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The Roles of Land Tenure Reforms and Land Markets in the Context of Population Growth and Land Use Intensification in Africa

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The Roles of Land Tenure Reforms and Land Markets in the Context of Population Growth and Land Use Intensification in Africa

By

Stein T. Holden[a] and Keijiro Otsuka[b]

[a]School of Economics and Business/Centre for Land Tenure Studies, Norwegian University of Life Sciences, 1432 Ås, Norway. Email: stein.holden@umb.no

[b]GRIPS, Tokyo, Japan. Email: otsuka@grips.ac.jp

Abstract

This article provides a review of the past and potential future roles of land tenure reforms and land markets in Sub-Saharan Africa (SSA) as responses to population growth in the process of land use intensification and livelihood transformation. The farm size distribution and the existence of an inverse relationship (IR) between farm size and land productivity in SSA and the implications of this relationship for efficiency and equity are investigated. More secure property rights and removal of restrictions on land markets have the potential to create both efficiency and equity benefits, but there are high risks of elite capture of large land areas with inefficient and inequitable outcomes. This situation is the case not only in land-abundant areas but also in urban and peri-urban areas where increasingly larger proportions of people will make their living. Increasing population pressure in densely populated rural areas contributes to more rapid rural–urban migration, and creating alternative livelihood opportunities for the migrating youth population is essential to achieving economic development with social stability.

Key words: Inverse farm size–productivity relationship, tenure security, tenure reform, land markets, migration, livelihood opportunities.

1. Introduction

While large parts of Sub-Saharan Africa (SSA) can be characterized as land abundant, scarcity of farmland is becoming an issue in a larger proportion of the continent as populations grow (Headey and Jayne, in press). This issue is particularly critical in densely populated rural areas where off-farm employment opportunities are limited and continued dependence on low-input and low-output traditional agriculture cannot sustain people's livelihoods. Large numbers of unemployed and desperate youth migrating to towns and cities, combined with increasing food prices, are part of what has led to newspaper headlines concerning demonstrations and riots in a

growing number of countries in SSA. Rapid and large increases in the prices of food and fuel resulting from the financial crisis in Western countries, as well as concerns about climate change, have spurred a new demand for land in Africa by national and international investors.

Given the increasing scarcity of land, land tenure security must be established to achieve efficient allocation of land among farm households and to promote investment in land improvement. Endogenous evolution of property rights institutions toward individualized and secure rights has typically been slow, particularly in customary tenure systems (Otsuka and Place, 2001). Old and new power relations in the midst of the new competition for land have created serious threats to large numbers of poor rural households in many African countries. Indeed, the allocation of land to international investors has been more widespread in areas with weak land governance institutions (Deininger and Byerlee, 2011). However, land market transactions, both rentals and sales, have become more active in Africa. Obviously, governments and international organizations need to pay more attention to these land issues in SSA to protect poor and vulnerable people and promote sustainable land management. In fact, the lack of a more comprehensive understanding of the region's land issues may have caused well-intended land reform law to fail and become subject to "elite capture" at the expense of the poor and vulnerable (Benjaminsen et al., 2009; Holden et al., 2013). Holden et al. (2008) conducted the first cross-country comparative study of land markets in SSA, focusing mainly on some eastern and southern African countries. They found land markets, and particularly informal land rental markets, to be more widespread and active than is generally believed. Such markets have developed where land has become scarce and the distribution of land and non-land factors are skewed, thereby creating incentives for market transactions for land.

Although land sales markets are prohibited in some countries, as a fear exists that such markets can lead to landlessness and concentration of land in fewer hands (Sjaastad 2003), Holden et al. (2008) found limited evidence to support this fear in Kenya, Malawi and Uganda. Land rental markets were found to be pro-poor in the sense that they help to improve access to land for land-poor households and provide income-earning opportunities for landed households with limited non-land resources, such as agricultural labor and farm management knowledge. Land rental markets therefore tend to enhance both land use efficiency and equity.

The overarching broad policy issue that our review aims to address is the roles that land tenure reforms and land markets should play in promoting land tenure security, land use intensification and food security in SSA. To address this broader issue and draw conclusions concerning policy implications, we first must understand how land rental and land sales markets work in practice from the viewpoint of both allocative efficiency and distributional equity. Second, we would like to know the extent to which land markets fail, thereby leading to misallocation of land among farm households. Third, to understand the implications of land tenure security for sustainability of land use, food security, and agricultural development, we need to explore the impacts of land tenure security on long-term investment in land and land use intensification. Fourth, we endeavor

to determine the impacts of shrinking farm size and land fragmentation on production efficiency in the face of continued and rapidly growing population pressure on land in densely populated areas in SSA. Finally, we seek to understand the roles of land markets and land tenure security in dealing with growing climate risk.

