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Land Rights, Power and Trees in Rural Ethiopia

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Abstract
This paper provides evidence from one of the poorest countries of the world that the institutions of property rights, in particular related to land, are of crucial importance for investment and growth. In Ethiopia, with all land state-owned, the threat of land redistribution never appears far off the agenda. A constitutional reform in 1996 has promised long-term user rights, and land rental and leasing have been made legal, but land rights remain restricted and the perception of continuing tenure insecurity remains quite strong. Using a unique panel data set including data on land right perceptions over time, this study investigates whether land rights affect household investment decisions, focusing on land allocation to coffee trees and other perennial crops. The period of investigation covers a period of change in land right perceptions after a constitutional change, a large scale but unexpected land redistribution episode in one region and a start to land registration in another region, offering exogenous variation to study the impact of tenure insecurity. Exploiting heterogeneity in the impact of the policy turmoil, including linked to the local political economy of land redistribution, the panel data estimates suggest a robust, causal negative impact of transfer rights on long-term investment in Ethiopian agriculture, contributing to the low returns from land and perpetuating low growth and poverty.

Keywords: property rights, land, investment, agriculture, Ethiopia, Africa

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1. Introduction

The central role of property rights in efficiency and growth has long been recognised (Coase, 1960; Demsetz, 1967; North, 1981). A key hypothesis is that well-defined complete individualistic property rights, codified and protected by the state, provide a central precondition for economic growth. In many contexts, property rights are not complete. Macro-level studies, mainly using cross-country growth regressions, have suggestive evidence that variations in the institutions governing property rights are an important factor in explaining growth and the lack thereof in parts of the world (North and Weingast, 1989; Acemoglu et al. 2001, Acemoglu and Johnson, 2005). Despite the limitation of rather crude aggregate data, the resulting narratives are highly suggestive and receive much attention in policy circles. Pande and Udry (2006) have stressed some of the limitations of this type of macro-analysis, and argued strongly for the need for more micro-level evidence.

In this paper, we add to this evidence focusing on the link between insecure rights to land and investment. We focus on Africa, the region where growth has been lagging most strikingly in recent decades and where imperfect property rights has been put forward as a crucial determinant of this growth failure (Collier and Gunning, 1998). More specifically, we study Ethiopia, one of the poorest countries in the world, and the role of insecurity in land rights on long-term investment in land-specific assets, in this case perennial crops, based on longitudinal household survey data.

North (1981) provides the standard definition of an economic institution as: "a set of rules, compliance procedures and moral and ethical behavioural norms designed to constrain the behaviour of individuals in the interests of maximizing the wealth or utility of principals" (p.201-202). A property rights system provides such a set of rules, assigning rights to use specific goods or assets from a nonprohibited set of uses. Full private property rights assign and recognise the exclusive use of goods to particular individuals, bounded by some constraints, such as that this usage is not violating the rights of someone else. They give an individual access rights to the stream of benefits from these goods and the right to transfer this right to others in whatever way they choose. These rights are secure and inalienable so enforcement is never in doubt. However, many property rights are not as complete or individualistic

as described here. For example, property rights could be communal, whereby rights are shared, or private, but restricted, such as in the context of particular types of customary law, whereby rights cannot be wholly ceded by those to whom an asset has been allocated.[1]

Rights to land in Ethiopia are neither complete nor fully individualistic. Since 1976, after a dramatic land reform in the wake of the overthrow of the emperor, the state owns all land, and rights to cultivation are handed to rural households. In principle, rights to the stream of benefits were offered, but as land redistributions continued regularly throughout the 1980s, their horizon and security was severely undermined. When a new government came to power after a civil war in 1991, a commitment was made to strengthen individual land rights via offering more long-term tenure security and broader transfer rights, as reflected in the new constitution of 1996. Uncertainty has remained ever since with, first, renewed land redistributions, and then, the failure to cement the new principles in law in many regions and slow progress in promised land registration programmes (which only in the last few years have taken off).

