Rural land rental markets in Southern Africa:

trends, drivers, and impacts on household welfare in Malawi and Zambia

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DRAFT VERSION

ABSTRACT

We use nationally representative survey data from two neighboring countries in Southern Africa – Zambia and Malawi – to characterize the current status of rural land rental market participation by smallholder farmers. We find that rural rental market participation is strongly conditioned by land scarcity, and thus is more advanced in Malawi than in lower-density Zambia. In both countries, we find evidence that rental markets contribute to efficiency gains within the smallholder sector by facilitating the transfer of land from less-able to more-able producers. However, we also find evidence of significant transactions costs, which may hamper such gains. Evidence of welfare impacts of rental market participation is mixed, with generally positive impacts accruing to tenants and (to a lesser extent) landlords in Malawi, but negligible impacts in Zambia, where rental markets are still in their infancy.

1) Motivation

Access to farmland in sub-Saharan Africa (SSA) is known to be a key factor in whether or not rural households will be poor, food insecure, and vulnerable to shocks (Woodhouse 2006, Potts 2006). Although land rental and sales markets have typically not been regarded as features of traditional tenure systems, recent evidence suggests that land markets are far more widespread than commonly perceived, and the role of such markets in facilitating access to land is of considerable interest (Holden *et al.* 2009, Hertel 2011, Jayne *et al.* forthcoming). In SSA, the empirical focus has been on rental markets in particular, as they generally face lower developmental barriers than sales markets and are consequently more prevalent within the region's smallholder production systems.[1] Theory suggests three primary channels of impacts: equity, efficiency and welfare (Holden *et al.* 2009). The literature defines equity gains in terms of equality, as the reallocation of land across households with different assets occurs in a way that land and non-land factor ratios tend to equilibrate. Efficiency gains are associated with net land transfers from less to more productive users. Welfare gains are implied by greater access to land as the primary productive asset within smallholder production systems, but also derive from the higher household incomes associated with enhanced equity and efficiency outcomes.

With these considerations in mind, this study has several objectives. First, we seek to identify the key factors that influence the development of land rental markets and household participation therein. These factors include population density, access to markets and

[1] These barriers include the lack of formal institutional mechanisms for sales within customary tenure systems, as well as the greater flexibility of rental arrangements as compared with sales arrangements, particularly in environments characterized by missing or imperfect credit markets, and the greater risk of longer-term investments implied by sales (Jin and Jayne 2013, Yamano *et al.* 2009, Otsuka 2007, Binswanger and Rosenzweig 1986).

household-level resource endowments. Second, we consider how land rental market participation affects a variety of household productivity and welfare outcomes. These outcomes include land and labor productivity, crop income, total household income, and food security status.

We conduct our analysis using nationally representative panel data from two neighboring countries in Southern Africa – Zambia and Malawi – which together represent a wide spectrum of relative land scarcity and market access conditions. We propose that this cross-country analytical approach offers richer insights into the processes of interest as well as greater external validity for our results. Data from each country is analyzed separately, but we evaluate results comparatively and draw conclusions on this basis.

To our knowledge, this is the first study to empirically evaluate the geographical and household-level determinants of rental market participation and farm-level impacts in such a comprehensive way. The closest related works are by Holden *et al.* (2009), which offer case studies mostly focused on the determinants of participation, and Jin and Jayne (2013), who investigate the impact of land rental markets on income and poverty in Kenya. In contrast to these studies, we address a broader range of indicators of participation including area rented in and rented out by the household, rather than simple binary participation indicators. We also evaluate a broader range of outcomes including maize production, net crop income, total household income and food security indicators such as how many months a household's staple food supply lasts them. Unlike previous studies we are able to fully capture the cost and benefits of both of renting in land and renting out land in our analysis and discuss how changes in rental prices affect outcomes.

While there is a growing empirical literature on land markets in SSA little work has been done on these issues in Malawi, and virtually no work has been done in Zambia to our knowledge. For Malawi, Lunduka *et al.* (2009) examine the relationship between tenure security and rental market participation in a cross-sectional context, while Lunduka (2009a, 2009b, 2009c) examines the impact of tenure security on a range of farm investment outcomes, as well as on technical efficiency, but the household-level impacts of land rental participation have not yet been empirically explored in this setting. Our study aims to address this gap. Furthermore, all the existing empirical studies that we are aware of have focused on rental markets in high density areas (e.g. Ethiopian highlands, high density parts of Kenya). Little attention has been paid to the function and role of markets in (ostensibly) lower density contexts, where land access may also be constrained (e.g. by competing land claims). More generally, no empirical studies have systematically investigated how both participation and impacts differ across a wide range of scarcity and productivity conditions.

We use household survey data in Malawi and Zambia, along with geospatial data to control for contextual factors, to estimate the determinants of household rental market participation, as well as characterize the impacts of rental markets on a range of equity, efficiency and welfare measures. In addition to the welfare indicators used elsewhere (i.e. household income), we explore the impact of rental markets on food security outcomes, which, to our knowledge, has not been previously explored. Food security is an on-going concern in both Malawi (Ellis and Manda 2012, Miller *et al.* 2011) and Zambia (Chapoto *et al.* 2011, Haggblade *et al.* 2009); relating household food security outcomes to the emergent land rental markets is of high relevance for both land and social welfare policy.

