Norwegian University of Life Sciences (NMBU)

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Norwegian University of Life Sciences
Centre for Land Tenure Studies

Centre for Land Tenure Studies Working Paper 6/18

Symposium paper: ICAE Vancouver July 28-August 2, 2018

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Abstract

Continued high population growth in already densely populated rural areas in parts of Sub-Saharan Africa makes it harder for youth to choose agriculture as their main source of income. We investigate whether near landless youth can still access rented land as a complementary source of income. We utilize a unique data set of rural youth that have been allocated rehabilitated communal land to form formalized business groups for joint business activity. They rely on complementary sources of income and land renting is one of these. Using data from a sample of 1138 youth business group members from 119 youth groups in five districts in the Tigray region of Ethiopia, we find that land renting is a complementary income source for 29% of these youth. It is the most important source of income for 16.8% of the youth and the second most important source of income for 14% of the youth. Access to rented land is constrained, however. Male youth who own oxen and ploughs are much more likely to be able to rent land. Utilizing a trust game to elicit trust and trustworthiness of the youth, we also found a positive association between trust and access to rented land. Trust reduces transaction costs and more trustworthy youth have better access to rented land. The importance of trust is also illustrated by the dominance of kinship contracts and contracts with close neighbors reducing the costs of monitoring tenants. The dominance of sharecropping contracts also contributes to rationing and low allocation efficiency in the market. The prohibition of land sales also limits the potential of the "agricultural ladder" to facilitate youth climbing out of poverty through purchase of land.

Key words: Income sources; land-poor rural youth; youth business group members; access to rented land; trust; Ethiopia.

JEL Codes: Q15;

1. Introduction

Youth unemployment is a growing challenge in developing countries (Awogbenle and Iwuamadi 2010). Unemployment rates are hard to estimate in developing countries where the majority of the population lives in rural areas and agriculture is the dominant source of livelihood. There are indications that youth unemployment rates are three times as high as adult unemployment rates (Anyanwu 2014). Continued high population growth in Sub-Saharan Africa contributes to growing land scarcity and shrinking farm sizes while area expansion becomes increasingly difficult and a threat to remaining forest areas (Chamberlin et al. 2015; Tilman et al. 2011). Shrinking farm sizes and growing landlessness is associated with accelerating youth outmigration from rural areas (Bezu and Holden 2014). Yet, excessive youth rural-urban and international migration can lead to increasing youth unemployment, frustrations, as well as social and political instability (Blattman and Miguel 2010; Onah and Okwuosa 2016). Policy action is needed to provide new employment and livelihood opportunities for youth in rural as well as in urban areas (Ajofu 2013; Salami 2013).

Ethiopia has spearheaded a new approach to youth employment by allocating rehabilitated communal lands to unemployed, land-poor and landless youth (Holden and Tilahun 2018a). The youth organize themselves in business groups formalized as primary cooperatives based on cooperative law. They are allowed to establish a sustainable business on the allocated land. They elect a board, make their own bylaw, and prepare a business plan that has to be accepted by the local administration. They typically invest in activities such as forestry, apiculture, livestock rearing, horticulture and irrigation. It takes time for these joint activities to start to yield sizable incomes to be shared by group members. They therefore depend on complementary sources of income.

This paper investigates the potential of the land rental market to provide complementary income to the youth who have joined this type of youth business groups. Ethiopia has a well developed land rental market while land sales are prohibited (Holden et al. 2011).

Research questions:

a) Can the land rental market be an important complementary source of land and income and thereby stabilize and secure the livelihood of youth business group members?
b) What constraints do youth face in their attempts at accessing land through the land rental market and what are the conditions that enhance such access?
c) How important is land renting as a complementary source of income for near landless youth compared to other sources of such income?

We hypothesize that the land rental market potentially can be an important complementary source of income but that this depends on gender, farm endowments and social capital (trust and trustworthiness) of youth group members, as these factors affect access to land through the land rental market. We use data from 1138 youth business group members in 119 youth business groups in northern Ethiopia to test the hypotheses.

2. Theoretical model and hypotheses

We draw on the literature on land rental markets and contracts with emphasis on the allocation efficiency of these markets (Bliss and Stern 1982; Skoufias 1995; Holden et al. 2010). Such allocation efficiency may be constrained by transaction costs. There is no need for land markets if all other factor markets function perfectly (Singh et al. 1986; Holden et al. 2010). High transaction costs in non-land factor markets provide opportunities for efficiency gains in the land rental (tenancy) market. Non-linear (fixed and variable) transaction costs may cause non-participation or partial adjustment through the land rental market when non-land factor markets are imperfect. The immobility and spatial dispersion of land contribute to the only partially reducible transaction costs in land rental markets (Binswanger and Rosenzweig 1986). Tenure insecurity may be an important reason for allocative inefficiency as well as Marshallian inefficiency in some contexts, among others due to failed policy reforms (Otsuka 2007; Holden et al. 2013). Ethiopia introduced a tenure security-enhancing low-cost land registration and certification reform from 1998 and this has contributed to improved tenure security and more active land rental markets (Deininger et al. 2008; 2011; Holden et al. 2011).

Access to and participation in the land rental market as a complementary source of income and livelihood option depends on supply and demand characteristics in the tenancy market. We think that both demand and access depends on the potential tenant's ability to farm and their access to land from other sources than the land rental market. The ability to farm depends on non-land resources such as labor endowment, farming skills, capital endowments in the form of oxen for ploughing, and equipment such as ploughs for cultivation. More of such capital is likely to be associated with higher expected returns from additional land. On the supply side in the land rental market, in a market where sharecropping is the dominant contract type, the ability to farm also matters for the landlord selecting tenants for her/his land to be rented out. Observable ability to farm may be inspected through the physical endowments of potential tenants. The same ability factors that are associated with higher demand for land and higher expected marginal returns from additional land are therefore also proposed to increase the likelihood that potential tenants are accessing land in the rental market.

We study land renting in a context where gender has been shown to have a strong role in terms of a gender division of labor in agriculture. Land cultivation with the use of oxen is considered primarily a male task. This also implies that male youth are likely to have better chances of accessing land in the land rental market and are more likely to also attempt to demand such land. The reason for male dominance in land cultivation with oxen is likely related to the greater upper body strength of males as an underlying explanation for this strong cultural norm in the Ethiopian context (Holden et al. 2011; Bezabih et al. 2016).