Ethiopia offers fertile ground to study the impact of land tenure insecurity. The relevance of Ethiopia in a study of the link between land rights and development is also without doubt. It is one of the poorest and the second most populous country in Africa, with few natural resources and with 85 percent of the population making a living off the land. With a GDP per capita around $125, take a random African in absolute poverty with consumption below $1 a day, the odds are that one will pick an Ethiopian. Understanding institutional constraints on growth goes beyond a trivial academic pursuit.

Our analysis is based on non-experimental data, using two rounds of the Ethiopian Rural Household Survey, a household panel data survey conducted thus far between 1994 and 2004. As we are using non-experimental data, our evidence is only as credible our identification strategy. We use data from 1997 and 1999, from a set of villages in one region, the Southern Nationalities, Nations and Peoples State (SNNP) with detailed data on land-specific assets in terms of trees, mainly coffee. As all land

[1]Bruce and Migot-Adholla (1994) document forms of customary land laws in Africa with this feature.

is state-owned, there is *de jure* (or legally) no variation in land rights in our data. Our analysis is therefore based on (self-reported) *de facto* rights[2], based on measured perceptions of land rights in each of the two years, during which we observe considerable variation between households and over time. It is the between-households variation in the changes over time at the household level, and its impact on land allocation to trees that we will exploit in the analysis.

However, for causal interpretation, this would require that these changes over time are a source of exogenous variation in the sample. During the two years, there is no *de jure* change in land rights in these communities: the new constitution came into existence before the 1997 data collection round, and the particular region did not issue any new rules or laws to govern the implementation of the constitution between 1997 and 1999, for example regarding the safeguards to offer long-term rights. However, more than anything else, one event shaped the land debate in the country and the region between the first and second round of the data used in the analysis: a sudden, unexpected large-scale land reform, (the first land reform in the 1990s), in another, non-adjacent region, Amhara Region, between late 1997 and the first few months of 1998, in which ex-soldiers and other politically important constituencies were given land, taken away from other households. It created a sense that despite the new constitution, land reform was not off the political agenda. The data show that in this period, farmers changed considerably in their perceived tenure security in the sampled villages in SNNP. For example, in 1997, households stated that they thought they would be able to transfer on average about 69 percent of their land to a relative or someone else, but this had dropped to 56 percent two years later.

To the extent that it affected perceived *de facto* land rights, this land reform episode offers a policy-induced source of variation in our sample. More importantly for identification, land redistribution has winners and losers, selected by those in charge of redistribution, so that local political economy factors will matter in this process. In our sample, 35 percent revised their own perception downwards between 1997 and 1999, mostly from feeling able to have long-term rights to determine the destiny of their land to not at all have rights, while a fifth had stated that their tenure security had

[2] See Pande and Udry (2006) for a discussion of the importance of distinguishing *de jure* and *de facto* land rights.

improved. Consistent with rising expectations for new land reform in our survey area after 1997 and the relevance of the local political economy, we find that changes in perceived land rights are affected by the economic, social and especially political position of the households. To establish the link between changing land rights and changes in land allocation to perennial crops, we use the variation in political power, as an instrument for changing land rights, besides controlling for household fixed effects and village-specific time effects. We find a strong, significant and robust link between land rights on the allocation of land to perennial crops such as coffee.