The structure of this article is as follows. In Section 3, we attempt to identify the major issues that influence land markets, tenancy, and land tenure reforms in SSA. In Section 3, we present our basic conceptual framework. We raise and discuss a number of more specific issues in the following five sections. In Section 4, we ask to what extent land markets have emerged in SSA and what their implications are for efficiency and equity. If land markets work efficiently, factor proportions are equalized across farm households in a rural community; thus, the output per unit of land tends to be equalized. In Section 5, we examine whether an inverse farm size–productivity relationship (IR) is present in SSA, and, if so, why this relationship exists. The existence of an IR may have clear policy implications; land reforms intended to favor small farmers may have both efficiency- and equity-enhancing effects. In Section 6, we undertake a review of the literature on the impacts of tenure security on long-term investment and land use intensification. Although this issue has been reviewed by Place (2009) and Fenske (2011), among other authors, we attempt to draw clearer conclusions concerning the policy implications for land tenure reforms. In Section 7, we inquire into the issue of how the IR is affected by land fragmentation in very densely populated areas. We consider this issue to be increasingly important in SSA in view of the fact that land fragmentation has been driven by continued population growth, in combination with egalitarian inheritance rules and land redistribution policies in some countries, such as Ethiopia. In Section 8, we explore the emerging issue of the influences that global warming expectations may have on climate risk, production incentives, intensification, and land tenure issues in African agriculture. This issue is related to the issue of IR because smallholder farm households may respond differently to risk than large farms, as reflected in the allocation of factors of production by farm households (Finkelshtain and Chalfant, 1991; Barrett 1996). Finally, in Section 9, we conclude this article by discussing what ownership size distribution and operational size distribution of farms and therefore potential land tenure reforms are conducive to economic development, poverty reduction and food security in SSA.

2. Major issues of land markets, tenancy and land tenure reforms in SSA

Unequal access to land in Africa was imposed primarily by colonial powers, e.g., by the British Empire in South Africa, Rhodesia, and Nyasaland (Malawi), and partly by feudal power structures, e.g., in Ethiopia before the radical tenure reform in 1975 (Holden, 2007). The colonial powers alienated local populations in various ways, sometimes declaring them tenants on crown land as a way to collect taxes and/or extract labor. For example, the British colonial power took control of much of the land in Nyasaland (Malawi) and introduced a tenancy system called *thangata* (meaning ‘to assist’ in Chichewa) in the Shire valley. The system implied an exchange

of land for labor. It was regarded as an oppressive system that was disliked by the local population. In the central parts of the country where land was more abundant, a "Visiting Tenancy System," which was relatively more lucrative than subsistence farming, was introduced. The tenure systems introduced by colonial powers continue to exist to some degree in some countries that have decided to maintain them, whereas others have partly removed them, and others have partly removed them and then reintroduced them (e.g., Uganda). The unequal land distribution or land access created by such systems is a major policy issue, particularly if large farms are less efficient than small farms. Even within smallholder and customary tenure systems, the distribution of land is highly unequal in many countries and has become more unequal in recent decades, e.g., in Ethiopia, Kenya, Mozambique and Rwanda (Jayne et al., 2003). Landlessness is emerging in an increasing number of countries and areas. The combination of lack of access to land and the lack of alternative non-farm employment opportunities is an important concern. Land access is a very important determinant of the income of the poor (Jayne et al., 2003). A related issue is whether market-assisted land redistributions recently introduced in some countries with skewed land distributions (Malawi, South Africa and Zimbabwe) can become efficient policy tools to provide land access to land-poor households by purchasing and transferring land from large land owners.

Ethiopia is unique in Africa in the sense that it was never colonized. Tenancy was widespread in the feudal system that existed before 1974 and was dominated by absentee landlords and poor tenants with very limited bargaining power in the southern parts of the country (Rahmato, 1984). Ethiopia went through a radical land tenure reform process in 1975, in which all land was declared to be state land, while user rights to land were distributed in an equitable manner within communities. Both land sales and rentals were prohibited, as was hiring of labor. Share tenancy still appeared to exist as a way to facilitate factor reallocation across households. In 1991, a new regime introduced more market-friendly policies, but land sales remained illegal, and restrictions on the duration and extent of land renting were introduced. Whether such new policies are conducive to production efficiency and distributional equity is another major issue.

In West Africa, e.g., Ghana, where land was more abundant, customary land tenure systems without much government intervention were dominant. Renting was not uncommon, even though land sales to outsiders were severely restricted. Some countries have statutory laws that acknowledge and build on customary tenure systems, while statutory laws in some other countries do not recognize or build on such customary tenure systems. The customary tenure systems tend to play a more important role in more land-abundant areas, and such areas have been exposed to sharp increases in the demand for land in recent years, particularly if land is officially owned by the state. The critical question is the extent to which the customary land tenure institutions provide tenure security and thereby enhance the intensification and investment in land.

Share tenancy appears to have been common and even dominant in the land rental markets in Ethiopia and Madagascar and has to some extent also been practiced on cocoa fields in Ghana and tobacco estates in Malawi (Holden et al., 2006; 2008; Lunduka et al., 2008; Quisumbing et al., 2001; Bellemare, 2012). In general, fixed-rent contracts appear to dominate in the land rental markets in SSA, including those in Kenya, Uganda and Malawi (Holden et al., 2008). Because (informal) land rental markets seem to have become more widespread and common in SSA over time, their implications for efficiency and equity are of importance.

Land sales have been prohibited in some countries and are not part of customary tenure systems in many countries, even though they were sometimes allowed within a restricted local group (Sjaastad, 2003). However, formal long-term leases for large land areas have been granted to foreign investors and well-connected people where land is abundant and/or where customary tenure rights are not recognized in statutory law. Formal long-term leases have also been the common way of providing land to international and national investors in recent large land acquisitions ('land grabs') (Deininger and Byerlee, 2011).

Land market transactions play an important role in transferring land rights from land-abundant to labor-abundant households, which may contribute to both efficiency and equity (Hayami and Otsuka, 1993). In Asia, however, where population densities are much higher than in SSA, land transactions, particularly renting, have been regarded as exploitative and feudalistic and hence suppressed, e.g., in India, Nepal, and the Philippines. Holden et al. (2013) report that the land-to-the-tiller program and land rent control in favor of tenants in South Asia have resulted in reduced incentives to rent out land and that access to land for the land-poor has declined rather than increased. In SSA, there have often been restrictions on land transactions as well, either as part of the customary tenure system or as part of statutory law, but there has been a broad trend toward policies that put fewer restrictions on such land transactions. Which policies can be justified is an important issue in the setting of SSA, where land is such an important basis for the livelihoods of many.