The rest of this paper is organized as follows. We review the conceptual arguments for rental market impacts in smallholder systems, as well as the empirical support, in Section 2. We then describe the current state of land rental markets in Malawi and Zambia in Section 3, along with the key features of their respective institutional and legal contexts. We outline a conceptual model in Section 4, followed by a description of our data and methodological approach in Section 5. Estimation results are described in Section 6, followed by a summary of key findings and implications for policy in Section 7.

2) Literature review

The magnitude of land (rental and sales) market participation by smallholder farmers in customary areas of Africa is not known with certainty, although recent empirical work suggests that rental market participation is significant in many parts of the region, particularly in areas of high population density and relatively good access to infrastructure, services and markets (Otsuka 2007, Holden *et al.* 2009). This has highlighted the importance of understanding how well land markets perform, especially in the context of high and rising constraints to access and unequal distributions of landholdings (Holden and Otsuka 2014).

A key result from theoretical assessments of rental markets is that they have the potential to improve farm efficiency by facilitating the equilibration of land and non-land factor ratios across farm households, when non-land factor markets are imperfect (Deininger 2003).[2]

[2] When all factor markets are well functioning, and production has constant returns to scale, land endowments should not matter for either efficiency or equity, as household factor ratios would equilibrate via markets (even where land markets do not exist but non-land factor markets do; Feder 1985, Bardhan and Udry 1999). However, we know that factor markets in SSA tend to be highly imperfect (Otsuka *et al.* 1992, Fafchamps 2004, de Janvry *et al.* 1991).

Such gains may be further enhanced by the inverse farm-size-productivity relationship[3], under which net transfers of land from land-rich to land-poor households would contribute to overall efficiency gains, as well as welfare improvements. However, there are several reasons why we might question the ability of land markets to deliver on these theoretical benefits.

First, in the presence of transactions costs, such efficiency gains may be limited (Skoufias 1995, Binswanger *et al.* 1995). The general idea is that the presence of such costs[4] drive a wedge between optimal and actual efficiency gains. Empirical support for transactions costs in rental markets is particularly high in areas where land rights are tenuous or ambiguous, frequently alleged characteristics of customary tenure systems in the region (Teklu and Lemi 2004, Tikabo *et al.* 2008, Deininger et al 2009, Ghebru and Holden 2009, Yamano et al 2009, Lunduku *et al.* 2009, Holden and Bezabih 2009, Kassie and Holden 2009, Jin and Jayne 2013).[5]

Furthermore, under certain conditions (e.g. limited access to credit), land market participation may be systematically easier for wealthier, land-rich households (Deininger and Jin 2008). If so, land markets may actually have a regressive impact on equity and efficiency outcomes. Empirical evidence on this question for Africa is mixed, with some studies finding that markets result in a net transfer of land from land-poor to land-rich households (Andre and Platteau 1998 for Rwanda, Zimmerman and Carter 1999 for Burkina Faso, Deininger *et al.* 2009

[33] Although there is some disagreement about measurement issues, there seems to be general empirical support for this stylized relationship in Africa. The voluminous literature on this subject has often pointed to labor market imperfections as a principle reason underlying the relationship (e.g. Gavian and Fafchamps 1996).

[4] Examples include the fixed costs of finding, negotiating and enforcing rental agreements, and the costs of monitoring land management by tenants (Holden *et al.* 2009b). Additionally, variable costs may be imposed by, e.g. pressure not to rent out too much land lest a household be perceived as excessively wealthy (and thus possibly subject to losing land under reallocation by traditional authorities).

[5] See also Kimura *et al.* 2001, Deininger and Jin 2005, for Asian case studies documenting land rental market functioning in environment's where land transfers are restricted.

and Ghebru and Holden 2009 for Ethiopia), while others find net transfers in the opposite direction (Lunduka *et al.* 2009 for Malawi, Deininger and Mpuga 2009 for Uganda, Yamano *et al.* 2009 and Jin and Jayne 2013 for Kenya). These results seem closely aligned to conclusions about whether or not land rental markets serve as safety nets for poor rural tenants (Deininger *et al.* 2009, Ghebru and Holden 2009; although these same studies show that poor landlords may experience welfare gains from such market characteristics).

To our knowledge the only other study to have examined welfare outcomes, such as income effects of rental market participation are Jin and Jayne (2013). The authors use 4 waves of household panel data from Kenya to measure the impact of renting in land. The authors find that renting in land causes households to increase their productivity and income. However, in absolute terms the increases are small, so participation in land rental markets alone do not reduce poverty.

The present study builds upon Jin and Jayne (2013) in several ways. First, we are able to measure the exent of rental market participation because we know total area rented in or out across all waves of the survey. This allows us to calculate a marginal return to rental market activity. Second we are able to distinguish the potentially positive and negative effects of renting in land from the effects of renting out land. Third we measure a more full set of welfare incomes including food security status, and poverty gap measures.