Our paper is directly nested in the small but growing literature exploiting micro-data to understand the causal role of land rights (Pande and Udry, 2006). Besley (1995) analysed investment in trees in Ghana, but in our paper we can use panel data on land allocation to permanent crops, rather than a cross-section data set. A number of studies can rely on well defined policy-induced variation in land rights. For example, Banerjee et al. (2002) exploit variation in exposure to tenancy law changes to assess the impact on agricultural productivity in West Bengal in India. Do and Iyer (2005) study the impact of specific legal changes in land rights in Vietnam and its impact on agricultural investments, including in terms of perennial crops. Field and Torero (2004) exploited the staggered implementation of a land titling programme in Peru for identification of its impact. Our paper can only indirectly rely policy-induced variation, and only by exploiting its heterogenous impact on perceived *de facto* rather than *de jure* land rights. The identification strategy is closer in spirit to Udry and Goldstein (2005), who focus on the links between actual land rights and the particular social or political position of households. In particular, they measure differences in perceived land rights in an area of Ghana and show that these perceptions are correlated with the political positions of individuals within the community. They use therefore information on local power to confirm the direct causal link between tenure rights and productivity. In our paper, we go beyond their work by our ability to control for time-invariant household heterogeneity, by showing a link between *changes* in outcomes and *changes* in perceived land rights over time through information on the social and political position of households and the way it shapes changing land rights.

In the next section, we first give more details on the institutional context, as well as a brief review of the existing evidence in Africa and Ethiopia. Next, we introduce our data. In section 4, we set out the econometric methodology, and the identification strategy used. Section 5 has the results.

2. Land rights in Ethiopia

After ousting the imperial regime, the military government (the 'Dergue', meaning the committee) nationalized land in 1975 and subsequently distributed use rights to cultivators. Legally, land was to be offered to families based on their household size, and this broad correlation is confirmed by all available data. In most areas, cultivators were allowed to retain some of the land they had been cultivating, including farmers that had inherited land or were simply tenants for large landlords, while landless farmers were accommodated as well. Nevertheless, it appears that political and local factors played a considerable role as well, implying a diverse experience in implementation (Rahmato, 1984).

Ever since the first land reform in 1976, the actual implementation has been at the local level. Land redistribution decisions are taken at the level of a specific committee at the Peasant Association (PA). The PA is an administrative unit usually consisting of one or a few villages, still relevant today.[3] During the initial land reform and the subsequent redistributions, the leadership of the PA were instructed to consider household size as the specific criteria for need. However, the process left much room for interpretation, such as whether a newly formed household could be entitled to land, judgements on land quality and also on specific land sizes.[4] Suspicions of forms of capture have been well documented.[5]

[3] In much research on Ethiopia, as in this paper, it results in 'Peasant Association' and 'village' being used interchangeably.
[4] Throughout Ethiopia, most land is measured using local units with imprecise meanings. For example, in most of the cereal producing areas, a 'timad' is the main unit, measuring the amount of land an ox can plough in a day.
[5] A classic study of the land reform in 1976, Rahmato (1984), documented this. "Not all peasants were satisfied with the eventual outcome of the distribution. Some felt they were entitled to larger plots, others that they had not been treated fairly. Some complained that those involved in allocation of plots were guilty of favouritism, nepotism and the like, others that the whole endeavour had been to the benefit of one social group and not to all… etc." (p.43).

The legal framework remained similar until the end of the Dergue in 1991. The system strictly prohibited private ownership of land, and transfer of land by sale, lease or mortgage. Periodic land redistributions were used to reallocate land. This was to accommodate the needs of new claimants, but as a result widespread land tenure insecurity was instigated in the rural areas. For example, in the data set used in this paper, more than a third of the households reported having lost land at one point or another during the period between 1975 and 1991. Another study, Benin and Pender (2001) found that in a study of 98 peasant associations that they had on average 3 land redistributions in this period; one PA even reported 14 redistributions – effectively, one a year.

After the fall of the Dergue regime in 1991, land redistribution was temporarily suspended without any provision to address the needs of the landless and the land hungry. The practice of repeated land redistribution had been already frozen in 1989, as part of the market-oriented reforms undertaken by the Dergue. In practice, at the local level, some occasional land reforms continued to take place. Politically, land rights became again a hotly disputed issue. Expectations were raised for a dramatic reversal towards privatization of land, but in 1996, a new constitution was adopted. In the debates on land for the new constitution some votes related to land were very close: Mersha and Githinji (2005) reported a vote in the constituent assembly with 499 votes for the retention of state ownership of land, with 495 voting for privatization of land. The outcome has nevertheless been that land policy had basically stayed the same with just relatively minor amendments. The constitution has restated that land remains the collective property of the state and a mandate is given to regional governments for its administration. Accordingly, a farmer who wants to make a livelihood from farming is entitled to have a plot of land free of charge (Federal Republic of Ethiopia, 2002). In line with this guiding principle, the policy provides usufruct rights to rural households while strictly prohibiting sale, exchange for other property or mortgage. However, a major improvement is that land leasing to

a third party is allowed under the current system.[6] Furthermore, transfer rights within families, specifically towards off-spring, are also allowed.