The challenge is to develop land policies that allow land markets to play a role that promotes efficiency, equity, and sustainability outcomes. Increasing land scarcity and demand for land can easily lead to more restrictions on land transactions, and there is a risk that these restrictions will have unintended negative effects on the equity of distribution and on land use efficiency and sustainability. Lack of recognition of customary land rights in statutory law represents a severe threat to tenure security and future livelihood opportunities for marginalized groups. These basic institutional issues will have to be sorted out before land markets can play a more conducive role.

3. Conceptual framework: Transaction-cost-constrained economies with growing land scarcity

In this article, we attempt to explore how growing land scarcity and transaction costs affect land tenure security, land investments, land market transactions, and eventually the extent to which an

inverse relationship exists between farm size and productivity. This section attempts to provide a simple but integrated conceptual framework for understanding the relationships among the key variables. Our starting point for the conceptual framework is the fundamental insights about tropical agriculture and farming systems that were diagnosed so cleverly by Ester Boserup (1965), Hans Ruthenberg (1980) and Hans Binswanger and coauthors in several studies (Binswanger and Rosenzweig, 1986; Binswanger and McIntire, 1987; Pingali et al., 1987; Binswanger et al.,1989). The basic insight that is essential to this framework is that increasing population pressure results in intensification as an "uphill climb" in terms of the labor requirement per unit of output when technology availability is unchanged. The fundamental constraints that land is immobile and that agricultural production is seasonal and risky under rain-fed conditions impose pervasive production characteristics with strong institutional implications. Fundamental behavioral characteristics such as risk aversion and moral hazard also influence institutional characteristics in such environments. These institutional characteristics include missing or incomplete and imperfect markets for insurance, credit, land and labor, with strong seasonal variations in the demand for inputs and supply of outputs. This again creates fundamental tensions between supply and demand that lead to regular seasonal fluctuations in (shadow) prices and inter-annual irregular fluctuations in prices due to covariate shocks. The livelihood strategies of vulnerable people living in these areas represent dynamic optimizing adjustments that include partial engagement in markets, asset portfolio management to facilitate consumption smoothing, and technology adoption and investment in intensified land use. Otsuka and Place (2001) note that agricultural intensification usually accompanies investments in land improvement, e.g., terracing, irrigating, composting, and tree planting, so that the intensification can improve livelihoods to the extent that the rates of return on investment are high.

Smallholder agriculture remains the dominant form of occupation in large parts of rural Africa over a wide range of population densities. Importantly, because of the high monitoring cost of hired labor in spatially diverse agricultural environments, family labor-based small-scale farming has an advantage over hired labor-based large-scale farming. We see two important recent changes, however: a) increasing population densities above the critical carrying capacity of the agro-ecological system in a growing number of areas (Muyanga and Jayne, in press), and b) a sharp increase in demand for land for commercial purposes in land-abundant areas where institutional structures are less well developed to handle these new land pressures (Deininger and Byerlee, 2011). Property rights, tenure security and land markets play increasingly important roles as institutional adjustments to growing population densities. Increased rural–urban migration is another important impact of the first type of change, as the young can no longer sustain the same livelihoods as their parents and have to search for new livelihood opportunities outside their home villages (Bezu and Holden, 2013).

4. The emergence of land markets and implications for efficiency and equity

In this section, we review empirical evidence of the existence, characteristics and implications of land rental and land sales markets in SSA. We are particularly interested in the land use efficiency, equity, poverty, and food security implications of land markets and the evolutionary effects of increasing land scarcity and population pressure on the development of land markets. Variation in "population pressure" can be decomposed to the farm level, in terms of land access per person/capita, and to the "community" level, which is affected by how equitable the distribution of land is. The equity of land distribution depends on the owned farm size distribution, the family size distribution across farm households, and the extent of access to and participation in markets for land and labor. Risk, shocks and liquidity constraints may also affect and drive land transactions and may lead to distress sales or rentals. Political factors and power may also lead to land expropriations and redistributions, as may urbanization processes whereby agricultural land use is often replaced by other forms of land use. Institutional structures will have a strong impact on how land rents will be distributed in urban and peri-urban areas where land values are rising rapidly. Such land rents are prone to "grabbing" in areas with weak and unclear tenure rights. This subject has received less attention by the media and researchers than "land grabs" in land-abundant areas, but they may be even more important for economic development and equity outcomes.

Do rural land rental markets enhance land use efficiency? Studies in Ethiopia (Deininger et al., 2008; Ghebru and Holden, 2008; Holden and Bezabih, 2008; Kassie and Holden, 2008), Kenya (Yamano et al., 2008; Jin and Jayne, 2013) and Malawi (Lunduka et al., 2008) demonstrate that land rental markets improve allocative efficiency by equalizing factor ratios among farm households, such that households rich in non-land resource endowments rent land from households that are poor in non-land resource endowments relative to their land endowments (Holden et al., 2008).

