterilized by burning or steaming, chemicals are used to controls diseases, weeds, and insects, and fertilizer is applied. Later, in late January/early February, the tobacco is topped (flower stalks are broke off so that the energy of the plant is directed to the leaves). While topping, the growers may also pull off some of the largest immature leaves on the stalk to prevent waste of water and nutrients.

Tobacco is ready for harvesting around late February/early March. Burley is harvested using machete-type knifes. After cutting, the large end of the stalk is fixed onto the sharpened end of a stick, which—when loaded with a number of stalks—is hung by hand in a tobacco barn for curing. Unlike flue- and fire-cured brands, which require firewood for leaf curing, burley tobacco is instead cured by air in open-sided thatched huts. The skill of the farmer on the curing process plays a major role in the final quality of the leaf. Once cured, the tobacco leaves are sorted by the farmer according to stalk position and leaf characteristics and packed into bales. The preparation of burley in bales requires special physical aptitude and specific knowledge. The selling season starts in April and ends in September-October.

The services delivered by the clubs increase the performance of members in key stages of the farming process. In order to document them, we use two sources of data. As before, some evidence come from the Tobacco Clubs Survey of 2007. Other pieces of evidence come from the tobacco module of the Malawi Integrated Household Survey, IHS, of 2004/2005.

In contrast to the TCS, which was especially deployed for the present project, the IHS was carried out by the Malawi Statistical Office.[9] Table 2 summarizes the evidence.

The services provided by the Clubs are derived from four main prerogatives that they are entitled to offer: institutional access, collective actions, economies of scale, and supporting network.

Institutional access has traditionally represented the major incentive for smallholder membership. For many years, tobacco clubs constituted almost the only way to access the auction floors and fetch higher prices. Upon registration with the Ministry of Agriculture, the club was allocated a burley quota and a license to sell the tobacco at the auction floor (Orr, 2000). Instead, non-members had to sell their tobacco either to intermediate buyers or across the borders, in Zambia or Mozambique, at a lower price. Although quotas have practically been *de facto* abolished, tobacco clubs are still an efficient vehicle to reach output markets. The IHS and the TCS provide different complementary evidence, reported in panel A of Table 2, on institutional access. On the one hand, the IHS reveals that 73 percent of the clubs acknowledge easier access to the auction floor. On the other hand, according to the TCS, only 33 percent of the clubs actually get better prices at the floors. Both the IHS and the TCS agree instead that tobacco clubs provide preferential institutional access to official extension support. In Table 2, 90 and 69 percent of the clubs surveyed in the TCS and the IHS, respectively, claim to have received better training and technical advisory services from official extension workers.

Burley clubs have a major role as facilitators of collective actions. One example is debt repayment monitoring. In the absent of collateral, credit institutions use peer monitoring as a way to bridge the asymmetric information gap between lenders and borrowers in small-scale credit transactions (Pitt and Khandker, 1998; Besley and Coate, 1995; Morduch, 1999). In Malawi, tobacco clubs act as a group-lending institution, and all members are made jointly liable for repayment.[10] In turn, the clubs have the right incentives to honor their debts in

[9]See Appendix 1 for a description of the Integrated Household Survey. The IHS was designed to make a thorough assessment of poverty in Malawi. Details of the survey and lots of analysis on poverty determinants, poverty profiles, coping mechanisms, and poverty-reducing policies can be found in World Bank (2006).

[10]The loan is later repaid when tobacco is sold at the auction floor by deducting the amount of the loan, plus interest, from the amount of the sale of tobacco (the difference is deposited directly into the club's bank

Table 2
Benefits of Tobacco Club Membership
(percentage of respondents)

	Malawi Integrated Household Survey (IHS)		Tobacco Clubs Survey (TCS)	
	Yes	No	Yes	No
A) INSTITUTIONAL ACCESS				
- Improved access to auction floor	73	27	–	–
- Higher prices	–	–	33	67
- Better and more extension advice[(a)]	69	31	90	10
B) COLLECTIVE ACTIONS				
- Improved access to credit	65	35	–	–
- Lower prices for inputs	13	87	11	89
- Better input quality	–	–	66	34
C) ECONOMIES OF SCALE				
- Transport of bales to auction floors	67	33	–	–
- Lower transport cost to auction floors	–	–	5	95
D) SUPPORTING NETWORK				
- Enhanced farming ability due to fellow advice	–	–	98	2
- Provision of labor assistance to club members	–	–	65	35
- Assistance on farming activities from club members	–	–	44	56
- Advice on non-farm activities from club members	–	–	49	51
- Motivation to work harder	–	–	96	4

Notes: The table shows weighted averages computed from the Malawi Integrated Household Survey (IHS) of 2004/2005 and the Tobacco Clubs Survey (TCS) of June 2007. In the Malawi Integrated Household Survey (2004/05), 280 club members answered the question: "Which of the following benefits did you enjoy from membership in a tobacco club?" In the TCS, 240 clubs responded specific questions on the prerogative of clubs. See Appendix 1.
(a): refers to visits from government officers or people from NASFAM/TAMA/etc.

order to avoid a bad reputation or to maintain the necessary credibility for further loans. The evidence from the IHS is in panel B of Table 2: 65 percent of the smallholders that organize themselves into clubs have indeed better access to credit.

The loans collectively obtained by the club are used mainly to buy inputs (fertilizer) in bulk at the beginning of the rainy season (October to December). In principle, this allows farmers to have access to cheaper and higher quality inputs. The evidence supports this statement. While only 13 percent of clubs from the IHS and 11 percent from the TCS actually pay lower prices for inputs, 66 percent of clubs (in the TCS) have in fact access to input of better quality. This implies that farmers pay roughly the same prices as non-members but get instead more efficient inputs.

The third major prerogative of burley clubs is the realization of economies of scale, especially in transporting tobacco. Once again, the IHS and the TCS provide complementary evidence, presented in panel C of Table 2. Around 67 percent of club members surveyed by the IHS benefit from overall transportation services (the actual question in the questionnaire refers to "transport of bales to the market," without specifying price or quality). However, according to the TCS, only 5 percent of the clubs enjoy lower prices for transportation due to membership. To resolve this apparent discrepancy, we collected additional qualitative information from group interviews. Members stated that transportation of their output with the club (through NASFAM or TAMA) is not necessarily cheaper but is instead more secure and safer. Moreover, while club members can be compensated for any losses to the harvest while in transit, farmers transporting the crop individually had to absorb any such burdens or risks themselves. In the end, the realization of economies of scale does not allow club members to fetch higher net prices but it does allow them reduce some risks associated with the marketing of tobacco.

Another major service provided by the clubs is as supporting networks and safety nets, which has significant implications in terms of labor supply, effort, absorption of negative shocks and externalities from positive shocks. The evidence from the Tobacco Club Survey is in Panel D of Table 2.[11]

account).