Initially, public statements by the government suggested that the policy would provide far more stability and long-term rights than before. In Tigray, it was announced that land registration would start (although in practice it took many years to implement), and no future land distribution was made official policy in 1997. However, in many parts of the country, this was undermined due to new land reforms. In Amhara Region, a relatively large scale, but largely unexpected land reform took place in late 1997 and 1998, offering land to demobilised soldiers and other groups. Although largely a cereal growing area, this redistribution also affected land covered by perennials such as eucalyptus, and contrary to the stated policy compensation was not paid to the former owners (Holden and Hailu Yohannes, 2002). A number of studies have reported that in the following years fear remained among farmers that they will be subjected to possible land redistribution without compensation at any time in the near future. In Amhara Region, Benin and Pender (2001) reported that by 2000, 80 percent of communities expected further land reform. Based on a nationally representative survey of farm households, Deininger and Jin. (2006) found out that 9 percent of the farmers were affected by land redistribution in the 1991-98 period. Also, less than a third of the farmers expected that there would not be land redistribution in the near future. In the data set from which a sub-sample is used in this paper, these results are reiterated: about 7 percent of households in 1999 lost land during land redistribution in the last five years, while 11 percent of households expected to loose land themselves in the next five years due land reform, and 10 percent expected to gain.

Even though the government had announced that regional governments would have to implement the spirit of the 1996 constitution via new land laws and rules, the lack of progress in some regions added to the confusion. In Southern Nations, Nationalities and People's Regional State (SNNP) and Oromiya, the two largest regions in Ethiopia, no clear policy statements were made until about 2002, in contrast to Tigray, where steps towards land registration were announced in 1997, and started in the

[6]Informal arrangements in the form of sharecropping or fixed rent tenancy were taking place even during the Dergue regime at the risk of losing land.

following years. Much more recently and belatedly, tentative steps have been taken towards some registration in the other regions.

As land is such a central concern in the policy debate, this issue has attracted many precedents in terms of research in Ethiopia. First, a number of studies have largely focused on tenure arrangements such sharecropping, rather than land rights per se. For example, Fafchamps and Pender (2001) suggested that variable input use was not affected by the variety of rural tenure contracts under which production takes place. Their results indicated that farmers apply more or less the same amount of inputs on land under informal and less secure contracts (rented, sharecropped and borrowed land) and on lands formally allocated to them via the local authorities. Other studies have tried to study on long-term investments, rather than variable inputs. Holden and Hailu Yohannes (2002) investigated the planting of perennial crops using data from 15 different sites in Southern Ethiopia. They suggested that tenure insecurity has little effect on the decision of farmers to plant perennials. Based on nationally representative survey data, Deininger and Jin (2006) argued that the impact of tenure insecurity varies across types of investments. In line with this, they found that tenure insecurity has encouraged planting (any) trees while discouraging investment in terraces. There is little or no evidence that resource constraints have adversely affected both investments. Gebremedhin and Swinton (2001) suggest that farmers' perceived land tenure security in Tigray was significantly and positively associated with long-term durable soil conservation investments such as stone terraces. Gebremedhin et al. (2003) argued from village level data that perceived tenure security increased land investments.

Many of these studies suffer from specific data or methodological limitations. For example, typically only a cross-section is available, measures of land rights are incomplete and endogeneity of tenure security cannot be appropriately addressed. Deininger and Jin (2006) can account for these issues to some extent, but only observe propensities to invest and only over a limited period of time, and only for broad categories of investments such as 'trees' in general.