Do land rental markets improve access to land for land-poor households? Studies in Kenya (Yamano et al., 2008), Malawi (Lunduka et al., 2008) and Uganda (Deininger and Mpuga, 2008) indicate that informal land rental markets reallocate land from land-rich to land-poor households. Such reallocation implies enhanced equity in land access and efficiency in land use, as long as there is an inverse relationship between farm size and productivity. Several studies in Ethiopia, where the initial land distribution was egalitarian, show that land is transferred from households poor in non-land resources to households rich in non-land resources, such that the land rental market caused a more skewed distribution of operational holdings (Ghebru and Holden, 2008; Holden and Bezabih, 2008; Kassie and Holden, 2008; Tadesse et al., 2008). Considering that the initial land distribution in this country was egalitarian, such findings indicate that not only the distribution of land but also that of other factors, such as draft animals and human capital useful

for farming, affects the direction of land rental transactions. Indeed, landlords are generally poorer than tenants in Ethiopia.

Can land rental markets serve as a safety net or insurance against shocks? The land rental markets in Malawi (Lunduka et al., 2008) and Uganda (Deininger and Mpuga, 2008) serve as safety nets for poor-tenant households, while the land rental market can serve as a safety net for poor-landlord households in Ethiopia (Deininger et al., 2008; Ghebru and Holden, 2008; 2013; Gebregziabher and Holden, 2011; Holden et al., 2011). In Ethiopia, the costs of using the land rental market for this purpose may be high for female landlords because of their weak bargaining power in urgent situations, which leads to unfavorable fixed-rent contracts, implying that other coping strategies are preferred if available (Gebregziabher and Holden, 2011).

The use of sharecropping contracts, which are common in some SSA countries, such as Ethiopia, Eritrea and Madagascar, may limit the "price response" in the land rental market, which leads to rationing of tenants. Indeed, landlords select only trustworthy laborers as share tenants because of the fear of under-reporting of output and shirking due to the disincentive effect of output sharing, which is termed Marshallian inefficiency (Otsuka et al., 1992). This rationing may make it difficult for some households that are poor in non-land resources, such as farm skills, farm implements and labor, to access land through the land rental market. This is particularly the case in rain-fed areas where ox-plowing is dominant because rental markets for oxen are missing in such areas, where everybody demands oxen service more or less simultaneously. The entry barrier to land access by land-poor tenants can therefore be lower in hoe-based farming systems than in ox-based farming systems (Holden et al., 2008).

Do land sales markets lead to landlessness and concentration of land in the hands of the wealthy? Only a few studies have investigated this issue. Deininger and Mpuga (2008) use data from Uganda in the 1990s and find that land sales markets have contributed to a slightly more egalitarian land ownership distribution. Another study in Kenya with data from 2001–2005 (Yamano et al., 2008) findthat it is particularly land-poor households that buy land; thus, a concentration of land in the hands of the land-rich was not observed.

How has increasing population pressure affected land markets? One would usually expect that increasing land scarcity would result in increasing land values. According to the theory of induced innovation (Hayami and Ruttan, 1985), increasing land scarcity will induce land use intensification and institutional change in land markets that can boost the total value of crops produced in the rural community as a whole. Such institutional change requires collective agreements that respect land use rights and land transactions. Because the extent of the development of land markets in response to population pressure should be assessed over time at the appropriate community level corresponding to the market, the statistical evidence is not as strong as one may wish, as such data collection has not been part of standard national surveys.

The general observations of Holden et al. (2008), however, are consistent with the emergence of land markets in SSA in response to increasing population pressure.

It is possible that recent "land grabs" or large land acquisitions have caused a concentration of land and loss of land for the poor. Such land has mostly been contracted to international and national investors in the form of long-term lease contracts. These types of formal lease arrangements may therefore function differently than the informal rental/lease contracts that have been studied earlier. It is important to note that large farms typically manage large areas using large labor-replacing machinery, even in labor-abundant economies. Employment effects and growth linkages for the poor are therefore weak, and general equilibrium effects on food prices are also uncertain. Otsuka (2013) argues that although monitoring of hired labor is not a problem for such large mechanized farms, the operation of such farms is likely to be costly and hence socially inefficient in low-wage economies. However, this is a subject that requires further research, as the availability of relevant data is limited.

In summary, both land rental and sales markets have been emerging in SSA in response to population pressure, which, in general, leads to reallocation of land from land-rich to land-poor households. This transfer of land use or ownership rights certainly leads to enhanced equity. Whether it contributes to production efficiency depends on the potential productivity gap between land-abundant and land-poor households, which we investigate in the next section.

5. Does an inverse farm size–productivity relationship (IR) exist in SSA?

If emerging land markets function efficiently, land use rights will be transferred from less productive to more productive producers to eliminate the productivity gap. The robust IR (after controlling for land quality), if it is found to exist, indicates that small farms are more efficient than large farms and that land and labor markets fail to equalize the production efficiency across farms, even though the land is generally transferred from land-abundant to land-poor households. Egalitarian farm size distribution, supported by activated land market transactions, can then be defended from efficiency, equity and food security perspectives.

A number of studies find that an IR exists between farm size and land productivity in Africa, but many of them have suffered from data limitations that may have biased the findings. The recent rapid expansion of large land acquisitions and establishment of large farms in SSA have made this classical research topic highly policy-relevant again. Indeed, if economies of scale and higher productivity can be found on large farms, there are stronger arguments for a transformation of African agriculture to larger commercial units.

There are methodological and data issues related to detecting an IR between farm size and land productivity. These challenges include controlling for land quality and measurement error related to farm size. Few studies have been able to address both issues. Here, we only review studies that

have been undertaken in Africa and refer the reader to Binswanger et al. (1995) and Eastwood et al. (2010) for more comprehensive reviews of the literature.