[11] No information on this theme is available in the IHS.

Clubs allow for peer to peer extension support as members visit each other's fields and sometimes jointly grade their tobacco. In addition, club members are expected to assist colleagues with farming activities and other social support in the event of sickness. This is to ensure sufficient tobacco production at the end of the season to offset any input loans—which must be covered by the club anyway. As a result, the clubs create an environment characterized by both learning by doing and learning from others (Munshi, 2004). We find that almost all clubs interviewed by the TCS (98 percent) acknowledge having enhanced their farming ability due to fellow advices. Also, around 65 percent of club members provide labor assistance to fellow members in farming activities such as baling, grading, harvesting or shade building. In contrast, only 44 percent of respondents claim to have actually received labor assistance from fellow club members. Almost half of the club members get advice in diverse issues such as personal matters, HIV, or other tips on how to spend the extra income generated by tobacco. In fact, tobacco clubs represent an alternative to the farmers' informal network of family and friends, and diversify the farmer's social network. In the end, these supporting networks provide the needed motivation and identity to withstand the hard work required to grow tobacco. Overall, 96 percent of respondents feel more motivated to work harder after membership in a tobacco clubs.

2.3 Tobacco Clubs: Outcomes Differences

The services provided by tobacco clubs together with the incentives entitled by club regulations are likely to have significant impacts on farm outcomes. Participation in the clubs allows for market access (for inputs and outputs), higher output prices, lower credit prices, better quality inputs, higher net prices, more effort, more stable and consistent labor supply, and higher tobacco quality. A priori, these factors could have large impacts on various tobacco farming outcomes, such as yields, sales, land allocation, and prices.

We begin with a cursory inspection of the data from the Malawi Integrated Household Survey and compare club members and non-members across major household characteristics and outcomes. Because we will be looking at burley club members, we only work with the 1,368 households that actually grew tobacco in the 2004/05 season. (The total sample size

of the IHS is 11,280 so that over 10 percent of the households grow tobacco—see Appendix 1.) In consequence, our analysis can only illustrate differences among tobacco growers and cannot in principle be extended to non-tobacco farmers.[12] Sample statistics from the IHS of key variables by club membership are reported in Table 3.

The sample includes 337 growers that do belong to a burley club and 991 tobacco growers that do not belong to a club. The two groups are similar in terms of several characteristics of the household and of the household head: the gender composition and marital status is almost the same for members and non-members and the health condition of the household heads is quite similar as well. Club members show a larger proportion of heads who have completed primary education (18 versus 11.4 percent), while non-members show a larger proportion of heads with no education or incomplete primary education (77.6 versus 68.7 percent).

The main difference across household characteristics is found in the number of members. Club member households have on average almost one member more than non-members. This is meaningful since burley tobacco is very labor-intensive. Also, land holdings of club members are only slightly bigger: the median total land area is 3.5 acres for members and 3 for non-members. The bottom panel of Table 3 displays the expenditure pattern of the two groups. There are no major differences in per-capita expenditures in food, clothing, health, education and recreation. However, some differences show up in items such as housing, furnishing, transport and communications.

Tobacco farming does show sharp disparities between the two groups. These are reported in Table 4. The most striking differences arise in output per acre and sales per acre, which are 40 and 45 percent higher for tobacco club members respectively. While our empirical analysis explains this difference in performance in detail, it is worth noticing at this point the dissimilar utilization of inputs, especially of fertilizer. Club members tend to use more fertilizer of the types UREA and CAN, while non-members use intensively the type COMPOUND D, which is cheaper. Further, less than 4 percent of the club members do not bale or grade their own tobacco. Instead, around 20 percent of the non-members do

[12]See section 3 for a detailed discussion.

Table 3
Descriptive Statistics: Household Characteristics

	Non-Club Members	Club Members
HEAD		
Female	6.05%	7.69%
Unmarried	8.37%	9.81%
Primary education incomplete or no education	77.61%	68.70%
Primary education complete	11.40%	18.04%
Secondary education incomplete	8.37%	9.81%
Secondary education complete	2.22%	2.65%
Tertiary education	0.40%	0.80%
Number of months away from HH	0.34	0.22
Weak health	19.47%	20.42%
HOUSEHOLD		
Household Size	5.26	6.02
Prop. members age 8-12	11.45%	13.33%
Prop. members age 12-18	10.97%	11.04%
Prop. members age 18-45	37.22%	36.58%
Prop. members age 46+	12.95%	10.05%
Land holding - in acres: Median	3	3.5
PER CAPITA EXPENDITURE - in Mk		
Food-Bev	41,954	43,133
Clothing-Footwear	4,100	4,163
Housing-Utilities	15,601	13,612
Furnishing	2,951	3,728
Health	828	884
Transport	4,231	3,991
Recreation	429	476
Education	813	911
Number of obs.	991	377

Note: Own calculations based on Malawi Integrated Household Survey (2004/05). Mk stand for Malawi Kwanchas.

Table 4
Descriptive Statistics: Farming

	Non-Club Members	Club Members
TOBACCO		
Output per acre - in kg	11,007	16,308
Sales per acre - in MK	10,199	16,090
Area dedicated to tobacco	29.79%	28.90%
Visits from agricultural field assistants	0.49	1.39
Percentage of tobacco growers in the community	60.92%	52.03%
Tobacco experience (grew tobacco in any of the last 5 seasons)	49.34%	63.92%
Average month when tobacco is sold (Jan= 1, Dec= 12)	5.47	5.91
Did not bale the tobacco	24.44%	3.20%
Did not grade the tobacco	18.04%	3.21%
Temporary work in days (Ganyu)	16.17	11.62
Fertilizer $23:21:0+4S$ (kg/acre)	48.06	41.14
Fertilizer DAP (kg/acre)	0.401	0.742
Fertilizer CAN (kg/acre)	42.41	69.33
Fertilizer UREA (kg/acre)	22.25	148.04
Fertilizer COMPOUND D(kg/acre)	387.63	43.59
OTHER CROPS		
Cash crops - output value per acre	31.4	35.3
Food Crops - output value per acre	33.0	38.1
Number of obs.	991	377

Notes: Own calculations based on Malawi Integrated Household Survey (2004/05).
Cash Crops: hybrid maize, groundnuts, cotton and sugar cane.
Food Crops: maize, cassava, potato, ground beans, rice, finger millet, sorghum, pearl millet, beans, soybeans and pigeonpeas.

not grade or bale their tobacco. Finally, tobacco club members benefit from more visits from agriculture field assistants, show more experience growing tobacco and hire less temporary work.

Both members and non-members allocate almost 30 percent of their plot to grow tobacco. In fact, very few producers specialize intensively in tobacco and almost all tobacco growers also produce food crops, such as maize, potatoes or beans, for their own consumption as well as other cash crops such as hybrid maize, groundnut or sugar cane. Although club members report higher values of output (per acre) of both cash and food crops, these differences are in fact not significant.