3. The Data

The analysis exploits household panel data from the Ethiopian Rural Household Survey (ERHS). This panel has been interviewing about 1450 households in 18 Peasant Associations covering six rounds between 1994 to 2004. For the purposes of this paper, we focus on long-term investments in the form of land allocation to perennial crops, such as coffee. Only specific areas of the country, mainly in the South, have agro-climatic conditions suitable for such crops and the data in this paper are therefore restricted to those areas in the sample suitable for coffee and chat.[7] All the communities used are located in Southern Nations, Nationalities and People's Regional State (SNNP).[8] We focus on the three relevant perennial crops in this area: two tree crops, coffee and eucalyptus, and one shrub, chat. All three are important cash crops in the area studied. Coffee trees only start yielding about 3-4 years after planting, reaching full potential only after 8 years. Then, trees can maintain high production levels for several decades. Eucalyptus is rather different in that it can yield a return after only a few years, either by cutting it down entirely or simply cutting by branches, and hence is more of a medium-term investment. It would be possible to recoup a reasonable part of the investment; still, it is likely to have to occur at a sub-optimal time for the household. It is in general grown both for providing 'subsistence' firewood as well as for cash.[9] Chat (or q'at) is a relatively drought-resistant evergreen shrub, somewhat resembling tea plants, and cultivated as a cash crop. The young leaves of this plant are widely appreciated in Ethiopia and neighbouring countries for their effects as a stimulant with mild narcotic impact, resembling the effects of amphetamines. The shrub is a perennial that starts yielding substantial return after about 2-3 years. As a shrub, it only has limited use as a source of firewood or building material when cut down. It would appear that eucalyptus and chat do not

[7] They are Cheha (near Imdibir, Gurage), Kedida (in Kembata), Bule (near Dilla in Sidamo) and Boloso (about 30 km from Sodo).

[8] Ethiopia is a federal state, consisting of 9 Regions, with high degrees of independence. There are four 'large' regions in terms of land and population: Oromiya Region, Amhara Region, SNNP Region and Tigray Region.

[9] The planting of eucalyptus trees used to be largely confined to State owned plantations and community woodlots, but increasingly it is also grown on household farms (Jagger and Pender, 2001). Nevertheless, it also has proven negative externalities on crop production on nearby plots, and part for this reason the regional government of Tigray has even banned eucalyptus on land suitable for crop production, even though there is little or no evidence of enforcement of this ban. In the regions studied in this paper, no restrictions on its growing exist.

have similar sunk costs and long gestation periods as coffee; still, they are investments with medium-term horizon. Secure land rights with a reasonable time horizon are relevant for all these investments.

Collecting data showing variation in land rights is a challenge, because, with all land owned by the state, there is no difference in the legal (or *de jure*) right to land between households. However, given the history of recurring land redistribution, there is likely to be variation in the *perception* of land rights among households and plots. In line with other studies on land rights in Ethiopia (Deininger and Jin, 2006), we focus on self-reported perceptions of land rights. This presents at least two problems. First, as these are subjective perceptions, they do not necessarily directly relate to the actual land rights offered and enforced. However, since when researching the consequences of particular land rights in terms of investment and efficiency, it is perceived rights that will govern behaviour, this is not a serious problem in our context.[10] Secondly, collecting subjective data via survey data is particularly vulnerable to framing issues, such as whether the question asked has direct meaning in the context researched. Extensive and critical piloting provides the only solution, even if it means that information on theoretically meaningful concepts can only be collected via proxies.