Given the limited incentives in sharecropping contracts, landlords may also be cautious in their choice of tenants and prefer tenants they trust and/or easily observe or influence in the way they cultivate the rented land. Trust and trustworthiness are not variables that are easily observable by researchers but may still be taken into consideration by landlords in their choice of tenants based on their accumulated knowledge of alternative tenant candidates.

We formulate the simple reduced form model for probability of access to land, $pr\left(R_{gi}\right)$, in the rental market by youth group members based on the above theoretical contextual considerations:

$$pr\left(R_{gi}\right) = \alpha_1 A_{gi} + \alpha_2 E_{gi} + \alpha_3 G_{gi} + \alpha_4 T_{gi} + c_g + \varepsilon_{gi} \quad (1)$$

where A_{gi} is the land available for youth group member *i* in group *g* from other sources (own land, land of spouse, land of parents). E_{gi} is the non-land endowments of oxen and ploughs that are instrumental for land cultivation, G_{gi} is the gender variable, a dummy=1 for being male, T_{gi} is a measure of trust (we return to how this is measured), c_g represents a set of group or higher level controls, and ε_{gi} is an error term.

Based on the theoretical considerations above we hypothesize: H1: $\alpha_1 < 0$, as access to own or other sources of land reduces the need and demand for rented land (Bliss and Stern 1982; Skoufias 1995; Holden et al. 2010). H2: $\alpha_2 > 0$, as the rental market for ploughing services is poorly developed and the ownership of oxen and ploughs therefore increases the expected marginal returns from rented land. These are observable endowments of tenants that make landlords more willing to rent land to them. H3: $\alpha_3 > 0$, as the labor market is imperfect and male and female labor are not perfect substitutes. Males are more likely to be interested in renting in land and more likely to access land from landlords given the cultural norms in the Ethiopian society. H4: $\alpha_4 > 0$, as higher trust between the tenant and the landlord reduces transaction costs and therefore increases the likelihood that a rental contract materializes.

Trust is endogenous and may depend on observable and, for researchers, unobservable individual and community characteristics. We use an instrumental variable approach to control for this endogeneity. We return to this below.

When it comes to intensity of land renting, we believe the same basic mechanisms are at work and pull in the same direction as in equation (1). Even those with access to the market may still be constrained, and may not have obtained as much land in the market as they had aimed for. One fundamental reason for this is that a land rental market dominated by sharecropping does not have a rental price that clears the market. This typically leads to rationing on the tenant side of the market. The model above may therefore be reformulated by replacing the probability of access with the area accessed in the market as follows;

$$\overline{R_{gi}} = \beta_1 A_{gi} + \beta_2 E_{gi} + \beta_3 G_{gi} + \beta_4 T_{gi} + c_g + \mu_{gi} \quad (2)$$

where $\overline{R_{gi}}$ is the rented area accessed by youth group member *i* in group *g*. With efficient allocation of land in the rental market, owned land and rented land should be perfect substitutes. Under such conditions, $\beta_1 = -1$. We hypothesize (H5) that $\beta_1 > -1$ as we think that youth do not have smooth and easy access to land in the rental market due to significant transaction costs. These transaction

costs are related to the immobility and spatial dispersion of land, the dominance of sharecropping and the need for landlords to monitor tenants.

We hypothesize that access to land in the rental market depends on the possession of non-land resources that are essential for farming, such as oxen, ploughs and male labor. This is essentially our hypotheses H2 and H3, which also imply that $\beta_2 > 0, \beta_3 > 0$. These effects are caused by transaction costs in the market for non-land factor markets (such as for skills, traction power, capital), production risk and the inter-temporal nature of land renting and the associated dominance of sharecropping contracts, with screening and rationing of tenants. Tenants with a good reputation are more likely to be trusted. Trustworthy behavior is rewarded through accumulation of a good reputation. It may be possible to influence others by stating your trustworthiness but actual observed trustworthiness is more convincing and more important in communities where individuals know each other well and interact repeatedly over time in close neighborhoods and kinship networks. This may explain the dominance of land rental contracts between kin partners in Ethiopia (Holden et al. 2011). Our hypothesis H4 therefore also applies here; $\beta_4 > 0$, the trust variables should be associated with access to more land in the rental market.

3. Data and estimation strategy

3.1. Data

Based on a census of 742 youth business groups in five districts in the Tigray Region in February-March 2016, we sampled 119 groups that were allocated land for establishing a sustainable business option. From each group we sampled randomly up to 12 group members among those available at the time of the survey in July-September 2016. The survey was combined with lab-in-the-field experiments to elicit risk tolerance and trust among group members. The survey asked questions about the individual members and their families and included questions on complementary sources of income such as land renting.

Measures of trust and trustworthiness were obtained using the standard incentivized trust game (Berg et al. 1995). Trusting behavior was measured as the share of a received endowment (30 ETB[1]) that was invested in another anonymous youth group member from the same youth group. The amount invested is tripled by the researchers before it is given to another random and anonymous member of the same youth group. This trustee decides freely how much of this amount to send back to the anonymous trustor. Trustworthiness was measured in two ways. Stated trustworthiness was measured as the stated share that would be returned if the amount received from an anonymous trustor in their own group is 30 ETB (assuming that the trustor has invested 10 ETB in the trust game). This is close to the average amounts received from anonymous trustors. Actual trustworthiness was measured as the share returned of the actual amount received from an anonymous trustor.

Risk tolerance was measured using the incentivized investment game of Gneezy and Potters (1997). The youth group members were given an endowment of 30 ETB from which they could

[1] ETB=Ethiopian Birr, 1 US$=21 ETB at the time of the survey.

invest any amount. The amount invested was tripled by the researchers and the youth group members had a 50-50 chance of winning the tripled amount or losing it (by drawing one out of two paper notes). The risk investment game was implemented after the first part of the trust game had been played and the stated trustworthiness had been elicited, but before the survey interview and the second part of the trust game when actual trustworthiness was revealed.