Barrett et al. (2010) used laboratory analysis of soil data to comprehensively control for land quality in their assessment of the IR in Madagascar. Using detailed cross-sectional farm-level and plot-level data, they found that only a limited part of the IR can be explained by land quality variation. Market imperfections also explained only a limited part of the IR. They therefore indicated that the remaining unexplained IR could be due to measurement error related to land size. We should, however, add that chemical analyses of soil samples are usually not able to explain much of land productivity, possibly because of the heterogeneity of soils that such samples are unable to capture or more fundamental problems with linking soil chemical properties and land productivity.

Larson et al. (2013) used farm-level data from Living Standard Measurment Survey (LSMS) studies in Tanzania and Malawi and household-plot panel data from Kenya and Uganda to assess the IR. All data sets contained data primarily from small farms, less than 5 ha in size. These data did not allow the researchers to explicitly control for land quality, even though household fixed effects are employed in studies on Kenya and Uganda, and they did not discuss the farm size measurement error problem in their data. They find an IR in all four countries and find the relationship to be more strongly related to the intensity of use of household labor than to whether various modern inputs such as herbicides or hybrid seeds are used on the land.

Carletto et al. (2013) used cross-section data from Uganda and took seriously the farm size measurement error problem that Lamb (2003) mentioned as a potential explanation for the IR. They tested how measurement error might affect the IR by comparing the results obtained using owner-reported land sizes and GPS-measured land sizes. They found that measurement error leads to an underestimation of the IR rather than an overestimation as suggested by Lamb (2003). This finding is critically important because most empirical studies that have found that the IR exists did not correct for area measurement error.

Tatwangire and Holden (2013) used three years of household panel data for the *mailo*, customary, freehold, and leasehold tenure systems in Uganda, for which most plot sizes were measured with GPS, which should yield smaller measurement errors than when owner-reported areas are used (Carletto et al., 2013). Combining household fixed effects and random effects models to control for unobservable household and farm characteristics, they found a significant and robust IR in all tenure systems but a significantly weaker IR under the freehold tenure system, under which land markets function better, pointing in the direction of market imperfections as an important explanation for the IR.

Ali and Deininger (2013a) used cross-section data from Rwanda from 2010/11. They relied on owners' own estimates of plot sizes. Their findings indicated constant returns to scale and a strong IR for output per ha and profit per ha when family labor is valued at shadow wages. The

IR disappears when family labor is valued at market wages. They conclude that labor market imperfections are the main explanation for the IR in Rwanda.

In South Africa, farms that range in size from small to large coexist due to the partial success of land redistribution from large estates to smaller farming units. According to Wiig and Øien (2013), a sharp IR is observed on redistribution farms, with a large estimated elasticity of the value of production per hectare with respect to the cultivable area, ranging from -0.49 to -0.87. Their study had a basically cross-sectional nature and may have suffered from estimation biases, but the IR was found to be robust to alternative specifications, and the main conclusion might not be affected qualitatively, considering the large estimated negative elasticities.

Holden and Fisher (2013) performed the most comprehensive assessment to date of area measurement error and the implications for bias in the estimation of the IR. They used a three-round household and farm plot panel (2006, 2009, 2012) with owner-reported and GPS-measured plot and farm sizes and showed that measurement errors in the estimation of plot sizes and farm sizes in Malawi result in an underestimation of the IR in Malawi by 60% or more for the whole sample of small farms (below 5 ha). This finding reinforces the findings of Carletto et al. (2013) for Uganda. Measurement error, however, leads to overestimation of the IR on very small farms (< 1 ha). Those authorsfind that the IR is particularly strong for farms below 1 ha, reflecting not only the high cost of hired labor but also the crowding of family labor with limited alternative non-farm employment opportunities, causing low shadow wages for labor on very small farms, in combination with food self-sufficiency motives that result in the strong IR and intensification on very small farms. Carletto et al. (2013) (in Uganda) and De Groote and Traorè (2005) (in Mali) found similar patterns of measurement error, i.e., the sizes of owner-reported farm sizes and plot sizes being overestimated for small farms and farm and plot sizes being underestimated for large farms. Owner-reported plot sizes and farm sizes are also typically rounded to the nearest acre, half acre, or quarter acre in many countries where owner-reported data are used.

Overall, recent studies have provided evidence that the IR exists for farm sizes smaller than 5 ha in many countries in SSA, due to imperfections in agricultural labor and land markets. The emerging land markets have so far failed to eliminate the IR, although they may contribute to reducing the slope of the IR. The policy implications are clear: governments should facilitate land market transactions to improve both efficiency and equity.

6. Tenure security, long-term investment, and land use intensification

In this section, we review evidence on the relationship between tenure (in-)security, investments and land use intensification. Is it tenure security that leads to investment or investment that leads to tenure security or both? This is a famous chicken-or-egg problem that has challenged researchers (Besley, 1995; Sjaastad and Bromley, 1997; Braselle et al., 2002). A related question is whether land reforms have contributed to strengthened tenure security and more investment.

Besley (1995) uses data from Ghana and controls for endogeneity of property rights (tenure security). He finds that tenure security enhances investment in one area (Wassa) but not in another (Anloga), while an earlier study (Migot-Adholla et al. 1994) that did not control for endogeneity of tenure security reached the opposite conclusion. Quisumbing et al. (2001) find for the same area that property rights are strengthened when farmers invested in the establishment of cocoa fields. A particularly interesting finding of theirs is that women, who were not allowed to own land traditionally under the uterine-matrilineal inheritance system, actually received secure ownership rights on established cocoa fields, provided that they helped in the establishment of cocoa fields on formerly family-controlled land for slash-and-burn farming and uncultivated forest land. In any case, enhanced tenure security, long-term investments, and land use intensification take place simultaneously in this region. Place and Otsuka (2001a, 2001b) find in the matrilineal and matrilocal areas of Malawi that while naturally grown trees belong to a wife's family, trees planted by a husband are owned by him, and upon divorce or the death of his wife, he can sell his trees before returning to his original village. Baland et al. (1999), using data from 36 villages in central Uganda, found evidence that investment enhances tenure security but not vice versa. Thus, observable efforts to invest in land seem to confer strong land rights.