3 Empirical Strategy and Results

We turn next to the estimation of the impacts of burley tobacco club membership on tobacco farming outcomes in rural Malawi. The analysis is based on the data from the Integrated Household Survey. The estimating equation is:

$$(1) \quad y_i = c + \beta C_i + \mathbf{x}'\gamma + d + \epsilon_i,$$

where y_i denotes an outcome of household i, a tobacco grower; C is a binary variable that indicates whether the person in charge of cropping activities in the household (usually, but not necessarily, the household head) has *ever* been member of a tobacco club in the last 5 years; $\mathbf{x}$ is a vector of additional controls including characteristics of the person who makes cropping decisions, like gender, education, age, marital status and health, as well as characteristics of the household such as size, demographic composition, and land holdings. In some specifications, the vector $\mathbf{x}$ also includes tobacco related variables such as tobacco experience, fertilizer use, baling procedures, and temporary work use (ganyu). The equation also includes district dummies d to control for differences in district infrastructure, local institutions, and demographic-cultural factors (such as the matrilineal or patrilineal nature of the district). Finally, the residuals ϵ capture other unobservable factors that affect the outcomes y and that may be correlated with club participation C.

Equation (1) is estimated only on the sample of tobacco growers during the 2004/2005 season and not on the whole sample. Therefore, our estimates of β represent the causal effects of burley club membership on those farmers who have selected themselves into tobacco. Since unobservable factors partially guide selection into different cropping activities, our estimates will not identify the impacts on a random farmer. We thus identify the average treatment effect on the treated as opposed to the average treatment effect on the population.[13]

Arguably, the most relevant tobacco farming outcomes are output per acre, which is a measure of land productivity, and sales per acre. On the one hand, low productivity in

[13]It could be interesting to consider cases where the decision to grow tobacco and to become a club member is done jointly. This raises various issues which, unfortunately, cannot be addressed with the available data.

agriculture is often the major reason behind the prevalence of poverty in rural Africa. On the other hand, sales of cash crops like tobacco often provide the income opportunities needed to escape poverty. In consequence, in two of our regression models, the outcome y is defined as yields (output of tobacco in kg per acre) and sales (value of tobacco sold) per acre.

Two additional tobacco outcomes of interest are tobacco participation and unit values. First, we ask whether farmers in clubs allocate higher shares of their land to tobacco than non-members. Low export participation is often cited as another major reason behind low household income and poverty traps. Second, we ask whether clubs allow members to fetch higher unit values for their tobacco. This is an important question because higher prices and higher quality, both associated with higher unit values, are also vehicles towards poverty reduction.

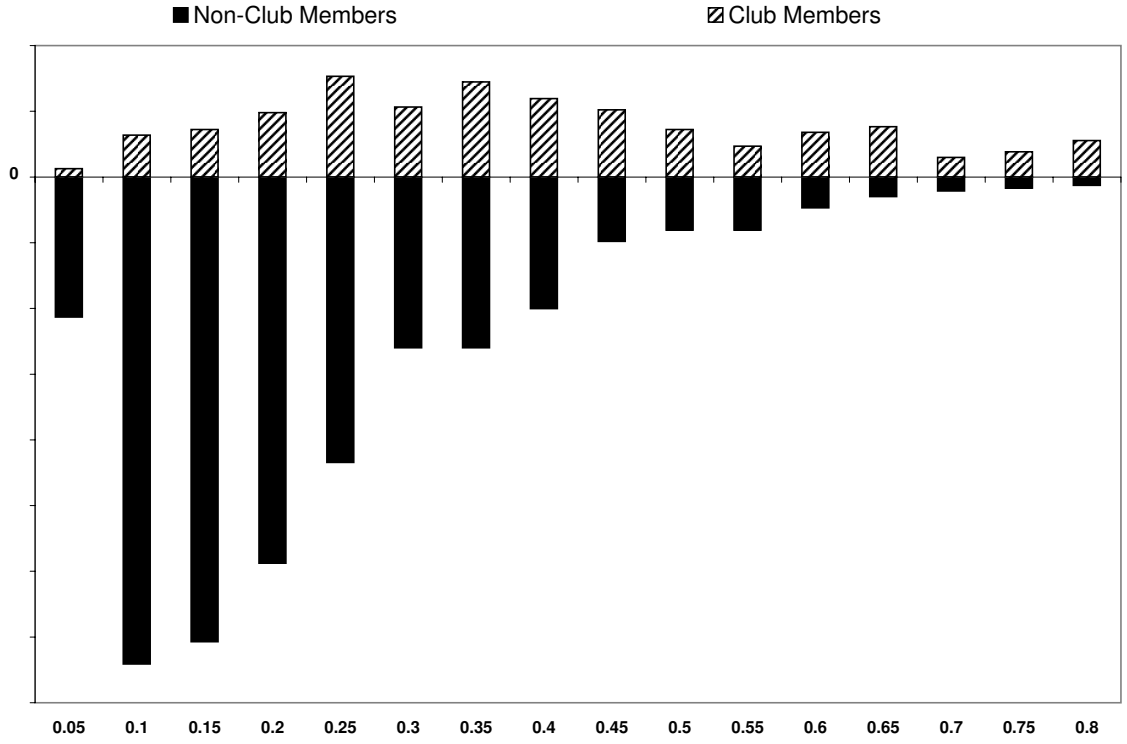
Tobacco Clubs can be very selective when choosing their members. The need to minimize the risk of default forces them to select trustworthy and able farmers to produce enough tobacco. Among those likely to be denied membership are newcomers to the village, farmers with very little land, and farmers who have misbehaved in the past. Club membership is thus an endogenous variable and using OLS to estimate (1) will produce biased estimates of β. Our empirical strategy addresses the selection problem by estimating the model with both matching methods and instrumental variables.

3.1 Matching Results

We begin with the matching estimates to provide some baseline results. The essence of the matching method is to compare the outcomes of club members with matched non-club members based on observable characteristics. Matching is a strategy to find control groups under a ignorability of treatment assumption, i.e., that participation in a tobacco club is based only on observable variables—$\mathbf{x}$ and d in (1). In practice, feasible comparisons are done on the basis of a scalar function of the covariates, the propensity score $p(\mathbf{x})$. This is the conditional probability of being a tobacco club member and we estimate it with a probit model of $C = 1$ using $\mathbf{x}$ and d in the conditioning set.