3.2. Estimation strategy

One challenge with the models above is that trust is likely to be endogenous. Another is that we have three alternative measures of trust from the lab-in-the field experiments. We are not sure which of these three measures is the most appropriate for our estimation. Tentatively, landlords may have information about the trustworthiness of youth group members based on their past behavior or expressed attitudes. Actual or stated trustworthiness of the youth group members, as revealed in the experiments, may also be correlated with landlords' perceptions of the trustworthiness of the youth group members. It is also possible that the trusting behavior of youth group members can indicate local trust and thus also be positively correlated with the trust landlords have in them. We are a bit less confident about this latter relationship, but aim to test all the three measures.

The fact that trust and trustworthiness are likely to be endogenous implies that we need an identification strategy that can eliminate or minimize such bias. The challenge is to find one or more instruments that are correlated with the trust variables but that are not affecting or directly correlated with the land access variable. Trusting people is a risky decision and more risk tolerant people may be more willing to trust others. We draw on the study of Holden and Tilahun (2018b), based on the same data, that investigated the relationship between trust and risk tolerance and found these to by highly correlated when the trust game was played within youth groups. This had the advantage that youth group members were more able to form expectations about the trustworthiness of their anonymous partners. The study revealed that both trust and trustworthiness were closely correlated with risk tolerance.

We use the shares invested in the Gneezy and Potters (1997) investment game as a proxy for risk tolerance. This variable was used as an instrument for the three trust variables, which were included alternatively. Another potential instrument is birth rank as it was found to be positively correlated with trusting behavior. Youth with more elder siblings are more trusting. We do not think risk tolerance and birth rank of tenants have any direct effect on access to land in the rental market. We test this with over-identification tests in the models where both instruments are included.

The model in equation (1) is estimated with instrumental variable Probit as the base model as follows:

$$
\begin{aligned}
pr\left(R_{gi}\right) &= \alpha_1 A_{gi} + \alpha_2 E_{gi} + \alpha_3 G_{gi} + \alpha_4 T^{*}_{gi} + c_g + \varepsilon_{gi} \\
T^{*}_{gi} &= \gamma_1 A_{gi} + \gamma_2 E_{gi} + \gamma_3 G_{gi} + \gamma_4 Z_{gi} + c_g + \upsilon_{gi}
\end{aligned}
\tag{3}
$$

where Z_{gi} is one or more instrumental variables that is correlated with trust but not with the outcome model error term. Similarly, for equation (2) instrumental variable Tobit models are used as base models:

$$\begin{aligned} \overline{R_{gi}} &= \beta_1 A_{gi} + \beta_2 E_{gi} + \beta_3 G_{gi} + \beta_4 T^*_{gi} + c_g + \mu_{gi} \\ T^*_{gi} &= \gamma_1 A_{gi} + \gamma_2 E_{gi} + \gamma_3 G_{gi} + \gamma_4 Z_{gi} + c_g + \upsilon_{gi} \end{aligned} \quad (4)$$

We use alternatively the individual trust, stated trustworthiness and actual trustworthiness variables from the trust games. Models were estimated alternatively with district (*woreda*) and community (*tabia*) fixed effects. The limited dependent variable characteristic of the models implies that the incidental parameter problem can bias the results from youth group fixed effects models.

We tested for exogeneity of the trust variables and this was rejected in most of the specifications of models for access to rented land (only weakly so when trust was represented by the share invested by trustors in the trust game). Exogeneity could not be rejected in the area rented models. The instruments (risk tolerance and birth rank) were highly significant in the first stage models in all specifications and can be classified as strong instruments, see F-tests in Table A2 in the Appendix. For robustness checks we used linear probability IV and panel data models and these are presented in the Appendix. Details on the exogeneity and over-identification test results are also presented there.

To investigate factors associated with the type of income source the youth have as their most important source of income, we used multinomial logit models. Only one specification of this model is included. It presents relative risk ratios and uses own farm as the baseline source of income.

4. Descriptive analysis

5.1. Land access by source

Close to 49% of the youth group members rented land in the year of the survey and 5.1% stated that they had attempted but failed to rent land. Table 1 gives an overview of alternative sources of land. This includes own inherited or allocated land through redistribution, land of spouse, and rented land. The table includes dummy variables for access to the different sources of land as well as average areas accessed for all households, measured in the local measurement unit, *tsimdi*, which is approximately 0.25 ha.

Table 1 shows that male and female members are about equally likely to own some land and about 25% of them do. Females are more likely to have a spouse that owns some land than males are, so females have significantly more access to land than males have through their spouses. After combining own and spouse own land there is no significant gender difference in land access besides land renting. Males have significantly better access to land in the rental market than females as 48% of the males and 29% of the females have such access. Overall, males access more land through the rental market than through other sources while this is not the case for females.

59% of the males and 48% of the females have access to land from at least one of these sources of land. This land comes in addition to the jointly allocated land for their youth groups.

Table 1. Land access from alternative sources, by gender

	Females Means	Males Means	Pr(|T|>|t|)	Gini-coef.
Number of observations	359	779		
Own land access, dummy	0.24	0.25	0.5055	
Own land area, *tsimdi*	0.32	0.35	0.5438	0.462
Spouse own land, dummy	0.13	0.08	0.0063	
Spouse own land area, *tsimdi*	0.18	0.12	0.0175	0.387
Own or spouse land, dummy	0.32	0.30	0.4911	
Sum of own and spouse land, *tsimdi*	0.50	0.46	0.4804	0.459
Rented land access, dummy	0.29	0.48	0.0000	
Rented land area, *tsimdi*	0.65	1.32	0.0000	0.412
Operational land access, dummy	0.48	0.59	0.0006	
Operational land area, *tsimdi*	1.15	1.79	0.0001	0.438

Table 1 also presents Gini-coefficients for the distribution of the different sources of land among the youth group members. The Gini coefficients do not vary substantially across the different sources of land.

5.2. Land rental contract characteristics

Land rental contracts may be characterized based on the contract agreement details in the form of sharing of inputs/input costs, output sharing, duration or renewal expectations of contracts, whether contracts are written or oral and have witnesses, and based on how closely related the contract parties are (social distance). These characteristics together say something about the functioning of the rental market, access constraints and transaction costs in the market and how varying levels of trust may affect who has access and to what types of contracts.