Using (broadly) nationally representative data, Deininger and Jin (2006) collected data on a variety of dimensions of land rights in 2001. They find that most but not all people (91%) perceive that they can rent or sharecrop out the plots they are allocated, which is a right explicitly allowed for in the constitution. In contrast, virtually no-one (only 4 percent) perceives the right to sell, which is illegal, despite some reports that in some areas people had started engaging in land sales unofficially. Most interestingly for our purposes, about 9 percent of households expected a land redistribution to affect them in the next five years, while 27 percent expected no redistribution. The rest appear to have responded "don't know" – a rather high

[10] The reverse, constructing 'objective' land rights without considering the perception of these rights independently, is possibly more problematic. For example, in a study on the impact of land rights in China, a context rather similar to the Ethiopian case, Jacoby et al. (2002) focused exclusively on calibrating 'objective' risks of expropriation based on past history of expropriation, and link these to land-specific investments.

percentage that would create considerable missing data and sample selection problems in statistical analysis.

For our purposes, the concern that land may be taken away via redistribution would conceptually be close to the issue at hand. Our own field work experience is consistent with the apparent problems present in the data by Deininger and Jin (2006). First, probing for the perceived risk of expropriation in the next five years proved difficult; a high number of inconsistencies were found both during piloting and the actual survey. Reasons may have been that phrasing the issue in a negative sense (losing land), may have made it seem too sensitive within these communities; farmers may have been rather unwilling to express their fears or confidence. Asking these questions without a time frame of five years also proved difficult. The problems during piloting in probing about these risks of losing land led us not to include the questions in the 1997 survey, although for a more complete analysis we included these questions again in 1999, thereby accepting problems intrinsic to these measures. As they are only available for one year, they are only used for descriptive purposes, and not included in the core analysis below.

Probing for transfer rights in the form of sales or mortgaging rights proved difficult as well, with virtually all farmers offering the 'official' line that these transactions are banned, as in Deininger and Jin (2006). Similarly, little variation could be detected in perception of rental or sharecropping rights, which by 1997 appear to have been fully established. As a result, after much piloting, a decision was made to focus the survey on probing for the perception of the right to benefit from the land and to decide the destiny of the plot of land, leaving the nature of the transaction open (although the primary suggestion was bequests and intra-family transfers).[11] While these choices were highly dependent on the context in which the research took place, the added advantage of a focus on these control rights is that an open-ended time horizon was used, beyond five years. This appears helpful in investigating the impact of land rights on perennial crops, such as coffee, which require a long-term perspective, well beyond five year, since any newly planted trees would only offer a full harvest after about 8 years and continue to do so for several decades. With low life expectancy and

[11] The question asked was "are you able to pass on the plot to a family member or someone else?"

high risk morbidity, an inter-generational perspective would be required for investment.

These perceived land rights data were collected at the plot-level. Across these two rounds, we have data on 300 households, and about 1000 plots. Table 1 reports the perceptions at the household-level based on a plot-size weighted average, as well as land allocated to different trees and shrubs. It reveals 69 percent of the land was considered to have long-term land rights defined in this particular way in 1997. In 1999, this proportion decreased to about 56 percent. The difference across years is statistically significant.[12] During the same period, the percentage of land allocated to shrubs and trees was unchanged at about 30 percent, even though for specific crops significant change can be observed. Although we only have information from 1999, about 6 percent report that they expected to lose land in the next few years, but some expected to gain as well.

Table 1: Basic descriptives on land allocation and land rights (300 households)

	1997		1999	
Percentages	Mean	Standard Deviation	Mean	Standard Deviation
Share of land allocated to coffee	0.188	0.164	0.240	0.191
Share of land allocated to eucalyptus	0.070	0.131	0.038	0.123
Share of land allocated to chat	0.044	0.083	0.026	0.077
Share of land allocated to trees and shrubs	0.302	0.200	0.304	0.214
Perceived right to decide destiny of land?	0.691	0.448	0.557	0.480
Expect to lose land in next five years?	n.a.		0.060	0.238
Expect to gain land in next five years?	n.a.		0.027	0.161

Source: 300 households in 4 villages in SNNP Region, part of the Ethiopian Rural Household Survey, round 4 and 5. Data at the household level: share of land as percentages of cultivatable land across all plots. Land rights data are at the household level, weighted by plot size (based on plot-level dummy whether the plot has transfer/destiny rights), and measure the percentage of land with land rights per household. n.a. =not available.