Two important conditions need to hold in a matching framework. First, the balancing

Figure 4
Propensity Score for Club's Membership



Note: The graph shows the proportion of club members and non-club members for different values of the propensity score.

condition must be satisfied. Intuitively, the balancing condition requires that observations with the same propensity score must have the same distribution of observable characteristics ($\mathbf{x}$) independently of their status of members or non-members. The second condition is unconfoundedness, which requires that the assignment to the tobacco club is unconfounded given the propensity score. This second condition cannot actually be tested and has to be maintained. In contrast, the balancing condition can be tested (following Dehejia and Whaba, 2002) and, in all our specifications, was found to hold. In addition, as suggested by Heckman, Ichimura and Todd (1997), we graph histograms of the propensity score for members and non-members in Figure 4. The graph shows sufficient overlap of the propensity score which implies that, for each club member in each interval of the common support, there is a substantial group of matchable non-members.

Results from the matching exercises are reported in Table 5. Our major finding is that

club members are around 40 percent more productive than non-members. The result is robust to the use of three different matching estimators, named kernel matching (column 1), stratification matching (column 2), and nearest neighbor matching (column 3). Our matching estimates are in fact almost the same as the unconditional mean difference of the two groups reported in Table 4. The matching estimates also reveal higher sales (per acre) for members than for non-members. In the Kernel matching on column (3), the club premium in sales (per acre) is 45 percent (also similar to the unconditional mean difference).[14]

Table 5
Effect of Club Membership: Matching Estimations

	Nearest Neighbor	Stratification	Kernel
Output per acre (logs)	0.472**	0.424***	0.395***
	(0.124)	(0.095)	(0.083)
Sales per acre (logs)	0.429**	0.487***	0.449***
	(0.162)	(0.094)	(0.098)
Land Share	0.190*	0.103	0.112*
	(0.112)	(0.081)	(0.067)
Unit Value (logs)	0.091	0.053	0.042
	(0.079)	(0.051)	(0.053)

Notes: Standard errors (computed via bootstrap) in parenthesis: ***, **, and * denote statistically significance at 1, 5, and 10 percent, respectively.
The balancing property is satisfied in all cases displayed in this table.

The land share allocated to tobacco is positively affected by club membership, but only marginally so. Further, even though clubs make farmers more productive and allow them to earn more income via sales, members do not fetch better prices: the unit values from tobacco sales do not show significant differences between members and non-members. This explains why the difference in sales per acre is roughly comparable to the difference in output per acre. This result is not really surprising because there are only a few buyers at the auction floors and tobacco clubs are not big enough to counterbalance their market power.

[14]Notice that while we can estimate the impact of overall burley club participation, we are unable to provide estimates of the differential impacts of the various services provided by them.

3.2 IV Results

Matching methods rely on the strong assumption of selection based on observables. In order to accommodate cases where club membership depends on unobservable characteristics, our second empirical strategy to estimate β in (1) adopts an instrumental variables approach. Our instrument is an indicator of default risk pertaining to a specific group of unmarried women. These individuals, especially younger ones, are risky for tobacco clubs because of a higher probability of marriage. Our Tobacco Club Survey (TCS) advances three major threats that arise from unexpected marriages of women. First, if the marriage occurs in the middle of the cropping season, there is a high risk that the bride would move away with her husband and leave the village, thus reneging her debt with the tobacco club.[15] In this case, the remaining members must still honor the whole loan, including the fraction under the name of the leaving bride. Second, there is a high risk that the husband overturns the farming decision of his bride or that he disapproves of her membership in clubs. This ordinarily induces brides to abandon participation in the club and leads to debt default. Finally, there is a higher risk of pregnancy.

These risks associated with marriage are prevalent in Malawi and clubs take active action to prevent them. The most extreme measure is the actual membership prohibition to unmarried women, especially younger ones. Recall that, in Table 1, we used data from the TCS to show that 40 percent of clubs openly deny membership to unmarried women. Also, an additional 27 percent of clubs would accept unmarried women only after a careful screening of her permanence in the area and only under very restrictive conditions. In many cases, the requirements imposed to unmarried women are impossible to meet and actually act as binding prohibitions in themselves. For instance, a common condition among these clubs is to require (intangible) proofs of "unlikely marriage," proof that the applicant will not get married in the short-middle term. This last requirement is almost never satisfied by young women.

In practice, thus, tobacco clubs are particularly reluctant to accept younger unmarried

[15] According to the TCS this is not only true for patrilineal districts but also it is quite common in matrilineal districts.

women as members. Notice that not all unmarried women are denied membership but only those that are young enough to pose a real marriage risk. Since there are no formal age requirements in the club constitutions, in order to determine the age cut-off we first performed interactive interviews (Udry, 2003) during the pilot phase of the Tobacco Clubs Survey in May and June. We concluded that many burley clubs specifically require unmarried women to be over 45 years old for eligibility. We then added a question to the core questionnaire of the TCS (Module B, see Appendix 1) to quantify the proportion of clubs admitting unmarried women under 45 years old: it turns out that only 3 percent of the clubs do.

Given this scenario raised within the clubs constitution, we propose to use the constraint on unmarried females under 45 years old as an instrument for tobacco club membership. For robustness, we also report results for different age cut-offs as well (see below). The instrument should clearly help explain tobacco club participation conditional on other covariates: since young unmarried women are more likely to get married, they are thus riskier for the club and should find it more difficult to be accepted as members. We test this below during the estimation of the first stage of the model.

There are various concerns that should be addressed before discussing our results. The instrument has to satisfy the exclusion restriction. This means that, conditional on other covariates, being an unmarried female under 45 years old should affect the outcome y only through club membership. However, the TCS highlights two other reasons behind the ban. First, since burley tobacco is a labor intensive crop, women would typically not be able to grow enough tobacco—or tobacco of sufficient quality—without the assistance of a husband or children. This makes unmarried women ineligible due to labor supply issues. Second, many clubs require members to produce a minimum of one bale of tobacco per season, and unmarried women may not own enough land to grow as much tobacco.

These two requirements may make the exclusion restriction fail. In the case of tobacco yields, for instance, the instrument will not only capture the benefits of the clubs but also the direct impacts of labor or land constraints. To account for this, we include a comprehensive set of controls to guarantee compliance with the exclusion restriction. Labor supply issues

are accounted for by controlling for household size and its age composition. Likewise, the land constraint is controlled for by including the size of land holdings. Other controls include education, age, health, characteristic of the household and tobacco related variables.

The exclusion restriction will also fail if there are inherent differences across farmers due to gender, marital status, and the interaction of marital status and gender. For example, males may be more apt (say, due to physical strength or village networks) than females and even more so than unmarried females. Likewise, unmarried females may have lower endowments (of land, land quality, tools) than males or married women, especially if better plots are allocated or bequeathed discriminatorily in favor of males. To account for this, we include separate dummies for male or female, marital status, and interactions of female and married dummies (the unmarried females).