We first inspect the variation in output sharing and input sharing contract conditions for the contracts that the youth group members in our sample have, see Table 2.

Table 2. Contract types by output, input and payment characteristics

Contract type	Number of contracts	% of contracts
Sharecropping (only sharing of output)	577	91.0
Sharecropping (output sharing) with cash	10	1.6
Output and input sharing	9	1.4
Cash rental contract	38	6.0
Total contracts	634	100.0

Table 2 shows that pure output sharing contracts totally dominate and constitute more than 90% of all contracts. 6% of the contracts are fixed rent contracts. A small share of the sharecropping

contracts include a cash payment upfront at the time of contract agreement. The dominance of output sharing contracts implies that the youth share the production risks with their landlords and do not have to pay for the land till at harvest time when the output is shared.

Second, we inspect the types of landlord partners the youth have for their rented land, see Table 3.

Table 3. Who do the youth access rented land from?

Rent land from whom?	Landlord partner	% of contracts
From relative	366	56.1
From neighbor	206	31.6
Other villagers in home *tabia*[1]	71	10.9
From villager in other *tabia*	9	1.4
Total	652	100.0

[1]*Tabia*=community, the lowest administrative level.

Table 3 shows that the youth primarily obtain land in the rental market from their relatives and neighbors. About 11% access land from others in their home community and very few access land outside their own community. This demonstrated the limited spatial integration in the land rental market. It may also indicate the importance of trust and personalized relations for land access. We inspect this further by looking at the nature of the contracts in terms of the degree to which they are written, have witnesses and are reported to the community administration, see Table 4.

Table 4. Contract agreement types

Contract agreement type	Contract agreement	% of contracts
Oral contract without witnesses	496	77.6
Oral contract with witnesses	105	16.4
Written contract signed by both parties	24	3.8
Written contract signed and reported to	14	2.2
	639	100.0

Table 4 shows that more than three quarters of the contracts are oral without witnesses and this demonstrates a high degree of trust among the contract partners such as may be expected among relatives and neighbors. While the land laws state that all rental contracts should be written and reported to the local land administrations, we see that only 2.2% of the contracts follow this regulation.

Table 5 presents data on the duration and/or renewal conditions of contracts.

Table 5. Contract duration and renewal types

Summary: Contract duration types	Contract length	% of contracts
For one year/season	158	25.2
Open ended (can be renewed one year at the time)	439	70.1
For a fixed number of years	29	4.6
Total	626	100.0

Table 5 shows that 70% of the contracts are open-ended. This means they continue from year to year until one of the parties decides to end the contract. There are few with longer-term fixed contracts.

5.3. Relative importance of land renting as source of income

All youth group members were asked to rank their three main sources of income, see Table 6.

Table 6. Youth income sources, by rank. Rank 1=most important.

Income sources, August2015-July2016	Rank 1, %	Rank 2, %	Rank 3, %
Youth group activity	6.98	27.56	16.8
Land renting/Sharecropping	16.8	14.04	3.45
Trade	9.56	7.41	3.36
Construction work	10.85	8.7	4.48
Support from family	20.93	10.34	3.53
Own farm	29.2	5.34	1.89
Other, specify	5.68	5.68	3.01
No activity	0	20.93	63.48
Total	100	100	100

Table 6 shows that own farm and support from the family are the most important sources of income followed by land renting. The youth group business activity has not yet become the main source of income for the majority of the youth group members. Trade and construction work employment are important non-farm sources of income.

Table 7 gives an overview of expected main source of income five years into the future. We see that the majority then expects the youth group activity to be the main source of income. Only 6%

Table 7. Expected main source of income five years into the future.

Source of income	Freq.	Percent
Youth group activity	691	60.72
Land renting/Sharecropping	67	5.89
Trade	137	12.04
Construction work	20	1.76
Support from family	9	0.79
Qwn farm	189	16.61
Other, specify	11	0.97
Do not know/Very uncertain	6	0.53
Missing responses	8	0.7
Total	1,138	100

expect land renting to be the main source of income then. This indicates that land renting is perceived to be a temporary complementary source of income.

5.5. Socio-economic characteristics

Socio-economic characteristics of the youth and their family/parent households were obtained through survey interviews and lab-in-the-field experiments. The lab-in-the-field experiments were used to obtain measures of trust, trustworthiness and risk tolerance. Summary statistics for the socio-economic variables for male and female youth group members are presented in Table 8. The data are grouped by gender due to our hypothesis that the land rental market primarily is a complementary source of income for males and the table demonstrates some important differences between males and females that also may contribute to the gender differences in land rental market access.

Table 8. Socio-economic characteristics, by gender

	Females Means	Males Means	Pr(|T|>|t|)
Number of oxen	0.540	0.816	0.0000
Number of ploughs	0.487	0.727	0.0000
Farm size of parents, *tsimdi*	1.950	2.461	0.0002
Trust, share invested	0.362	0.426	0.0000
Stated trustworthiness, share returned	0.304	0.306	0.8527
Actual trustworthiness, share returned	0.271	0.304	0.0072
Risk tolerance, share invested	0.399	0.463	0.0001
Birth rank	3.089	3.112	0.8600

Table 8 shows that there are significant gender differences in farm endowments such as oxen and ploughs, which are instrumental for land cultivation. This is likely to affect land access in the rental market. Parent households of males have on average larger farm sizes than the parent households of females. There are also significant gender differences in trust and actual trustworthiness but not in stated trustworthiness. Males are significantly more risk tolerant.

5. Results and discussion

5.1. Access to land in the rental market

The results from alternative instrumental variable probit models are presented in Table 9, which presents marginal effects. We assess what the results indicate for our first four hypotheses. Hypothesis H1 states that access to own or to other sources of land reduces the need and demand for rented land. We see from Table 9 that the coefficients on own and spouse land as well as on parents' farm size are negative. The coefficients are only significant in the models with *tabia* fixed effects for own and spouse land but highly significant in all specifications for parents' farm size. We therefore cannot reject this hypothesis. It will be more interesting to discuss the size of these coefficients in the area rented models.