3) Rental markets and their contexts in Malawi and Zambia

Malawi and Zambia share similar environments in many important respects. Both countries are predominantly agricultural, and rural populations consist primarily of farm households.[6] The overwhelming majority of these households are smallholders, conventionally defined as farming 10 hectares or less. Even within the smallholder sector, median farm sizes are very small: 1.2 ha for Zambia; and 0.8 ha for Malawi.[7] The small farm sector is characterized by low productivity, low levels of market engagement, and high poverty (e.g. Chapoto *et al.* 2012 for Zambia). Poverty rates are high (show) and food security remains a perennial issue in both countries (cite).

Both countries recognize two major tenure regimes: private (or leasehold) and customary (or traditional) tenure.[8] Customary lands are under the localized management of chiefs according to customary law. Specific terms of customary law vary across localities, but generally adhere to a model wherein usufruct rights to land resources within a chiefdom are allocated by the chief (or sometimes via their subordinate networks of headmen and *indunas*) to clan members.[9] Familiar usufruct rights are generally heritable, but ultimately subject to possible reallocation by the chief.

Under leasehold tenure, land allocation is regulated by the market: titled lands may be bought and sold without restriction. In order to formally access customary lands through this

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[6] The population of Zambia is about 13 million, 61% of which reside in rural areas and earn their incomes primarily from agriculture (ZBS 2011). The population of Malawi is about 16 million, of which about 85% are rural farm households.

[7] Farm size distributions are also highly skewed *within* the smallholder sector. For example, in Zambia, 50% of smallholders farm less than 2 hectares and about a quarter have farms of one hectare or less.

[8] There is also public tenure, which corresponds to land rights claimed by some kinds of State entities.

[9] See Brown (2005) for a review of the Zambian land institutions and history; see Lunduka (2009) for a review of the Malawian context.

mechanism, they must be first transferred from customary to leasehold status, as provided by the respective Lands Acts in either country.[10]

Most smallholders operate farms under customary tenure. Although an increasing number of smallholdings have been converted to leasehold tenure over the last decade, such holdings remain a minority.[11] Within customary lands, the buying and selling of land has no legal basis (although it is frequently carried out clandestinely under the guise of traditional mechanisms for transferring permanent usufruct rights [Sitko 2010]). Meanwhile, renting of customary landholdings, while also legally ambiguous, is something that the chief may tacitly or explicitly endorse, and which is increasingly reported by smallholder households (as we show later in this paper). Thus, land rentals are found both within formal and customary tenure systems, while sales are mostly confined to titled land.

Rental markets are increasingly prevalent within the smallholder sector of both countries (Table 1). Fixed rent contracts are the dominant contractual form (Holden *et al.* 2006, for Malawi). Contractual arrangements are usually undocumented.

Rental market development is much more pronounced in Malawi than Zambia, probably owing to the very different rural population densities in either country. Nonetheless, rental market participation is growing in Zambia. This growth may well be fueled by perceptions of land unavailability, which are widespread, but particularly strong in Zambia's higher density areas.

[10] The Zambia Land Act of 1995 established mechanisms for the conversion of customary land to leasehold statues.
[11] Almost 10% of the land area under smallholdings in Zambia has now been converted to leasehold tenure (Sitko *et al.* forthcoming).

In summary, Malawi and Zambia constitute a two-country setting which is characterized by predominantly small farm sizes and high rates of poverty and food insecurity, and similar institutional environments, in which customary tenure predominates. Rental markets are legally ambiguous in customary lands but are nonetheless on the rise, particularly within the higher density and more accessible areas.

[TABLE 1 ABOUT HERE]

4) Conceptual model

Following Bliss and Stern (1982) and Skoufias (1995), we assume a household utility maximization model which posits that land rental decisions (renting in, renting out, and market abstention) are made in an effort to minimize the distance between actual and desired farm size. Achieving desired farm size would be an efficient outcome, but the reduction of this distance is incomplete if there are transactions costs in the rental market. Desired farm size (and, thus, rental market participation decisions) is conditioned by household endowments of non-tradable non-land assets, which include family labor, and other household characteristics, which we collectively refer to as H, as well as community level conditioners V.

$$R_{ij} = \zeta A_{ij}^{*}\left(H_{ij}, V_j\right) + \delta \bar{A}_{ij} + \varepsilon_{ij}$$

where R_{ij} is the amount of land rented in ($R_{ij} > 0$) or out ($R_{ij} < 0$), $\bar{A}_{ij}$ is actual (pre-rental) farm size and A_{ij}^{*} is optimal (desired) farm size, and ε_{ij} is an error term.

As discussed by Skoufias (1995), in the absence of transactions costs, rental markets work efficiently and the market-facilitated adjustment between actual and optimal farm size is complete. In such a case, and where $\bar{A}_{ij} < A_{ij}^{*}$, $\delta \to 1$. Where $\bar{A}_{ij} > A_{ij}^{*}$, the household participates in the market as a landlord, and in the absence of transactions costs $\delta \to -1$.