Other reasons why the exclusion restriction may fail can take place if unmarried women have inherently lower ability or less expertise to grow tobacco. While part of this effect will be absorbed by the female-married interaction, we also include measures of tobacco expertise in our specifications. Further, males or married women, who can have access to help and advice from other family members, may have an advantage over unmarried women in key steps of tobacco production, particularly baling, which requires lots of strength. Once again, part of this impact will be captured by the unmarried-women dummy. On top of this, we also include an indicator of baling activities to deal with inherent differences in this production process and to control for specific tobacco expertise.

Once all these controls are included in the model, our instrument is only capturing the high risk of default in the event of a marriage and the exclusion restriction should be satisfied.

A similarly important issue is that our eligibility condition must be exogenous. Exogeneity may fail if, for instance, unmarried women decide to get married in order to become members of a tobacco club. The Tobacco Clubs Survey, however, explicitly rules out this possibility. When asked whether young women may envision marriage as a means to club membership, 99 percent of the respondents asserted that no such marriage market exists.

Table 6 presents results from the 2SLS estimation. As before, we investigate impacts

on the four major tobacco farming outcomes, namely yields, sales per acre, land shares and unit values. We define three sets of controls and estimate four model specifications. The set of controls A includes characteristics of the household and of its head. The set of controls B includes variables related with the plot and the activity of growing tobacco. Meanwhile, the set of controls C includes inputs used in the production of tobacco such as fertilizer and temporary work (ganyu).

Panel A reports results from the first stage regression of burley club membership on the instrument and the controls. Results show that being unmarried female under 45 years old significantly reduces the probability of belonging to a tobacco club in all models. Concretely, an unmarried woman under 45 is around 54-55 percent less likely to be a burley club member than an unmarried women over 45 (notice that the controls include gender dummies and an interaction unmarried-female dummy). In all the specifications, the instrument is highly significant with associated F-tests always above 10. These results rule out any concerns with weak instrumentation (Staiger and Stock, 1997; and Hahn and Hausman, 2002). In our case, weak instrumentation may arise not precisely because of the lack of explanatory power of the instrument—as is often the case—but because of small sample sizes. In our sample of tobacco growers, there are only 86 household heads that are unmarried females and only 28 of these are younger than 45 years old. Clearly, the F-tests estimated in the first stage of our models rule out these concerns.[16]

We now turn to the outcomes. We begin with yields and use this to deploy a series of robustness and sensitivity tests of our results. The impacts of burley clubs on yields are reported in panel B of Table 6. Results reinforce the notion that club membership increases tobacco yields: output per acre is between 71.6 and 122.2 percent higher due to burley membership. In model 4, which includes the most comprehensive set of controls, yields are in fact 73.9 percent higher due to club participation. These impacts are even higher than the matching estimates of Table 5. Notice that some of the variables included in the set

[16]Another issue is that life expectancy at birth in 2007 was 42.61 years old. This begs the question of whether the "under 45" constraint is actually binding. In fact it is. The reduction in life expectancy in Malawi is a somewhat recent event associated with AIDS. In the relevant sample from the IHS, 6.4 percent of the population is female and older than 45 years old. Further, 2.5 percent of household heads are women, unmarried and over 45 years old.

Table 6
Effect of Club Membership: Instrumental Variable Estimation

	Model 1 (A)	Model 2 (A+B)	Model 3 (A+C)	Model 4 (A+B+C)	OLS (A+B+C)
A) First Stage	-0.539^{***}	-0.551^{***}	-0.539^{***}	-0.549^{***}	
	(0.138)	(0.132)	(0.138)	(0.132)	
	0.15	0.23	0.18	0.23	
B) Second Stage					
Output per acre	1.222^{***}	0.716^{*}	1.228^{***}	0.739^{**}	0.188^{***}
	(0.407)	(0.383)	(0.392)	(0.369)	(0.065)
	0.22	0.35	0.27	0.39	0.42
Sales per acre	1.918^{**}	1.468^{**}	1.292^{***}	0.890^{**}	0.177^{**}
	(0.796)	(0.734)	(0.493)	(0.452)	(0.077)
	0.01	0.20	0.21	0.35	0.40
Tobacco land share	-0.106	-0.259	-0.078	-0.242	0.054
	(0.321)	(0.298)	(0.325)	(0.299)	(0.046)
	0.11	0.17	0.17	0.23	0.25
Tobacco unit value	0.054	-0.194	0.063	-0.188	-0.011
	(0.491)	(0.494)	(0.484)	(0.448)	(0.055)
	0.03	0.05	0.03	0.06	0.07

Notes: Robust standard errors in parenthesis. ***, **, and * denote statistically significance at 1, 5, and 10 percent, respectively. The R-squared of the regression is reported below the standard errors.
Control set A: unmarried-female, female, unmarried, household size, proportion of members age 8-12, age 12-18, 18-45, 46+, educational categories
Control set B: area allocated to tobacco, months away from households, weak health, visits from agricultural field assistants, percentage of farmers in the community that grows, tobacco experience: whether farmer grew tobacco in any of the last 5 seasons, average month when tobacco is sold, dummy for own baling.
Control set C: ganyu (temporary labor), manure, fertilizer 23:21:0+4S (kg/acre), fertilizer DAP (kg/acre), fertilizer CAN (kg/acre), fertilizer UREA (kg/acre), fertilizer COMPOUND D (kg/acre).

of controls B and C capture part of the services provided by the tobacco clubs that may generate those higher yields. The set of controls B includes variables such as the number of visits of extension workers, which is one of the benefits the clubs offer through better institutional access. Similarly, the set of controls C includes the use of each type of fertilizer, which, in the case of club members, is determined by collective acquisition through loans. Hence, it is reasonable to find that the causal effects of clubs decrease as these controls are included in the regressions (compare Models 1 and 4).

Although the estimated impacts of burley club membership are quite large, they are reasonable. To see this, recall that, as we reported in Table 2, club membership provides a number of services that can significantly affect yields. According to both the Integrated Household Survey and the Tobacco Clubs Surveys, most clubs offer access to credit, inputs and knowledge, all services that should boost yields. In addition, burley clubs offer two powerful channels through which tobacco growers are induced to increase their effort and thus outperform non-members. On the one hand, the clubs increase the expected profit margins of the members by raising the likelihood of fetching higher prices at the auction floor in comparison with the alternative of selling the tobacco to intermediate buyers and by reducing some risks associated with the transportation of tobacco to the auction floor. On the other hand, the clubs instill a sense of identity and motivation that, along with peer pressure to grow enough tobacco to honor the club's debt, induce members to exert more efforts in growing the crop. Unfortunately, the available data prevent us from telling apart the relative importance of each one of these services.

The large impacts of club membership on yields are in line with previous findings in the literature as well. Access to credit, and, through it, to inputs of higher quality has played a major role in productivity enhancement in many developing countries. For instance, Viyas (1983) shows that access to both proper fertilizer and know-how can cause yields (in Asia) to increase by 50-75 percent. Munshi (2004), in turn, shows that the Indian Green Revolution, via access and adoption of certain seeds of wheat and rice, increased farm productivity and rural incomes. In Western Kenya, Duflo, Kremer and Robinson (2006) find that the adoption of proper combinations of inputs can generate rates of return as high as 231 percent.