The general decline in perceived rights hides that the unexpected land reform in Amhara region is likely to have induced households in these communities reassess their land rights in different directions, apparently with different implications for

[12] In Dercon and Krishnan (2007), these perceptions data are analyzed further for the entire sample, i.e. not restricted to the perennial crop areas, and further analysis on some variables collected also in 2004 is offered as well.

perennial crop decisions. Table 2 considers three groups of households: those that revised their perceived land rights land downwards (35 percent), those that revised them upwards (21 percent) and those that kept them unchanged (44 percent). The table reports the mean changes in the land allocated to perennial crops, and the significance of simple t-tests of differences in these means across groups. Overall, changes in land allocated to perennials and changes in perceived rights move as expected. There are general increases in land shares allocated to coffee in this period, but again they are higher for those who perceive improvements compared to those perceiving worsening rights. Similar consistency in the findings can be seen for eucalyptus and for chat. Many of these group means are significantly different from each other using simple t-tests. For comparison, we also report the changes in land allocated to crops between 1997 and 1999 for those reporting to expect to lose land after 1999. Even though the percentages involved in the latter group are small, they reduced substantially total land area allocated to all perennials, and to a significantly different extent compared to the group not expected to lose land, suggesting further consistency in the findings.

Table 2 Changes in perceived transfer rights and allocation to perennial crops 1997 to 1999 (n=300)

	Changes in total land share to perennial crops	Changes in the share of land allocated to coffee	Changes in the share of land allocated to eucalyptus	Changes in the share of land allocated to chat
Worsened rights (n=104)	-0.044	0.039	-0.057	-0.026
Similar rights (n=131)	0.017	0.049	-0.020	-0.013
Improved rights (n=65)	0.045	0.075	-0.014	-0.016
Testing difference in mean				
Lower vs Similar	**		**	*
Lower vs Higher	***	*	**	
Similar vs Higher				
No loss expected (n=282)	0.009	0.058	-0.033	-0.017
Loss expected (n=18)	-0.102	-0.050	-0.014	-0.038
Testing difference in mean				
Expect loss vs not expected	**	***		*

Note: Changes in transfer rights, comparing the plot size weighted perception of transfer rights in 1997 and 1999. Crop allocation is the changes in the percentage of land allocated to any perennial crop and for each of the perennial crops separately. Significance levels reported for t-tests of differences of means (assuming equal variance). ***=significant at 1 %; **=significant at 5% and *=significant at 10%. No loss expected versus loss expected refers to whether the household expected to lose land in the next five years in 1999, even though the changes tested refer to 1997 compared to 1999.

Table 2 is nevertheless not convincing evidence, since both perceptions and land allocation may have been shaped by the same observed or unobserved factors. Furthermore, farmers may have changed land allocation in order to achieve stronger land rights. To explore this further, table 3 offers some evidence of changes in perceptions by plot acquisition and specific household characteristics.

First, changes in perceptions are given by the mode of acquisition of each plot. Even though all land is state-owned, on average 73 percent of the land cultivated is inherited, meaning that it was acquired from the father, and that the household was allowed to keep it during the land reform and subsequently. About 9 percent was purchased, mainly before 1976.[13] About 11 percent of the land is directly allocated by the PA to the household, as part of the land reform in 1976, or subsequent re-allocations in the village. About 7 percent of land is sharecropped or rented.[14] These percentage changed somewhat between 1997 and 1999, largely because sharecropping had picked up again in this period.