We follow Jin and Jayne (2013) in defining three regimes of rental market participation, renting-in ($R_{ij} > 0$), renting-out ($R_{ij} < 0$), and autarky ($R_{ij} = 0$), which can be represented as an ordered probit model, wherein the rental decision is a function of the marginal returns to renting in (out) net of the costs of renting (which include both rental costs and transactions costs associated with rental market participation).

5) Data

For Malawi, we observe a total of 1,375 households surveyed in each of 3 waves (2003/04, 2006/07, 2008/09), and 2,468 households surveyed in only waves 1 and 2. This gives us a total of 7,311 household observations to use in the analysis. For Zambia, we use cross-sectional data on 8,716 households in 2012. Our emphasis in this analysis is on Malawi, for which the availability of panel data enable us to control for unobservable factors related to rental decisions in our analysis. We accompany this analysis with cross-sectional analysis of the Zambia data to evaluate how consistent our findings are across the wider range of rental market conditions.

6) Empirical model and identification strategy

Key variables in H are labor and land endowments, gender of head, and farming ability. Since farming ability is not observed directly, we estimate this as the time-invariant innovation component of a production function, following Jin and Jayne (2008).[12] The key variables in V are population density, market access, various indicators of rainfall, and input and output prices.

For the Malawi analysis, we employ a correlated random effects (CRE) model to control for unobserved heterogeneity. The CRE model employs cross-sectional averages of all time-varying components of the model in order to control for unobserved time-invariant heterogeneity (under the assumption that such heterogeneity is correlated with the time-averages; see Wooldridge 2010 for elaboration). A key advantage of the CRE model over Fixed Effects (FE) and differencing models is that we are able to include time-invariant model components which would otherwise drop out of the estimating equation. In our case, we are interested in geographically varying conditioners of land market development, such as rural population density, accessibility, agro-ecological potential, and institutional inheritance factors such as whether or not land is passed down to sons or daughters, which would generally not be amenable to analysis within a FE framework. Our geographical indicators come from variety of

[12] We estimate a Cobb-Douglass production function for household i, village j and year t as: $log(Q_{ijt}) = \alpha_i + \beta_1\, log(A_{ijt}) + \beta_2\, log(L_{ijt}) + \beta_3\, log(X_{ijt}) + \beta_4\, V_{jt} + \beta_5\, T_t + \varepsilon_{it}$, where Q_{ijt} is value of production, A_{ijt} is area cultivated, L_{ijt} is labor, X_{ijt} is a vector of other inputs, V_{jt} are village-level shifters and T_t are year-dummies. The time-invariant intercept α_i corresponds to our indicator of household farming ability. This is easily recovered following fixed-effects estimation.

recently compiled geospatial datasets, which we merge with household survey information on the basis of geo-referenced village locations.

To examine impacts of rental market participation on welfare outcomes, we define models of household income as functions of participation indicators along with a variety of household and village-level controls. We assume that any potential endogeneity concerns about rental market participation variables in such models arise primarily from an unobserved variables argument, i.e. that similar unobserved factors that condition rental participation decisions may also condition productivity and welfare outcomes. To the extent that such unobserved factors are likely time-invariant household characteristics (e.g. social capital endowment of the household head), a CRE approach will attenuate such concerns. As an additional control, however, we estimate our welfare equations (for Malawi, where we have panel data) within a recursive modeling framework wherein the determinants of first-stage rental market participation decisions are estimated jointly with the determinants of household welfare outcomes (Roodman 2011).

For Zambia, because we do not have panel data available, we estimate cross-sectional versions of the participation and impacts models. Our emphasis with the Zambia analysis is not on identification, but rather on evaluating how consistent these cross-sectional results are with the Malawi results.

7) Results

Descriptive statistics for both countries are shown in table 2. Female-headed households are more likely to participate in markets as landlords than as tenants. Tenant households (i.e. those who rent in at least some of their farmland) tend to have larger labor endowments and smaller land endowments, as would be expected. We also see evidence that population density seems to be rising over time in areas with more active land rental markets. Both tenants and landlords are located in areas with higher population densities than non-participants. Immigrants are more likely to be tenants than non-immigrants, although they are less likely to be landlords

than non-immigrants. This is what we would expect ex ante, as people likely migrate in search of land. Another interesting finding is that while tenants are wealthier in terms of asset wealth than land lords and autarkic households in both Malawi and Zambia, the disparity in asset wealth between tenants, landlords and autarkic households is shrinking over time in Malawi. This descriptive evidence is suggests that access and participation in land rental markets may be becoming more equitable over time.

[TABLE 2 ABOUT HERE]

The Cobb-Douglas production function for value of crop production was estimated for the Malawi panel data with the FE estimator. Estimation results, shown in Table 3, indicate that households with greater labor endowments (measured as household size in adult equivalents), larger (pre-rental) landholdings, more productive assets, and who use more fertilizer, have a significantly higher value of crop production on average than do other households. Not surprisingly, households who have experienced an adult death in the households over the previous 2 years have lower output. In addition, areas where the retail price of maize was significantly higher in the previous harvest season experience significantly higher output in the current year than do other households on average. This finding is what we would expect, as higher past prices may induce farmers to increase output in the following year.