Similarly, Conley and Udry (2005) report returns to technology adoption in pineapples of 250-300 percent.

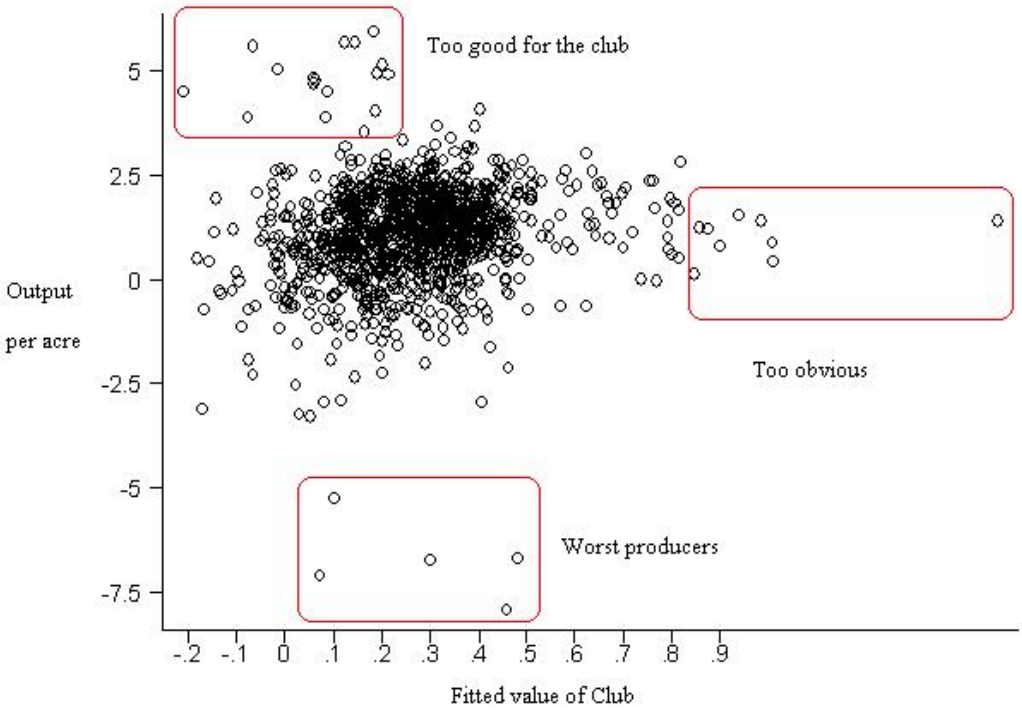
Another issue with our IV estimates is that they are much larger than the matching estimates (74 versus 40 percent yield gain) and than the OLS estimates (19 percent–see the last column of Table 6). However, a cursory view of the association between club membership and output would suggest that the IV estimates should instead be lower than the OLS (and possibly matching) estimates. The argument is that if the more productive and responsible farmers are also more likely to form tobacco clubs, we should expect a positive correlation between club membership and the error term in an OLS regression, and thus an upward bias in the OLS estimate of club's effect.

Before attempting to reconcile this argument with our findings, we need to rule out any role played by outliers, a potential problem that could be exacerbated by the small number of ineligible tobacco growers in our sample. To address this issue, we build four groups of outliers, three of them chosen discretionally and the last one chosen with Hadi (1994) method for multivariate outliers. Figure 5 plots the fitted value of the first stage reduced form equation for club membership against the log of tobacco output per acre. In the Figure, we highlight the three groups of outliers discretionally selected on an observational basis. The upper-left group consists of farmers that are very productive but have small fitted values in the first stage. These farmers are thus very productive in spite of not being club members (only 2 out of 23 are). The bottom-center group consists of those farmers that have, by far, the lowest yields. Finally, the center-right group consists of 10 farmers with the highest predicted value for club membership.

Once outliers were identified, we re-estimated Model 4 of Table 6 four times, each time excluding a different set of outliers (Frankel and Romer, 1999). Results are reported in Table 7. In all cases, the magnitude of the coefficient of interest (the impacts of burley clubs) experienced little variation. This suggests that the magnitude of the IV estimates is actually not driven by outliers.

Having ruled out outliers, a leading explanation of why our instrumental variable estimates exceed the OLS estimates is attenuation bias due to measurement error of club

Figure 5
Sensitivity Analysis: Outliers



Note: The figure is a scatter plot of (the log of) output per acre against the exogenous component of Club Membership (the fitted values from the first stage regression). The observations highlighted in the graph correspond to three different groups of outliers identified on an observational basis. The regression models are then run excluding these outliers (see Table 7).

Table 7
Robustness to Outliers: Summary Table
Effect of tobacco clubs on output per acre

	Number of outliers excluded in the regression	First stage: significance of the IV	Second stage: significance of club membership
Too good for the club	23	-0.546^{***}	0.669^{*}
		(0.133)	(0.382)
		0.26	0.44
Worst producers	5	-0.552^{***}	0.671^{*}
		(0.132)	(0.381)
		0.26	0.37
Too obvious	10	-0.535^{***}	0.685^{*}
		(0.151)	(0.382)
		0.26	0.42
Hadi's method	27	-0.564^{***}	0.756^{**}
		(0.134)	(0.347)
		0.26	0.38
Whole sample	0	-0.549^{***}	0.739^{**}
		(0.132)	(0.369)
		0.23	0.39

Notes: Robust standard errors in parenthesis. ***, **, and * denote statistically significant at 1, 5, and 10 percent, respectively. The R-squared of the regression is reported below the standard errors.

services. Our binary variable of club membership is a measure of the different services provided by the clubs, and not all clubs offer exactly the same services and not all services are provided with the same quality by all clubs. Also, in the data, the question that defines club membership ($C = 1$) actually refers to having *ever* been a member in any of the last five years. As a result, although not a common event, it is possible for a farmer to be considered as a club member when he/she has actually not been a member during the current season. This implies that, while the farmer may benefit from some services like knowledge (perhaps acquired in previous seasons), he/she will not enjoy other services like motivation, credit, or labor assistance. In consequence, the binary indicator for club participation is indeed a noisy measure of the various club services.

In addition, the Tobacco Clubs Survey reveals that some non-members may actually benefit from some of the club's services if non-club smallholders send their tobacco to

the auction floor through club members at a fee. Also, some club members may sell secretly a fraction of their fertilizer obtained through the club to non-members (63 percent of respondents in the TCS claimed to have witness side-selling) and sometimes some non-members find temporary work with club members. This reinforces the notion that the binary indicator of club membership is only an imperfect proxy for the services of the club. Being thus measured with error, it may lead to downward bias of the OLS estimates.