Hypothesis H2 states that oxen and ploughs increases the expected marginal returns from rented land and these are observable endowments that make landlords more willing to rent out their land. We see that the coefficients on oxen and ploughs are highly significant and positive in all model specifications, giving strong support to this hypothesis. Such endowments are obviously crucial for access to land in the rental market.

Hypothesis H3 states that males are more likely to be interested in renting in land and more likely to access land from landlords, given the cultural norms in the Ethiopian society. Table 9 shows that the coefficient on the male gender dummy is significant and positive in all specifications and males are 29-44 percentage points more likely to access land in the rental market than female youth group members.

Hypothesis H4 states that higher trust between the tenant and the landlord reduces transaction costs and therefore increases the likelihood that a rental contract materializes. Table 9 shows that all the predicted endogenous trust variables had positive and significant effects on access to land in the rental market. This is strong evidence that trust is important for access to land in the rental market. The standard errors on the trust variables were too high to state with confidence which of the trust variables is more appropriate but the coefficient on actual trustworthiness was larger than that on stated trustworthiness, which again was larger than that on trusting behavior. Theoretically, we would also expect actual trustworthiness to be more important than trusting behavior for landlords choosing among potential tenants in closely knit societies where individuals build a reputation as more or less trustworthy and which may be known and evidently taken into account by landlords in the community. Next, we look at the impact of these variables on area accessed in the rental market.

5.2. Area rented models

Table 10 presents the results from instrumental variable models with the alternative trust variables. The models provide marginal effects where the outcome in terms of area rented is measured in *tsimdi*. In a smoothly functioning market where rented land is easily substituted for owned land we expect that the coefficients on own land and possibly parents' land, if the youth cooperate with their parents in their farming activity, should be close to -1 (Bliss and Stern 1982; Holden et al. 2010). As we see from Table 10, the coefficients are much closer to zero and this indicates that access to land in the rental market is severely constrained on the tenant side, *ceteris paribus.* Based on this result, we cannot reject hypothesis H5 that $\beta_1 > -1$.

Access to rented land is achieved through investing in oxen and ploughs, non-land endowments essential for farming. One extra ox increases the access to additional rented land by about 1.5 *tsimdi* and one extra plough increases access to rented land by about 1.2 *tsimdi.* Furthermore, we see that a male youth, just by being male, can achieve an additional rented area of about 1.2 *tsimdi.* The rental market for land is thus primarily an additional source of income for male youth owning oxen and ploughs.

The trust variables all turned out to give positive coefficients in line with our hypothesis H4 but none of them was significant. The indication may be that high trust is not sufficient alone to ensure allocative efficiency in the market.

5.3. Main income source models

We assessed factors associated with the main income source of the youth group members utilizing the Rank 1 responses in Table 6 and using multinomial models. The most common source, own farm, is the base category that the other alternatives are compared with. The results are presented in Table 11. We did not have any particular hypotheses we wanted to test here. We therefore just summarize the key results.

Own and spouse farm size is associated with higher likelihood that own farm is the main source of income compared to all other alternatives. This result is not very surprising. Larger farm size of parents is associated with higher probability that support from family is the main source of income and lower probability that land renting and construction work are the main sources of income. Parents with larger farm sizes are likely to be more able to support their children, *ceteris paribus.* Oxen ownership is associated with higher likelihood that land renting is the most important income source and lower likelihood that construction work is so. Oxen and plough ownership are also associated with higher likelihood that the youth group activity is the main source of income and lower likelihood that support from the family is their main source of income. Males are generally more likely to have all other activities than own farm as the main source of income than females. This may indicate that females are generally disadvantaged in their access to alternative sources of income. Higher risk tolerance is also associated with other activities than own farm to be more likely as the main source of income, although all of these coefficients were not significant. Construction work and the youth group activity were having the largest and most significant coefficients for risk tolerance and may therefore be more likely to be chosen by more risk tolerant individuals. Finally, age was associated with higher likelihood that own farm is the main source of income compared to all other activities.

5.4. Robustness checks

To further scrutinize the findings related to our key hypotheses, we estimated linear probability models for access to rented land where we controlled for unobservables with fixed effects alternatively at district (*woreda*), community (*tabia*), and youth group levels. Youth group random effects were used in the models with district and community fixed effects. For these models, we were not able to include and take endogeneity of trust into account. The results for the hypotheses H1-H3 were shown to be robust to the alternative specifications. The results are presented in Table A1 in the Appendix.

To further scrutinize the endogenous trust and instrumental variables, we ran a number of linear probability instrumental variable (2SLS) models for each of the three trust variables and using alternatively district and community fixed effects. We included tests for endogeneity, over-identification and strength of instruments. In order to facilitate over-identification tests we included risk tolerance and birth rank as instruments for all the three trust variables. The results are presented in Table A2 in the Appendix. The instruments are found to be strong and the models pass the over-identification tests. The trust variables are found to be only weakly endogenous but

this varies somewhat across model specifications. The results do not lead to a need to change our conclusions related to the four hypotheses.

One additional concern is whether access to the rental market and intensity of renting can be modeled as one decision, like we did with the Tobit model specifications. To test for this, we tried alternative selection models with control function and two-step approaches. Each of these models is run alternatively with district and community fixed effects. The two modeling approaches gave contradictory results with respect to whether there is a significant selection bias. The Hazard lambda in the two-step models was quite strongly significant while the Athrho variable in the control function specifications was insignificant in both specifications. The control function approach uses robust standard errors while the two-step model uses conventional standard errors. All these models produce marginal effects that are lower for the key variables than those from the tobit models. The results do not lead to any changes in the conclusions regarding the key hypotheses, except that the signs for the farm size of parents' variable changed from significant and negative to becoming slightly positive and insignificant. The results therefore point in the direction of even more sluggish responses in area rented, to changes in the key variables than we found in the other models.

5.5. Discussion

We can now discuss the regression findings in relation to some of the contract and partner information that we presented in the descriptive analysis. Table 2 shows that sharecropping contracts dominated the land rental market, as only 6% of the contracts were fixed-rent contracts. Sharecropping implies that the tenant characteristics and efforts affect the outcomes of the contracts for the landlords who therefore need to worry about the performance of their tenants. Trust plays a more important role in sharecropping, and screening and monitoring are methods used to overcome the information asymmetries.