As discussed above, we use the time-invariant error component from these results as a measure of farmer ability, which is then incorporated as a regressor in the models of rental market participation and impacts described next.

[TABLE 3 ABOUT HERE]

Table 4 shows the results for Malawi when we evaluate the characteristics of rental market participants more rigorously, using an ordered probit estimator. We find broad confirmation of the descriptive findings. Larger households are more likely to rent in and less likely to rent out; households with larger land endowments are less likely to rent in and more likely to rent out.

The land ownership coefficients indicate the presence of significant transactions costs in the rental market. (Recall that if land markets enabled farmers to fully adjust for the differences between actual and desired farm sizes, then the coefficient on land endowment would be -1 for renting in and +1 for renting out [Skoufias 1995]. This finding is very consistent with other studies of rental markets in the region.)

The ability coefficient derived from the production function estimated in table 3 shows that farmers with greater farming ability are more likely to rent in. This supports the contention that rental markets enhance efficiency, as more talented farmers rent in land from less talented farmers. This finding is consistent with previous literature such as Holden *et al.* (2009) and Jin and Jayne (2013). In addition, when we analyze the results from the landlord side of the market we find consistent results as more talented farmers are also less likely to rent out their land. This is also consistent with the idea of a net transfer of land from less-efficient to more efficient producers.[13]

Table 4 also shows that more education households are significantly more likely to rent in land, and significantly less likely to rent out land. This finding provides some evidence to support the idea that better educated households are able to take advantage of the opportunity to acquire more farm land that land rental markets provide to them. We also find that migrants are significantly more likely to rent in land and less likely to rent out land. This is consistent with the descriptive statistics in table 2, and is what we would expect as people likely move from one rural area to anther in search of land to farm.

The statistical significance of the population density variable in table 4 reveals some interesting insights. Households in areas of higher population are significantly more likely to rent in land, which supports the notion that the increasing number of people in rural areas is driving these markets into existence out of necessity. However, population density has a statistically significant negative effect on renting out. This result is extremely interesting and may suggest that smallholders in densely populated areas are resistant to parting with their

[13] These findings stand in contrast to those of Jin and Jayne (2013) for Kenya, who found that more able farmers were more likely to participate in rental markets as tenants and as landlords. In our view, the Malawi results are more consistent with a net transfer of land to the most able producers, than are the Kenya results, although Jin and Jayne also claim that their results support this characterization of the Kenyan rental market.

land. Regardless, land that gets rented in has to come from somewhere, and it seems likely that smallholders in densely populated areas are renting in land from larger farmers not captured in the survey sample and possibly even commercial estates, particularly tobacco estates that may be under-utilizing their land. The statistical significance and sign of the coefficients on the central and southern regional dummies supports this idea, because they are the areas of highest population density, and are where most of the commercial estates are located in Malawi. Understanding exactly whom smallholders are renting land from is an important question, and warrants further research.

[TABLE 4 ABOUT HERE]

Table 5 presents the crop income and total household effects from land rental markets. Results indicate that renting in land generates a statistically significant and positive effect on both crop income and total household income (net of costs). The same is true for the marginal effect of renting in land. An additional hectare of land boosts crop income by 29,600 Malawian Kwacha (roughly US $200), and total household income by 34,300 Kwacha (roughly US $230) on average. The fact that total income increases more than crop income from renting in land may indicate some value added activities such as livestock rearing or tree and fruit production that may occur on rented in land.

In contrast, participation in rental markets as a landlord does not have a statistically significant impact on either crop income or total household income. However, when we consider the marginal impact of renting out an extra hectare of land the results indicate that an additional hectare of land has a marginally significant impact on crop income. An additional hectare of land rented out leads to an extra 4,900 Kwacha of crop income. This finding may indicate that households invest the money they obtain from renting out land into other agricultural activities. The fact that participation in rental markets as a landlord is not a significant factor in affecting crop income, while each additional hectare of land rented out is, may mean that the distribution of these effects is uneven. Many households obtain little to no crop income benefit from renting out land, while a few households who rent out land do see a

return. Renting out land also has no significant marginal impact on total household income, which may mean that some of the money obtained from renting out land could be dispersed to other uses such as paying for immediate needs like food, or school fees which have no direct impact on income.

[TABLE 5 ABOUT HERE]

Table 6 presents the factors affecting land rental market participation in Zambia. Results indicate that many of the same factors that affect rental markets in Malawi also play a similar role in Zambia. For example, even though population density is much lower in Zambia then in Malawi, households in areas of relatively high density are much more likely to rent in land and also less likely to rent out land. This also supports the idea smallholders are unwilling to give up their land as population grows. Also, as in Malawi, Zambian households with more adult equivalents are more likely to rent in and less likely to rent out, indicating that rental markets transfer land from land scarce to land abundant households. In addition, households in Zambia with less land are more likely to rent in and households with more land are more likely to rent out. This indicates that rental markets in Zambia help equilibrate initial land endowments between relatively land rich and land poor households. However, as in Malawi, the fact that coefficient estimates on land differ considerably from ±1 indicate the presence of significant rental market transactions costs.