Empowering Women

A different concern arises if there is heterogeneity in the impacts of club membership across different types of farmers. In particular, if this heterogeneity is caused by unobservable factors that determine club membership as well, the IV strategy pursued here will not work well. For example, it could be that more able unmarried (young) women have a higher probability of becoming club members. If, further, the benefits of the club depend on unobserved farming ability, then the IV estimate will be biased. In these instances, we can only hope to recover an estimate of the LATE, the local average treatment effect (Angrist, Imbens and Rubin, 1996). Hence, β in (1) is applicable only to the portion of the population affected by the instrument, i.e., unmarried women under forty five years old that belong to a tobacco club.[17] Even under heterogeneity, our estimates are valuable. Women are often poorer and more vulnerable and membership in tobacco clubs can empower them. In the end, while the interpretation of our IV results varies under heterogenous impacts, the key finding of our work is that club membership has the potential to truly enhance member's productivity.

Other Outcomes

We now turn to the impacts of the clubs on other tobacco and farm outcomes. These results are reported in panel B of Table 6. As expected, club membership has a positive impact

[17]It is difficult, a priori, to indicate how the average impact of clubs would compare with our IV estimate. The fact that our IV is actually larger than the OLS would suggest that unmarried women benefit more than the average farmer. However, this argument would hold if measurement error were not present. Without further information on the magnitude of the attenuation bias, nothing conclusive can be said about the biases in the estimation.

on sales. In the model 4 (column 4), club members earn 89 percent more (per acre) than non-members from sales of tobacco at the auction floors. This impact is fairly consistent with the increase in yields reported before.

Notice, in addition, that club members fetch the same unit values for their tobacco as do non-members, implying that clubs cannot in fact secure higher tobacco prices at the auction floors. This is consistent with the responses from the TCS, where only a 33 percent of farmers claim to have enjoyed higher prices due to burley membership. As explained above, this is most likely because tobacco market at the auction floor is monopsonistic so that a few buyers purchase tobacco from a competitive fringe of smallholders.

Furthermore, the land share allocated to tobacco is not affected by club membership. On the one hand, tobacco smallholders are often subsistence farmers that need to grow enough food for autoconsumption. This may limit the scope for land reallocation. On the other hand, club membership significantly increases yields and thus household income. If the need for cash income is limited (because of the risk of food shortages associated again with subsistence farming in Africa), the expansion of tobacco land shares may not be observed in practice.

It follows that the bulk of the increase in household income due to tobacco club membership can be attributed to increases in yields rather than to higher unit prices or land shares. We can further explore the implications of club membership for household income with the following simple back of the envelope calculation of the income gain for the average tobacco club member.[18] In the Malawi Integrated Household Survey, the average share of income earned by farming tobacco is about 50 percent and the median plot size allocated to tobacco is roughly 1 acre (among club members). In consequence, with gains in yields of 40-74 percent, the average tobacco farmer that belongs to a club would earn between 20 and 37 percent more than the average tobacco farmer that does not belong to a club. Additional simple calculations reveal that these income gains would be equivalent to the benefits generated by increases in tobacco prices of between 37 and 54 percent.[19]

[18]Notice that our identification strategy cannot be utilized to estimate the impacts of clubs on income because the exclusion restriction is unlikely to be satisfied in this case.

[19]To see this, take a second order approximation (thus allowing for supply responses) to the income generating equation of a typical farmer. This is given by $cv_p = \overline{s}d\ln p + \frac{1}{2}\epsilon_p\overline{s}(d\ln p)^2$, where cv_p is the

3.3 Robustness

A potential concern with our analysis is sensitivity to the age cut-off for our instrument. The 45 years old cut-off was first selected based on testimonies gathered during the pilot phase of the Tobacco Clubs Survey and then tested with a specific question included in the final questionnaire of the TCS. Even with all our efforts to gather evidence to support the age cut-off, there remain some elements of arbitrariness behind it. In rural Malawi, it is not easy to determine the age of women because most of them are not registered at birth and do not have an ID issued by the government. Hence, the 45-year cut-off suggested by the respondents of the TCS is just a reference number. It reflects the intention of clubs to choose a number high enough to minimize the probability of a new marriage while at the same time ensuring that the female candidates are strong enough to be able to grow tobacco productively.

In our robustness analysis, we re-estimate Model 4 of Table 6 using different cut-offs for the instrument. Results are reported in Table 8. The exercise shows that our main results are robust to various age cut-offs ranging from 41 to 47 years old. The instrument remains highly significant in the first stage, with associated F-tests always above 10. Similarly, the effects of club membership on the four tobacco outcomes (output per acre, sales per acre, unit value and land share) are also robust. The statistical and economic significance of the coefficients remains unaltered—in the cases of output and sales, however, the impacts somewhat increase when the age cut-off is reduced.

Another important result from this exercise is the lack of significance of the relevant variables in both stages when no cut-off is used and, thus, when the instrument for club membership is just being an unmarried woman instead of being an unmarried woman under a certain age. This result reinforces the argument that clubs do not condition their admission criteria on gender and marital status but on an interaction of these two characteristics and age. While being unmarried woman does not explain tobacco club participation, being a young unmarried woman does help to explain it.

income gain, $\overline{s}$ is the average share of income earned in tobacco, ϵ_p is the elasticity of tobacco supply for tobacco growers, and $d\ln p$ is the proportional price change. Finally, solve for the price changes that cause income gains in the range 0.2-0.37 (assuming a unitary supply elasticity).

Table 8
Robustness to Age Cut-off of our Instrument

Cut-off age:	NO cut-off	41	43	45	47
A) First Stage	0.194	−0.512***	−0.632***	−0.549***	−0.539**
	(0.113)	(0.155)	(0.179)	(0.132)	(0.212)
	0.24	0.25	0.15	0.23	0.25
B) Second Stage					
Output per acre	−1.098	1.217**	0.833***	0.739**	0.735**
	(1.591)	(0.501)	(0.312)	(0.369)	(0.373)
	0.25	0.30	0.37	0.39	0.38
Sales per acre	−36.37	1.568***	1.187**	0.890**	0.907**
	(363.7)	(0.603)	(0.537)	(0.452)	(0.449)
	0.25	0.24	0.31	0.35	0.35
Tobacco land share	9.317	−0.297	−0.174	−0.242	−0.216
	(66.55)	(0.450)	(0.378)	(0.299)	(0.600)
	0.25	0.28	0.30	0.23	0.29
Tobacco unit value	−15.85	0.367	0.429	−0.188	0.365
	(158.4)	(0.496)	(0.429)	(0.448)	(0.326)
	0.05	0.03	0.01	0.06	0.03
People affected by the instrument	86	23	26	28	32

Notes: Robust standard errors in parenthesis. ***, **, and * denote statistically significance at 1, 5, and 10 percent, respectively. The R-squared of the regression is reported below the standard errors.
Model 4 of Table 6 was used in all regressions displayed in this table.