Table 3 shows that 56% of the contracts are with kin landlords and another 32% are with neighbors. Relatives may be more trusted and neighbors are more easily observable, and this reduces information asymmetries and monitoring costs. Table 4 shows that 78% of the rental contracts were oral and without witnesses, a very clear indication of trust among the contract parties. Only 6% of the contracts were written and only 2% reported to the local administrations although such reporting is a requirement according to the land laws and regulations in the country. This may be due to local perceptions that such reporting is unnecessary for sharecropping contracts with local persons you trust. It indicates also a high level of trust in the youth that have received such contracts, but this rationed access and trust applies mainly to a subsample of business youth group members. Male youth with oxen and ploughs that are kin or neighbors who can easily be monitored. This demonstrates a very limited spatial integration in this market and that land renting as a complementary source of income for youth primarily works for youth staying close to home.

The dominance of one year and open-ended contracts provides a flexibility for landlords to pull out if tenants do not perform well, and this could potentially also represent a "threat of eviction" as renewal may depend on performance (Kassie and Holden 2007). However, we did not collect data to investigate this further. For the youth this may imply tenure insecurity in the rental market. However, this will also depend on the mutual trust among the contract partners.

6. Conclusions

We have investigated the potential of the land rental market to serve as a complementary source of income for land-poor rural youth in northern Ethiopia. Our study is of youth that are formal members of youth business groups that recently were allocated some joint land for joint business establishment. We found that land renting was an important source of complementary income for close to 30% of the youth group members. It was mostly male youth owning oxen and ploughs and with very little own land that were able to rent land. Being trustworthy and trusting were also found to positively influence access to land in the rental market. Female youth group members appeared generally disadvantaged in their access to complementary sources of income.

In the future, the majority of the youth expected their joint business activity to become their primary source of income and land renting was expected to become less important. We may therefore conclude that land renting was perceived as a temporary solution during the period they are building their joint business. The fact that land cannot be purchased or sold in Ethiopia limits the potential for the "agricultural ladder" to be a pathway out of poverty for the poor through first renting and then purchasing land. The land tenure system constraints may also limit the potential for agricultural transformation.

Table 9. Trust and land rental market access instrumental variable probit models

	(1)	(2)	(3)	(4)	(5)	(6)
Exogenous variables						
Own and spouse land holding	-0.0651	-0.0708	-0.0669	-0.0866*	-0.0958*	-0.0928**
tsimdi	(0.0450)	(0.0498)	(0.0451)	(0.0458)	(0.0499)	(0.0459)
Farm size of parents, tsimdi	-0.110****	-0.102****	-0.110****	-0.128****	-0.117****	-0.131****
	(0.0237)	(0.0258)	(0.0240)	(0.0256)	(0.0283)	(0.0254)
Oxen owned	0.585****	0.553****	0.558****	0.608****	0.557****	0.572****
	(0.0757)	(0.0893)	(0.0849)	(0.0813)	(0.1020)	(0.0919)
Ploughs owned	0.515****	0.442****	0.506****	0.523****	0.397***	0.485****
	(0.1010)	(0.1180)	(0.1070)	(0.1150)	(0.1320)	(0.1220)
Sex=male, dummy	0.368****	0.324***	0.427****	0.366***	0.285**	0.438****
	(0.1090)	(0.1090)	(0.0991)	(0.1150)	(0.1230)	(0.1020)
Endogenous variables, instrumented						
Trust, share sent	1.327**			1.623**		
	(0.6610)			(0.7110)		
Actual trustworthiness, share return		2.478**			3.068***	
		(1.0210)			(1.0090)	
Stated trustworthiness, share return			1.877**			2.247**
			(0.8940)			(0.9200)
Woreda FE	**Yes**	**Yes**	**Yes**	**-**	**-**	**-**
Tabia FE	**No**	**No**	**No**	**Yes**	**Yes**	**Yes**
Main activity FE	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-1.462****	-1.525****	-1.513****	-0.816*	-0.727**	-0.852**
	(0.2640)	(0.2270)	(0.2680)	(0.425)	(0.336)	(0.361)
First stage regressions	Trust, share	Actual tw.	Stated tw.	Trust, share	Actual tw.	Stated tw.
Instruments						
Risk tolerance	0.261****	0.130****	0.178****	0.252****	0.120****	0.177****
	(0.0306)	(0.0273)	(0.0286)	(0.0320)	(0.0277)	(0.0295)
Birth rank	0.00845***			0.00842***		
	(0.0032)			(0.0032)		

Sex=male, dummy	0.0507****	0.0307**	-0.00602	0.0519****	0.0348***	-0.00742
	(0.0135)	(0.0125)	(0.0132)	(0.0135)	(0.0131)	(0.0132)
Own and spouse land holding,	0.00897	0.00822	0.00794	0.00836	0.0100*	0.0103**
tsimdi	(0.0072)	(0.0058)	(0.0048)	(0.0082)	(0.0056)	(0.0047)
Oxen owned	0.0147	-0.00252	0.00375	0.0118	-0.00559	0.00284
	(0.0099)	(0.0077)	(0.0127)	(0.0094)	(0.0074)	(0.0123)
Ploughs owned	-0.0103	0.00805	-0.0127	-0.0123	0.0138	-0.00397
	(0.0118)	(0.0111)	(0.0148)	(0.0118)	(0.0106)	(0.0140)
Farm size of parents, tsimdi	-0.00406	-0.00114	0.000387	-0.00478	-0.000524	0.00163
	(0.0031)	(0.0025)	(0.0030)	(0.0031)	(0.0027)	(0.0031)
Woreda FE	**Yes**	**Yes**	**Yes**	**-**	**-**	**-**
Tabia FE	**No**	**No**	**No**	**Yes**	**Yes**	**Yes**
Main activity FE	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.251****	0.212****	0.253****	0.276****	0.144****	0.244****
	(0.0297)	(0.0207)	(0.0215)	(0.0737)	(0.0340)	(0.0530)
Athrho2_1 Constant	-0.221	-0.485*	-0.400**	-0.271*	-0.613**	-0.467**
	(0.1450)	(0.2480)	(0.2020)	(0.1540)	(0.2790)	(0.2150)
Lnsigma2 Constant	-1.586****	-1.660****	-1.647****	-1.610****	-1.677****	-1.671****
	(0.0271)	(0.0278)	(0.0255)	(0.0276)	(0.0284)	(0.0270)
Wald test of exog., Prob>chi2	0.1271	0.0501	0.0474	0.0788	0.0284	0.0302
N	1128	1128	1128	1110	1110	1110

Note: Instrumental variable probit models using maximum likelihood estimation. Standard errors corrected for clustering at youth group level. Three groups were lost in the models with *tabia* FE due to no within-*tabia* variation in dependent variable. Significance levels: * p<0.10, ** p<0.05, *** p<0.01, **** p<0.001.