[TABLE 6 ABOUT HERE]

Table 7 presents the results for factors affecting crop income and total household income in Zambia. The results indicate that land rental participation on either the tenant or landlord side or the number of hectares rented in or out have no discernable effect on crop income or total household income. It could be that due to the relatively underdeveloped state of rental markets in Zambia, land renting has yet to have a statistically significant effect on well-being across the smallholder population.

[TABLE 7 ABOUT HERE]

8) Conclusions

The objectives of this study have been to estimate the determinants of smallholder participation in rural land rental markets in Malawi and Zambia and to better understand how land rental markets impact household income and food security. The main results of the study are as follows.

Households in areas of relatively high population density in Malawi and Zambia are significantly more likely to rent in land, and also significantly less likely to rent out land. This finding may indicate that would-be smallholder landlords in high-density areas are unwilling or unable to give up arable land, perhaps in part because of a dearth of non-farm livelihood opportunities in such areas. Because rates of renting in are much higher than rates of renting out, it is apparent that much of the land coming into the rental market comes from outside the smallholder sector, i.e. from relatively large family farms not included in household surveys and/or from commercial estates who may be under-utilizing land.

There are strong indicators that rental market participation for both tenants and landlords is hampered by transactions costs, perhaps particularly so for Zambia, where rental markets are in a more incipient stage of development. Despite these costs, however, rental markets do seem to enable a net transfer of land from less-able to more-able producers, thus contributing to production efficiency in the smallholder economies of both countries.

In Malawi, the impacts of rental markets on welfare are generally positive, particularly for those who rent in land (the welfare impacts of renting out are less pronounced). In Zambia, welfare impacts were found to be negligible, but this may be due to the very low levels of rental market activity there. Our primary window into welfare impacts was farm income. Further work in this area would do well to examine a broader set of welfare impacts, and investigate distributional effects more thoroughly.

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Tables

Table 1: Rental Status of the Sample by Survey Wave

	Malawi			Zambia		
	2002/03	2006/07	2008/09	2001/02	2008/09	2012/13
% of sample renting in land	7.5%	13.4%	15.4%	1.0%	1.0%	3.0%
% of sample renting out land	4.3%	5.3%	8.9%	0.2%	0.6%	0.5%
% of sample renting in and renting out land	0.004%	0.002%	0.002%	0.000%	0.000%	0.000%
% of sample that does not rent in or out	89%	80%	76%	99%	98%	97%
Average area rented in unconditional (hectares)	0.06	0.08	0.07	0.01	--	0.03
Average area rented out unconditional (hectare)	0.03	0.04	0.05	0.01	--	0.01
Average area rented in conditional on renting (hectares)	0.62	0.68	0.63	1.35	--	1.06
Average area rented out conditional on renting (hectare)	0.76	0.58	0.47	6.94	--	1.59
Median land rental price (Real 2009 Kwacha/hectare)	3,294	3,521	5,761	--	--	101,174
Median retail lean season maize price (Real 2009 Kwacha/kg)	22	22	40	--	--	--
Median agricultural wage rate (Real 2009 Kwacha/day)	159	170	286	--	--	--
Median commercial maize seed price (Real 2009 Kwacha/kg)	-	95	167	--	--	--
Median commercial NPK & urea price (Real 2009 Kwacha/kg)	63	83	130	--	--	--

Table 2: Household Characteristics by Rental Status and Survey Wave

	Malawi									Zambia		
	2002/03 & 2003/04			**2006/07**			**2008/09**			**2011/12**		
Characteristics	*Tenant*	*Landlord*	*Autarkic*	*T.*	*L.*	*A.*	*T.*	*L.*	*A.*	*T.*	*L.*	*A.*
% female headed	17	29	25	18	24	26	22	28	30	15	31	24
Adult equivalents	4.5	4.1	3.7	4.6	4.2	4.1	4.8	4.4	4.3	4.8	5.4	4.4
Number of working age adults	4.5	3.9	3.5	4.6	4.2	4.0	4.8	4.4	4.2	3.1	3.2	2.6
Land owned (hectares)	0.7	1.6	1.1	0.9	1.6	1.0	0.7	1.8	1.0	1.9	2.6	1.6
Value of assets (‘000 kwacha)	78.5	29.9	33.0	70.5	37.6	47.5	59.1	52.4	56.8	16.6	4.9	7.9
% of hh heads attending school	80	68	71	78	67	72	81	70	73	94	84	87
% staple deficit in maize last year	--	--	--	60	64	64	72	80	76	--	--	--
Distance to paved road	14.88	17.14	16.86	15.64	19.26	16.77	16.31	21.88	16.64	--	--	--
Distance to main district market	35.81	36.67	36.8	36.82	37.13	37.17	35.95	50.64	38.62	--	--	--
% in matrilineal villages	68	70	67	66	63	68	66	57	67	--	--	--
Population density	183	174	169	229	201	209	289	216	257	32.9	26.2	19
Years HH head lived in village	23	31	30	25	32	30	24	33	30	17	37	26
# older men in HH, over 65	0.06	0.18	0.09	0.07	0.11	0.11	0.07	0.17	0.12	--	--	--
% immigrants	29	3	14	22	6	13	19	7	12	71	36	55
% farm credit access in village	47	28	30	28	35	30	32	40	31	--	--	--

Notes: T= tenant (household which rented out any land), L=landlord (household which rented in any land), A=autarkic (household which neither rented-in nor rented-out any land).