Many land right formalization (land titling) attempts in Africa have failed to increase tenure security (Atwood, 1990; Braselle et al., 2002; Deininger and Jin, 2006). Indigenous land rights may in many cases provide sufficient tenure security, and land formalization may even increase tenure insecurity in cases in which local elites take control over the reform (Place and Hazell, 1993; Sjaastad and Bromley, 1997; Benjaminsen et al. 2009). Investigations into the extent of security of tenure should therefore be conducted before drawing conclusions about the potential effects of land rights formalization on tenure security and investment.

Holden et al. (2009) use three rounds of household- and farm plot-level data to assess whether low-cost land registration and certification has resulted in more investment and higher land productivity in the Tigray region in Ethiopia. Their data includes observations up to seven years after land certificates were received. After controlling for endogeneity in the allocation of certificates, they find that receipt of land certificates has resulted in better maintenance of soil conservation structures and more planting of trees on certified land. They also find that land productivity has increased 40–45% on certified land, a sign of land use intensification. Similarly, Deininger et al. (2011) find that land certification has enhanced tenure security and investment in the Amhara region in Ethiopia, where land registration and certification started approximately five years later than in the Tigray region. The strong observed effects in Ethiopia are likely to be due to high tenure insecurity invoked by the previous radical land reform, with weak user rights and frequent land redistributions.

Thus, consistent with the findings of the review of the literature on land tenure security and investments by Fenske (2011), we find that investments in land improvement, particularly tree planting, tend to enhance land tenure security in customary land areas in SSA. Land tenure

security may potentially be enhanced by land rights formalization policies in areas where tenure insecurity is high. New technologies in the form of low-cost and rapid approaches to land registration and formalization have reduced the costs of registration and certification from three-digit to one-digit costs (in US$) per farm plot and have rendered such interventions more feasible in poor countries. Whether the Ethiopian success story can be replicated in other African countries depends on the location-specific institutional characteristics, meaning that careful diagnosis of the potential benefits is crucial, and pilot testing is recommended. There is always a risk that local elites will resist or take over such programs in ways that can threaten the land rights and livelihoods of the poor and less well connected. However, new demands for land by international and national investors in many land-abundant areas may recently have increased tenure insecurity of the indigenous populations where the customary tenure systems are not recognized by statutory law and therefore fail to protect the traditional land rights holders.

7. Implications of shrinking farm sizes and land fragmentation in densely populated areas

Is there a need to change land tenure policies in response to increasing land scarcity and emerging landlessness? Can existing tenure systems lead to excessive land fragmentation, and does this have negative efficiency implications? Are consolidation, setting of minimum farm sizes and changes to inheritance rules needed to prevent further fragmentation? The potential benefits of land fragmentation have to be compared with the potential costs. This comparison would also require investigation of whether and when a stage of excessive fragmentation has been reached. Fragmentation has been a deliberate policy in some countries, such as Ethiopia, where, after the 1975 radical land reform, land was distributed in an egalitarian way in each community by giving households land according to their food needs. This was accomplished by giving an equal portion of each land quality class to each household, which often resulted in households having multiple plots distributed in different locations. This phenomenon reduced production risks and possibly labor bottlenecks and facilitated production of a more diverse portfolio of crops. However, additional costs are associated with the additional travel and transportation to and from each of the plots and monitoring of dispersed plots. The relative risk reduction versus the cost increase needs to be assessed. Land fragmentation may also be a consequence of topographic characteristics and may also be driven by the inheritance system by which plots are further subdivided among children.

Blarel et al. (1992) studied the implications of land fragmentation in Ghana and Rwanda. They did not find any significant negative effect of fragmentation on production and found that land fragmentation facilitates crop diversification. The additional labor costs were considered to be moderate because a single household’s plots are not located too far apart. They concluded that land fragmentation was not leading to serious inefficiencies and had various advantages. They therefore warned against comprehensive consolidation policies and suggested that policymakers should focus instead on the root causes of fragmentation, such as market imperfections.

Ali and Deininger (2013b) performed a new assessment of the implications of land fragmentation in Rwanda based on new and better data. Rwanda, which is one of the most densely populated countries in Africa, introduced a land law in 2005 that prohibited sub-division of land into units less than one ha. However, they found that the average farm size is 0.72 ha and that 90% of the farm plots are less than one ha. They estimated the travel time needed to operate the fragmented plots, as well as the plot-level production efficiency and variability in production across plots, using a stochastic production frontier approach and two years of data from a sample of households. They concluded that by reducing the incidence of production shocks, fragmentation provides significant benefits without increasing costs or reducing production efficiency. They therefore come to the same conclusion as Blarel et al. (1992) that prohibiting fragmentation may have unintended negative impacts. The low cost of labor, short travel distances, and lack of economies of scale explain this conclusion. However, these conclusions may not apply everywhere in Africa.