4 Conclusions

Institutions are a major bridge towards development. There is a role for macro institutions such as the legal and political system, and there is also a role for smaller institutions, closer to the grassroots, that are fundamentally valuable in less developed countries. These include credit associations, risk schemes, tenancy systems, social networks, and many others. Some of these institutions foster income growth and one channel through which this happens is trade and exports. Large institutions like the judicial system facilitate international trade and foreign direct investment, for instance through enforcement of property rights. Meanwhile, in rural areas, local nonmarket institutions can play a major role in facilitating crop production associated with exports. In this paper, we have explored an instance of such institutions, the burley tobacco clubs. These are groups of farmers that jointly grow tobacco and provide institutional access, facilitate collective actions, allow for the realization of economies and scale, and foster supporting networks.

Created as a part of the tobacco liberalization process of early 1990s, burley clubs proliferated in Malawi during the last decade. At the same time, tobacco production among subsistence smallholders significantly increased. Our empirical analysis has explored this relationship and has revealed some interesting features about the role of local nonmarket institutions for exports and development. By providing access to credit and high input quality, securing higher output prices, spreading knowledge, instilling motivation, and reducing labor constrains and some risk associated with marketing activities, the burley tobacco clubs enable their members to be more productive than non-members, with differences in yields per acre ranging from 40 to 74 percent. Tobacco members also earn more income from tobacco sales, with premiums ranging from 45 to 89 percent. However, members and non-members cannot negotiate better prices at the auction floors (probably because there are a few buyers that can exercise monopsonistic power). Members and non-members do not allocate significantly different shares of their land to tobacco either. This is probably because tobacco growers in Malawi are smallholder subsistence farmers that need to grow enough food for home consumption.

The differences in yields and sales generated by club membership are equivalent to

increases in tobacco prices of between 37 to 54 percent. (Those price increases could, for instance, materialize by enhanced foreign market access, improved formal export costs, or increased behind the border competition in the tobacco value chain.) In rural Africa, thus, export barriers at the grassroots can be a significant hindrance to income growth among smallholder farmers.

Appendix 1: The Surveys

This Appendix describes the two main sources of information used in this paper: the Integrated Household Survey and the Tobacco Clubs Survey. The household survey is the main source of data for our analysis. The Tobacco Clubs Survey has a more modest role as complementary data to support some of the claims in the empirical analysis. It is becoming increasingly common, especially in research on institutions in Africa, to supplement a major data set with pieces of evidence from small-scale surveys or interviews with farmers. See Udry (2003) for a discussion of different research strategies and data collection efforts in Africa.

The Malawi Integrated Household Survey (IHS)

The sample design of the IHS is a two-stage stratified sampling procedure from a sample frame of Enumerator Areas (EA) from the 1998 Population Census. The survey covers the three geographical regions (north, center and south), dividing the country into rural and urban areas. The urban stratum includes the four major urban areas (Lilongwe, Blantyre, Mzuzu, and the Municipality of Zomba); all other areas are considered as rural. The total sample is 20 households per each of the 564 EA selected, resulting in 11,280 households surveyed.

The Integrated Household Survey (IHS) consists of two questionnaires: a household questionnaire, and a community questionnaire. The community questionnaires include typical questions on socio-economic conditions at the village level. The household questionnaire includes several modules: A) Household identification; B) Household roster (size, demographics; marital status); C) Education (schooling attainments); D) Health (recent illness or injury, chronic disease, treatments); E) Time use and labor (household work, employment); F) Security and safety (crime, crime protection); G) Housing (dwelling characteristics); H) Consumption (over the last three days); I) Consumption (during last week); J) Consumption (non-food items during last month); K) Consumption (non-food items during last three months); L) Consuption (non-food items during last year); M) Consumption (durables); N) General Agriculture (general); O) Agriculture (rainfed cultivaion): P) Agriculture (rainfed crop sales); Q) Tobacco (club membership, land allocation, input use, yields, sales); R) Agriculture (dry-season cultivation); S) Agriculture (dry-season crop sales); T) Agriculture (tree crops); U) Agriculture (livestock); V) Household enterprises; W) Other income; X) Gifts; Y) Social safety nets; Z) Credit; AA) Subjective assessments of well-being; AB) Recent shocks; AC) Deaths; AD) Child anthropometry. The main ingredient for our analysis is module Q) on tobacco farming.

The Tobacco Clubs Survey (TCS)

The Tobacco Clubs Survey (TCS) was launched in the summer of 2007. Our objective was twofold: to gather qualitative information on the basis of personal interviews with farmers that belong to burley clubs, and to deployed a simple questionnaire with quantitative additional information. The TCS performs a supplementary role to the IHS (Udry, 2003).

The TCS was prepared to collect the club "constitutions" and to provide tabulations of the more prevalent rules, regulations, and services of the clubs. The survey has four different modules: A) Regulations; B) Demographics; C) Services and Benefits; D) Other clubs (common practices of other tobacco clubs).

The Tobacco Clubs Survey is a small-scale survey with a design constrained mostly by budgetary reasons. It has a stratified sampling with strata based on the geography of Malawi. Using data on tobacco clubs by districts provided by the Tobacco Control Commissions, the sampling was designed in order to represent the actual distribution of tobacco clubs across the 3 regions: Northern, Central and Southern. This geographical division reflects disparities in terms of natural conditions to growth tobacco (i.e., soil quality, rains, etc.) as well as tribal representation (Tumbuka tribes dominate the northern region, Chewa tribes, the central and Yao tribes, the southern). Three districts were surveyed in the Northern region, seven districts in the Central region and two in the Southern region. The basic information is in Table A1.[20] In each district, twenty tobacco clubs were randomly selected. A total of 180 villages were visited. The weights used to compute descriptive statistics in tables 1 and 2 were constructed using the total number of tobacco clubs displayed in the fourth column of Table A1. This information was provided by the Tobacco Control Commission.

[20]The remaining districts, not included in the TCS, comprise only 8.7 percent of the tobacco clubs in Malawi.

Table A1
Tobacco Clubs Survey

	Clubs Surveyed	Villages Visited	Total clubs in district
NORTHERN REGION			
Chitipa	19	15	328
Mzimba	20	13	2,670
Rumphi	20	18	1,242
CENTRAL REGION			
Dedza	21	19	420
Dowa	21	18	3,977
Kasungu	20	13	2,442
Lilongwe	19	11	5,851
Mchinji	20	18	1,457
Ntcheu	21	8	669
Ntchiji	20	17	1,038
SOUTHERN REGION			
Mangochi	16	13	708
Zomba	21	17	956
Total	238	180	21,767

Notes: The total number of clubs in each district corresponds to 2007 and was provided by the Tobacco Control Commission of Malawi.

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