Table 3: Malawi, Cobb-Douglass production function

	(1) Log value of crop production	
	coeff.	p-value
Female head	-0.0642	(0.633)
Adult equivalents	0.1436	(0.000)***
Plot area	0.6079	(0.000)***
Fertilizer (kg/ha)	0.0000	(0.000)***
Mortality (=1)	-0.1585	(0.078)*
Lagged maize price (hungry season)	0.0117	(0.515)
Lagged maize price (harvest season)	0.0885	(0.001)***
Value of assets (kw)	0.0000	(0.038)**
Log rainfall	-0.0221	(0.928)
2002	1.9462	(0.000)***
2003	1.1997	(0.000)***
2007	1.2218	(0.000)***
N	7311	

* p<0.10, ** p<0.05, *** p<0.01

Note: Table shows coefficient estimates from fixed effects regression. Standard errors are robust to clustering at the community level.

Table 4: Determinants of rental market participation in Malawi (partial effects from ordered probit model)

	(1) Renting in		(2) Autarky		(3) Renting out	
	APE	p-value	APE	p-value	APE	p-value
Farming ability	0.0065	(0.002)***	-0.0027	(0.003)***	-0.0039	(0.002)***
Female head	-0.0059	(0.433)	0.0024	(0.437)	0.0035	(0.432)
Adult equivalents	0.0082	(0.000)***	-0.0034	(0.000)***	-0.0049	(0.000)***
Land owned	-0.0161	(0.003)***	0.0065	(0.007)***	0.0095	(0.002)***
Years of schooling	0.0054	(0.000)***	-0.0022	(0.000)***	-0.0032	(0.000)***
Value of assets (kw)	0.0000	(0.197)	-0.0000	(0.197)	-0.0000	(0.200)
Immigrant (=1)	0.0756	(0.000)***	-0.0447	(0.000)***	-0.0309	(0.000)***
Mortality (=1)	-0.0117	(0.225)	0.0043	(0.169)	0.0075	(0.259)
Matrilineal (=1)	-0.0131	(0.260)	0.0055	(0.272)	0.0076	(0.254)
Lagged rainfall	0.0000	(0.457)	-0.0000	(0.456)	-0.0000	(0.459)
Population density	0.0002	(0.000)***	-0.0001	(0.001)***	-0.0001	(0.000)***
Distance to road (km)	0.0001	(0.678)	-0.0000	(0.677)	-0.0000	(0.678)
Central	0.0409	(0.000)***	-0.0135	(0.002)***	-0.0274	(0.001)***
South	0.0280	(0.030)**	-0.0074	(0.020)**	-0.0206	(0.043)**
2002	0.0013	(0.905)	-0.0005	(0.905)	-0.0008	(0.905)
2003	0.0065	(0.537)	-0.0026	(0.537)	-0.0039	(0.537)
2007	0.0215	(0.019)**	-0.0088	(0.021)**	-0.0128	(0.020)**
N	7240		7240		7240	

* p<0.10, ** p<0.05, *** p<0.01

Note: Correlated random effects specification. Standard errors are robust to clustering at the community level.