Access to land is still a constitutional right in Ethiopia, but population growth has made it increasingly difficult, if not impossible, to provide land to all the youth of the country who reach adulthood. Most youth are therefore not being provided their constitutional rights, and the role of land as the main safety net is eroding away. While a complementary safety net, the Productive Safety Net Program, has been created as a workfare program providing food-for-work and cash-for-work opportunities for eligible chronically food-insecure households, the dependence on land as a source of food security remains high. Bezu and Holden (2013) study youth behavior in some of the most densely populated areas in southern Ethiopia, including the traditionally very subsistence-oriented Wollaita area. Using household and individual panel data from 2007 and 2012, they discover that a threshold level of land scarcity has been passed in this period and that this has resulted in a sharp increase in outmigration of youth, mostly to urban areas. Land scarcity has become an important driver of youth migration. The youth from the Wollaita area, among others, have taken over much of the shoe shiner business in Addis Ababa. Economic growth in Ethiopia and the growth of small towns have created many new employment opportunities outside agriculture, and these opportunities facilitate the escape of youth from poverty traps due to extreme land scarcity in rural areas. The study demonstrates that the majority of rural youth seek urban jobs and that only 9% of the youth still residing in the rural areas examined plan to continue life as farmers in the places where their parents have lived. Recent land laws in Ethiopia prohibit subdivision of farms below 0.5 ha in cereal-based cropping systems and below 0.25 ha in perennial crop systems, but a considerable share of the farms have already been subdivided into sizes below these limits, and there appears to be no good way of enforcing the legal restrictions mentioned. Currently, the consequence is that farms cannot be formally divided by splitting one farm and one land certificate into two farms with two separate land certificates. The law also recommends co-farming by families in such cases. The situation is the same with respect to divorces, in which farms are supposed to be divided equally between the spouses. The legal

restrictions on subdivision of farms require divorced spouses to continue to farm together and hold one joint land certificate (Bezu and Holden, 2013).

In Uganda, there is evidence that farmers sell their land in some of the most densely populated areas, migrate and buy land in areas with lower population densities where land is cheaper. Access to cheap land has been particularly cheaply available in freehold areas in the western region (Mwesigye and Matsumoto, 2013).

In Malawi, a market-assisted redistribution program financed by the World Bank has made it possible for 15,000 households from some of the most densely populated areas in southern Malawi to obtain farm land from tobacco estate owners that were willing to sell land (Simtowe et al., 2013). In summary, although farm sizes have been shrinking and land fragmentation has been taking place in densely populated areas, they have not resulted in production inefficiency, although they may have contributed to food-security-driven intensification, rural-to-urban migration, rural-to-rural migration, and market-assisted land redistribution programs. However, continued population pressure on limited land resources is likely to cause further reductions in farm sizes and increased land fragmentation, which may have significant negative consequences for production efficiency in the future, if such pressure leads to more soil mining (Shiferaw and Holden, 1998).

8. Climate risk and food insecurity: Implications for land policies

How does production risk, including climate risk and market risk, affect incentives to intensify production and the food security of rural households? How is production risk related to land tenure issues? The standard producer theory states that increasing risk and increasing risk aversion leads to lower production and input use, *ceteris paribus* (Sandmo, 1971). However, Finkelshtain and Chalfant (1991) have shown that net buyers of food may respond to increasing price risk and increasing risk aversion by increasing their output. This finding may imply that poor, risk-averse, and food-insecure households that face price risk respond by increasing input use to meet their food needs in environments with covariate risk. There have been a few empirical studies on this subject in SSA. Barrett (1996) finds that small rice farmers in Madagascar that are averse to price risk and net buyers of rice overemploy labor and thus create an inverse farm size–productivity relationship. Price risk aversion can be important in environments in which a single crop/commodity is dominant in production/consumption. Hagos and Holden (2011) found that the probability of adoption of fertilizer was positively correlated with relative risk aversion among net buyers of food in the semi-arid Tigray region of Ethiopia, even though intensity of fertilizer use was uncorrelated with risk aversion.

The finding of the existence of a strong IR for very small farms (below 1 ha) by Holden and Fisher (2013) for small-holder maize producers in Malawi is also consistent with this theory. The same may be the case for the study by Ali and Deininger (2013a) in Rwanda, although labor intensification on small farms may not be driven only by price risk and price risk aversion.

Holden and Shiferaw (2004) also demonstrate the importance of price risk in a crop–livestock system in the highlands of Ethiopia due to covariate risk. In years with good rainfall, most households produce a surplus of cereals and are net sellers of cereals. Such years are typically characterized by low cereal prices. However, climatic shocks lead to crop failure, and most households become net buyers of cereals in drought years. In such years, cereal prices are high, and to buy cereals, households have to sell livestock, leading to a fall in livestock prices. They find that the indirect negative income effects due to covariate risk/price effects are larger than the direct production loss due to the production risk. Local general equilibrium effects across several markets can therefore contribute to price risk and responses to such risk.

Land-poor rural households living in risky environments face imperfect markets and are vulnerable to shocks and use alternative coping strategies as a way to mitigate such shocks (Dercon, 2002). The vulnerability of such households to covariate shocks is particularly high as *ex-ante* risk management strategies and *ex-post* coping strategies are less able to handle such shocks. This phenomenon provides an important basis for public interventions in safety net programs on both human rights grounds and efficiency grounds. This vulnerability can otherwise lead to severe depletion of asset stocks, including natural resources such as local forests. Migration and asset strategies are among the most important responses to shocks and have been the subjects of many studies. Policy responses include early warning systems, safety net programs of various forms, livelihood programs, index insurance and microfinance options (Heltberg et al., 2009).

Distress land sales have been perceived as likely responses to severe shocks if land sales markets are allowed and are perceived as a potential cause of more unequal land distribution. However, lack of such selling opportunities may also cause a poverty trap that people may be unable to escape by selling their land and getting enough capital to start a less risky business elsewhere. Distress land rentals may also serve as coping response opportunities if land rental markets work.