Table 10. Area rented-in instrumental variable Tobit models and panel Tobit model: Average marginal effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Own and spouse land holding,	-0.112	-0.139	-0.115	-0.147	-0.124	-0.159	-0.0999
tsimdi	(0.1470)	(0.1400)	(0.1490)	(0.1420)	(0.1540)	(0.1480)	(0.1090)
Farm size of parents, *tsimdi*	-0.144*	-0.168**	-0.155*	-0.182**	-0.148*	-0.175**	-0.160***
	(0.0801)	(0.0826)	(0.0791)	(0.0819)	(0.0808)	(0.0833)	(0.0547)
Oxen owned	1.505****	1.440****	1.526****	1.456****	1.547****	1.485****	1.510****
	(0.2760)	(0.2470)	(0.2880)	(0.2550)	(0.2590)	(0.2330)	(0.1560)
Ploughs owned	1.232****	1.221****	1.244****	1.202****	1.176****	1.137****	1.217****
	(0.3110)	(0.3030)	(0.3120)	(0.3050)	(0.3070)	(0.3120)	(0.1930)
Sex=male, dummy	1.189****	1.168****	1.331****	1.310****	1.193****	1.155****	1.302****
	(0.2880)	(0.3000)	(0.2900)	(0.2970)	(0.2940)	(0.3170)	(0.2700)
Risk tolerance							0.522
							(0.4430)
Endogenous variables, instrumented							
Trust, share sent	2.270	2.250					
	(1.8140)	(1.8240)					
Stated trustworthiness			2.907	2.698			
			(2.7280)	(2.7280)			
Actual trustworthiness					3.973	3.919	
					(3.5770)	(3.7880)	
Woreda FE	**Yes**	**-**	**Yes**	**-**	**Yes**	**-**	**Yes**
Tabia FE	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**
Main activity FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-3.221****	-1.194	-3.298***	-1.14	-3.405***	-1.052	-2.428****
	(0.9430)	(1.2020)	(1.0650)	(1.2080)	(1.1250)	(1.1840)	(0.4590)
First stage	Trust, share	Trust, share	Actual TW	Actual TW	Stated TW	Stated TW	
Risk tolerance	0.260****	0.251****	0.178****	0.174****	0.130****	0.120****	
	-0.0307	-0.0319	-0.0286	-0.0296	-0.0273	-0.0274	
Birth rank	0.00871***	0.00884***					
	-0.00326	-0.00327					

athrho2_1	-0.152	-0.141	-0.189	-0.17	-0.223	-0.219	
_cons	-0.113	-0.119	-0.168	-0.178	-0.223	-0.242	
lnsigma1	1.123****	1.081****	1.130****	1.085****	1.137****	1.094****	
_cons	-0.105	-0.105	-0.104	-0.104	-0.107	-0.107	
lnsigma2	-1.586****	-1.613****	-1.647****	-1.672****	-1.660****	-1.683****	
_cons	-0.0271	-0.0273	-0.0255	-0.0267	-0.0278	-0.0285	
sigma_u							0.451***
							-0.161
sigma_e							3.006****
							-0.106
N	1128	1128	1128	1128	1128	1128	1128

Note: All models but the last are IVTobit models. Model 7 is a panel Tobit model with *tabia* random effects. Significance levels: * p<0.10, ** p<0.05, *** p<0.01, **** p<0.001.

Table 11. Multinomial logit models for main source of income of youth group members

	Youth group activity	Land renting	Trade	Construction Work	Family support	Other
Own and spouse land holding, *tsimdi*	0.681*	0.504****	0.589***	0.522***	0.540***	0.480***
	(0.1410)	(0.0807)	(0.1170)	(0.1170)	(0.1170)	(0.1300)
Farm size of parents, *tsimdi*	1.009	0.829***	0.705****	1.022	1.133**	0.879
	(0.0855)	(0.0579)	(0.0689)	(0.0633)	(0.0579)	(0.0924)
Oxen owned	1.581**	1.726****	0.738	0.422****	0.641*	0.901
	(0.3610)	(0.2590)	(0.1710)	(0.1010)	(0.1550)	(0.2130)
Ploughs owned	0.358****	1.034	0.624*	1.034	0.412**	0.548*
	(0.1070)	(0.1890)	(0.1540)	(0.2390)	(0.1820)	(0.1820)
Sex=male, dummy	1.731*	3.702****	2.037***	10.96****	2.134***	1.825**
	(0.5340)	(0.9120)	(0.5600)	(3.8560)	(0.4930)	(0.5180)
Risk tolerance	3.938**	1.907*	1.777	3.026***	1.397	1.700
	(2.4880)	(0.7270)	(0.8920)	(1.2230)	(0.6460)	(0.8310)
Age	0.865****	0.935****	0.924****	0.943***	0.834****	0.942**
	(0.0276)	(0.0132)	(0.0166)	(0.0178)	(0.0270)	(0.0254)
District FE	Yes	Yes	Yes	Yes	Yes	Yes
Main activity FE	Yes	Yes	Yes	Yes	Yes	Yes
N	1128					

Note: The baseline activity for comparison is income from own farm. The table presents relative risk ratios with cluster robust standard errors. Significance levels: * p<0.10, ** p<0.05, *** p<0.01, **** p<0.001.