Table 5: Impacts on household income in Malawi

	(1)		(2)		(3)		(4)	
	Crop income ('000s MWK)				Total income ('000s MWK)			
	coef.	p-value	coef.	p-value	coef.	p-value	coef.	p-value
Tenant (=1)	12.0949	(0.001)***			19.0819	(0.000)***		
Landlord (=1)	0.0829	(0.964)			-0.9042	(0.820)		
land Rented in (ha)			29.6322	(0.000)***			34.2813	(0.000)***
land Rented out (ha)			4.8777	(0.069)*			4.7594	(0.315)
Female head	-2.3785	(0.021)**	-2.4979	(0.017)**	-4.8941	(0.231)	-5.1204	(0.211)
Adult equivalents	0.7340	(0.088)*	0.5060	(0.239)	3.7937	(0.000)***	3.6295	(0.000)***
Land owned	12.7676	(0.001)***	12.4389	(0.001)***	10.1458	(0.024)**	9.5453	(0.027)**
Farming ability	2.8283	(0.000)***	2.9793	(0.000)***	3.0881	(0.027)**	3.2920	(0.019)**
Years schooling	-0.0127	(0.941)	-0.0630	(0.718)	3.7602	(0.000)***	3.7450	(0.000)***
HH assets value	0.0000	(0.184)	0.0000	(0.188)	0.0001	(0.163)	0.0001	(0.166)
Fertilizer (kg)	0.0073	(0.138)	0.0068	(0.102)	0.0045	(0.376)	0.0042	(0.382)
Immigrant (=1)	-3.6250	(0.042)**	-3.8629	(0.025)**	37.6662	(0.000)***	37.7900	(0.000)***
Mortality (=1)	-0.8658	(0.590)	-0.7258	(0.650)	7.5695	(0.279)	7.7741	(0.269)
Matrilineal (=1)	-1.3572	(0.504)	-1.6092	(0.424)	-4.6338	(0.462)	-5.0172	(0.435)
Lagged rainfall	0.0037	(0.362)	0.0045	(0.266)	0.0024	(0.807)	0.0032	(0.737)
Pop. density	-0.0082	(0.467)	-0.0082	(0.465)	0.0564	(0.019)**	0.0581	(0.018)**
km to road	-0.0551	(0.106)	-0.0640	(0.065)*	-0.1673	(0.011)**	-0.1761	(0.009)***
Central	8.1123	(0.010)**	7.0889	(0.022)**	9.2283	(0.173)	8.4244	(0.220)
South	0.1507	(0.962)	-0.2704	(0.930)	5.6696	(0.485)	5.2532	(0.519)
2002	-11.7431	(0.000)***	-12.0372	(0.000)***	-16.1797	(0.001)***	-16.6468	(0.000)***
2003	-8.2310	(0.000)***	-9.3731	(0.000)***	-4.3289	(0.508)	-5.7027	(0.381)
2007	-8.1168	(0.000)***	-8.4959	(0.000)***	-34.8853	(0.000)***	-35.2773	(0.000)***
N	7226		7226		7224		7224	

* p<0.10, ** p<0.05, *** p<0.01

Note: Correlated random effects specification. Standard errors are robust to clustering at the community level.

Table 6: Determinants of rental market participation in Zambia (partial effects from ordered probit model)

	(1) Renting in		(2) Autarky		(3) Renting out	
	APE	p-value	APE	p-value	APE	p-value
Female head (=1)	-0.0134	(0.000)***	0.0083	(0.001)***	0.0051	(0.002)***
Adult equivalents	-0.0006	(0.431)	0.0004	(0.420)	0.0002	(0.455)
Land owned	-0.0016	(0.059)*	0.0010	(0.075)*	0.0006	(0.061)*
Years of schooling	0.0013	(0.017)**	-0.0008	(0.029)**	-0.0005	(0.019)**
Value of assets (kw)	0.0000	(0.448)	-0.0000	(0.445)	-0.0000	(0.461)
Immigrant (=1)	0.0042	(0.114)	-0.0026	(0.111)	-0.0016	(0.147)
Matrilineal (=1)	-0.0005	(0.853)	0.0003	(0.852)	0.0002	(0.855)
Lagged rainfall	-0.0000	(0.147)	0.0000	(0.182)	0.0000	(0.115)
Population density	0.0002	(0.013)**	-0.0001	(0.025)**	-0.0001	(0.015)**
Hours to town	0.0000	(0.915)	-0.0000	(0.915)	-0.0000	(0.915)
N	7809		7809		7809	

* p<0.10, ** p<0.05, *** p<0.01

Note: Provincial dummies included but not shown. Standard errors are robust to clustering at the community level.

Table 7: Impacts on household income in Zambia

	(1)		(2)		(3)		(4)	
	Farm income ('000s ZMW)				Total income ('000s ZMW)			
	APE	p-value	APE	p-value	APE	p-value	APE	p-value
Tenant (=1)	-14.6461	(0.195)			-12.9214	(0.258)		
Landlord (=1)	-9.5080	(0.399)			-10.2650	(0.375)		
Rented in (ha)			-9.8470	(0.243)			-9.6550	(0.256)
Rented out (ha)			-3.2632	(0.296)			-3.6189	(0.253)
Female head (=1)	-13.0258	(0.266)	-12.9357	(0.266)	-14.0508	(0.231)	-13.9776	(0.230)
Adult equivalents	-5.6409	(0.446)	-5.6369	(0.446)	-5.6629	(0.444)	-5.6579	(0.444)
Land owned	8.8461	(0.240)	8.8956	(0.239)	8.8794	(0.239)	8.9271	(0.238)
Years of schooling	5.0879	(0.183)	5.0788	(0.183)	5.9806	(0.118)	5.9750	(0.118)
Value of assets (kw)	0.0000	(0.349)	0.0000	(0.349)	0.0000	(0.292)	0.0000	(0.292)
Immigrant (=1)	9.4784	(0.221)	9.4541	(0.219)	10.9092	(0.159)	10.8909	(0.158)
Matrilineal (=1)	-27.2336	(0.180)	-27.2536	(0.179)	-28.3997	(0.162)	-28.4165	(0.161)
Lagged rainfall	-0.0010	(0.987)	-0.0008	(0.989)	0.0008	(0.988)	0.0010	(0.986)
Population density	-0.5829	(0.478)	-0.5845	(0.477)	-0.5667	(0.490)	-0.5678	(0.489)
Hours to town	-0.5178	(0.423)	-0.5162	(0.424)	-0.5557	(0.392)	-0.5541	(0.392)
N	7809		7809		7809		7809	