Gebregziabher and Holden (2011) find that in northern Ethiopia, distress land rentals are among the last coping responses that households choose, due to the unfavorable contracts offered to them when they are in weak bargaining situations. They may then choose fixed-rent contracts to obtain urgently needed cash, and such contracts are much less favorable than the typical sharecropping contracts offered in the same area. Sharecropping contracts expanded in the area after land certification was implemented and provide improved food security to female landlord households who face difficulties in farming the land efficiently themselves. Expanded land renting following the land tenure reform that enhanced tenure security has therefore contributed to improved tenure security, more land renting, improved food security and improved child nutrition (Holden and Ghebru, 2013; Ghebru and Holden, 2013). Ethiopia has recently imposed stronger restrictions on land renting, prohibiting farm households from renting out more than 50% of their land and confiscating land (without compensation) from households that have migrated and been away from their land for more than two years. Such restrictions may

contribute to enhancing rural poverty traps and food insecurity and should be lifted. Reforms should rather aim to help create more flexible adjustments to reduce transaction costs to facilitate social transformation. If climate change implies that future climatic shocks will be more severe, such enhanced flexibility through enhanced market performance will be crucial to reducing the negative effects on the poor and reducing destitute migration by facilitating early migration by better-endowed migrants who can afford to invest in new livelihoods.

The discussion in this section suggests that climate risk is likely to affect market imperfections by increasing production risks and covariate risks, which, in turn, will affect the IR, as well as distress land sales and rentals. We believe that efficient land rental and sales markets will help poor farmers cope with increasing climate risk in coming years. Better-functioning land markets are also likely to lead to more stable land prices.

9. Conclusions: Toward pro-poor land tenure systems in SSA?

The importance of land markets evolves over the course of economic development due to increasing population pressure or rising labor–land ratios. Our literature review suggests that land rental and sales markets have been emerging in SSA and have facilitated the transfer of land rights from land-abundant to land-poor households, thereby contributing to greater efficiency of land use and equity of land distribution among farm households. Land markets and individual ownership rights are not as important in the early stages of development with traditional institutions, when land is relatively abundant. The different countries in Africa are at different stages of this evolution and process of dynamic adjustment.

The quantitative impacts of secure tenure rights and land transfer rights are highly context-specific, and the number of studies that have measured such impacts has been very limited. However, access to land has been shown to be a very important determinant of income and food security for land-poor households in rural areas in SSA, where few alternative livelihood opportunities exist. Strengthened property rights through land certification have been found to increase investment in land and land productivity by 40% and have also enhanced land renting and have increased the incomes of poor female landlord households and have improved child nutrition in northern Ethiopia. It is also obvious that formal recognition of customary tenure rights for poor and marginalized groups can have a huge impact on their future livelihood opportunities. Likewise, decisions concerning who are allocated the rights to rapidly rising land rents in urban and peri-urban areas will have a huge impact on future income distributions. Inheritance rights will also have a huge impact on the next generation's livelihood opportunities. Rapid social transformation will be required in densely populated areas in SSA, and having flexible dynamic and predictable institutional arrangements will be essential for broad welfare promotion. Transparent and well-functioning land markets can help to reduce the social costs of

this transition. It would be a cardinal mistake not to address these issues in future development policies. It would also be a mistake not to start to collecting better national data that can be used to conduct better impact assessments related to these issues.

Even if land markets transfer land rights from land-abundant to land-poor households, an inverse relationship between farm size and productivity is widely observed in SSA. This finding clearly supports the view that larger farms are inefficient because of market imperfections and the absence of scale economies, at least in the "peasant sector," as opposed to the emerging "super large farm sector," for which limited data are available. This finding also indicates that land and labor markets fail to eliminate the inefficiency of land use across farm households. We also found that decreases in farm size and increasing land fragmentation among smallholders have not resulted in major inefficiencies in production but rather the opposite: enhanced intensification occurs on very small farms to meet food needs. Based on these findings, we advocate a small farm approach, through infrastructure investments and market development, as an effective development strategy.

Recent studies demonstrate that secure farmland ownership rights, including transfer rights, will facilitate more efficient and equitable transactions of land rights through land rental and land sales markets and will also induce more investments in land improvement. We found that the development of land markets helps poor farmers cope with increasing climate risk by providing a last resort in the form of a coping response opportunity. Thus, we would like to argue that strengthening the land rights of small farmers, particularly transfer rights, is the most critical step toward providing a better exit option for those who are forced to leave agriculture. Land markets can in this way reduce the transaction costs and enhance more efficient social transformation with fewer destitute migrants. While the smallholder sector will continue to employ a large share of the population, it is unable to continue to absorb all the growing population in densely populated rural areas, and this inevitably leads to more skewed land distributions in such areas, even if land fragmentation continues. Increasing landlessness is inevitable, and the creation of alternative livelihood opportunities outside agriculture is an essential part of a pro-poor development strategy.

While the provision of secure individual titles or certificates has been an efficient tool in some countries, such as Ethiopia and Rwanda, the provision of group titles and formal recognition of customary land rights may be better in other areas with lower population densities, but this circumstance may also vary within countries. Tenure laws and policies should therefore be responsive to local contexts and local demands, and pro-poor policies should emphasize the needs and rights of the poor in land law and policy formulation.

SSA is undergoing strong social transformation, driven by population growth and economic growth and leading to accelerating rural–urban migration and the huge challenge of providing

alternative livelihood opportunities for the youth who cannot continue the agricultural ways of life of their parents. These youth are the key to the future success of African development. Ignoring them or excluding them economically and politically can easily lead to disaster.

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