Appendix. Additional models for robustness checks

Table A1. Land rental market access linear probability panel data models

	(1) Land Access	(2) Land Access	(3) Land Access
Own and spouse land holding, *tsimdi*	-0.0141	-0.0155	-0.0182
	(0.0125)	(0.0127)	(0.0137)
Farm size of parents, *tsimdi*	-0.0325****	-0.0365****	-0.0379****
	(0.0055)	(0.0060)	(0.0061)
Oxen owned	0.169****	0.168****	0.176****
	(0.0224)	(0.0213)	(0.0217)
Ploughs owned	0.162****	0.156****	0.136****
	(0.0275)	(0.0288)	(0.0285)
Sex=male, dummy	0.122****	0.118****	0.130****
	(0.0265)	(0.0262)	(0.0276)
Risk tolerance	0.0763	0.0893	0.0729
	(0.0546)	(0.0565)	(0.0583)
Woreda FE	**Yes**	-	-
Tabia FE	No	**Yes**	-
Youth group FE	No	No	**Yes**
Youth group RE	Yes	Yes	No
Main activity FE	Yes	Yes	Yes
Constant	0.166****	0.415****	0.177****
	(0.0431)	(0.1040)	(0.0383)
N	1128	1128	1128
R-sq., within	0.3062	0.3071	0.308
R-sq., between	0.6392	0.8238	0.5576
R-sq., overall	0.3772	0.4139	0.3616
sigma_u	0.046	0.000	0.159
sigma_e	0.388	0.388	0.388
rho	0.014	0.000	0.143

Note: Models with cluster robust standard errors, clustering at youth group level. Significance levels: * p<0.10, ** p<0.05, *** p<0.01, **** p<0.001.

Table A2. Instrumental variable (2SLS) linear probability models for land rental market access, with alternative trust variables

	(1)	(2)	(3)	(4)	(5)	(6)
Own and spouse land holding, *tsimdi*	-0.0162	-0.0173	-0.0187	-0.0182	-0.0208	-0.0228*
	(0.0128)	(0.0129)	(0.0135)	(0.0127)	(0.0129)	(0.0135)
Farm size of parents, *tsimdi*	-0.0308****	-0.0322****	-0.0313****	-0.0349****	-0.0372****	-0.0361****
	(0.0053)	(0.0055)	(0.0055)	(0.0054)	(0.0057)	(0.0059)
Oxen owned	0.164****	0.166****	0.169****	0.164****	0.166****	0.172****
	(0.0249)	(0.0263)	(0.0233)	(0.0231)	(0.0242)	(0.0216)
Ploughs owned	0.168****	0.171****	0.160****	0.160****	0.159****	0.146****
	(0.0280)	(0.0289)	(0.0274)	(0.0269)	(0.0275)	(0.0271)
Sex=male, dummy	0.105****	0.124****	0.103****	0.0984****	0.121****	0.0904***
	(0.0278)	(0.0260)	(0.0290)	(0.0281)	(0.0262)	(0.0310)
Trust, share sent	0.308*			0.370*		
	(0.1830)			(0.1900)		
Stated trustworthiness		0.454			0.540*	
		(0.2800)			(0.2920)	
Actual trustworthiness			0.606			0.764*
			(0.3910)			(0.4340)
Woreda FE	**Yes**	**Yes**	**Yes**	-	-	-
Tabia FE	No	No	No	**Yes**	**Yes**	**Yes**
Main activity FE	Yes	Yes	Yes	Yes	Yes	Yes
_cons	0.075	0.0452	0.0324	0.303**	0.280**	0.304**
	(0.0775)	(0.0968)	(0.1090)	(0.1190)	(0.1310)	(0.1210)
N	1128	1128	1128	1128	1128	1128
R-sq.	0.368	0.341	0.332	0.401	0.368	0.345
Endogeneity robust score, p-value	0.1932	0.0739	0.1443	0.1236	0.0458	0.0872
Over-identification test, p-value	0.7308	0.6796	0.5159	0.7355	0.6239	0.4762
F-test, instruments	43.6146	19.4119	10.1127	41.6148	16.8589	8.51927

Note: Instrumental variable (2SLS) models with robust standard errors. Risk tolerance and birth rank were jointly used as instruments in all these models. Significance levels: * p<0.10, ** p<0.05, *** p<0.01, **** p<0.001.

Table A3. Selection models for access to rental land and area rented

	(1) Two-step Selection Model 1	(2) Control func. Selection Model 1	(3) Two-step Selection Model 2	(4) Control func. Selection Model 2
Own and spouse land holding, *tsimdi*	-0.075	-0.075	-0.0702	-0.0702
	(0.0547)	(0.0900)	(0.0508)	(0.0823)
Farm size of parents, *tsimdi*	0.000147	0.000147	0.00654	0.00653
	(0.0337)	(0.0644)	(0.0323)	(0.0598)
Oxen owned	0.927****	0.927***	0.763****	0.763**
	(0.1380)	(0.3590)	(0.1240)	(0.3030)
Ploughs owned	0.464***	0.464**	0.378***	0.378**
	(0.1500)	(0.2190)	(0.1320)	(0.1740)
Sex=male, dummy	0.441***	0.441**	0.356***	0.356**
	(0.1460)	(0.1850)	(0.1330)	(0.1410)
Risk tolerance	0.1780	0.1780	0.0364	0.0364
	(0.2280)	(0.2750)	(0.2140)	(0.2350)
Woreda FE	**Yes**	**Yes**	**-**	**-**
Tabia FE	**No**	**No**	**Yes**	**Yes**
Main activity FE	Yes	Yes	Yes	Yes
Constant	0.636***	0.636**	1.188***	1.188**
	(0.2220)	(0.2700)	(0.4420)	(0.5720)
Hazard lambda	1.405****		0.964***	
	(0.3770)		(0.3260)	
Athrho		1.024		0.670
		(0.7490)		(0.4380)
lnsigma		0.600***		0.499****
		(0.1840)		(0.1410)
N	1127	1127	1127	1127

Note: The models present the 2nd stage results. The two-step models are with conventional standard errors and the control function models are with robust standard errors. Significance levels: * p<0.10, ** p<0.05, *** p<0.01, **** p<0.001.

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