Inherited land relative to allocated or sharecropped land may appear surprisingly high in the overall context of Ethiopia. In the full country-wide data set (of which the data in this paper are a sub-sample), inherited land only constitutes about a quarter of the land, while government allocated land is about 55 percent and sharecropped or rented land is most of the remainder (19 percent). These figures are not dissimilar to those found in other data sets (such Deininger and Jin, 2006). Permanent crop areas and the South of the country in general had a substantially different land tenure system before land reform in 1975, and land reform allowed many households in the South to cultivate land they were farming at the time and had inherited from their families, while in the more Northern regions (especially Amhara, Tigray and Oromiya) the traditional Rist system meant that large land owning families cultivated at times vast areas, and reform meant an effective transfer for many. If anything, this would suggest that the areas studied in this paper have enjoyed historically relatively more

[13] In a few rare instances, farmers told us of plots they had bought illegally in more recent years, in the expectation that land rights would be made permanent with further legal reforms.

[14] Land rental (against a cash payment) was virtually nil in this setting, so we will refer to this land as 'sharecropped land' in the rest of the paper. Sharecropping in this context involves land cultivated for relatively considerably length of time: the mean is about 6 years, with a maximum in the sample of a plot sharecropped for 37 years. This length of cultivation is nevertheless still on average much lower than for other plots, which have been cultivated for 26 years on average.

secure tenure, and thus this sub-sample provides a tougher test of the impact of tenure security.

Table 3 shows how perceptions changed by mode of acquisition. Households perceived a strong reduction in land rights for purchased plots, and somewhat less so for inherited and allocated plots. Respondents suggest that sharecropped plots have increased land rights, which may seem surprising but in light of possible land reform or land registration, they can be seen as consistent with past experience. In 1997, no-one reported to have transfer rights on sharecropped plots. However, by 1999, a quarter of the plots were categorized as having transfer rights. Since the main land reform of 1976 very often offered 'land to the tiller', i.e. sharecroppers were allocated the plots they were cultivating, this expectation may have emerged again, with the transfer rights of a quarter of the sharecropped plots expected (by the cultivator) to revert to the current cultivator.

Table 3: Percentage change in perceived rights by plot and household characteristics

	Change between 1997 and 1999
Inherited plot	-0.14 ***
Purchased plot	-0.32 ***
Allocated plot	-0.16 **
Sharecropped plot	+0.25 ***
Below median land holding	-0.09 **
Above median land holding	-0.18 ***
Below median livestock holding	-0.11 **
Above median livestock holding	-0.16 ***
Land lost in land re-allocation?	-0.27 ***
No land lost in re-allocation?	-0.09 **
Public office in PA?	-0.04
No public office in PA?	-0.14 ***

Note: land lost variable refers to whether the household lost land in the 1976 reform or in subsequent reallocations. Public office in PA refers to senior positions in the peasant association in 1995, the local government institution responsible for land allocation. Significance levels reported for t-tests of differences of means (assuming equal variance). ***=significant at 1 %; **=significant at 5% and *=significant at 10%.

Table 3 also reports changes in perceptions of rights to transfer land by some household characteristics, possibly linked to forms of capture in case land reform

were to occur. First, it appears that poor people (those with land or livestock below the median holding) perceive more slowly declining land rights in this period. Secondly, about 21 percent of the households in the sample had experienced some losses of land during earlier land re-allocation exercises (in 1976 or afterwards). By 1997, those that had lost land before reported somewhat stronger transfer rights, but after 1997, their confidence appears to have collapsed considerably, with a large decline relative to the other households. Finally, we have data on those households in the sample that have a member in an influential position in 1995 in the form of public office in the Peasant Association (such a Chairman, Treasurer or member of the committee responsible for land); one in twenty households report to have someone in this position.[15] This group experienced a decline in land rights that was not significantly different from zero, contrary to those without such connections. Overall, this is suggestive evidence of the expectation of land capture possibilities.

Overall, the table reflects heterogeneity in the changes in transfer rights, consistent with heterogeneous responses in a climate affected by an increased sense that a new period of land reform may happen. Even though we now know that no such land reform actually occurred after 1999, and only limited land re-allocation happened in the areas studied ever since, the change in perceived land transfer rights is likely to have caused changes in the long-run investment patterns in terms of perennial crop allocation. In the next section, we pins this down further.

4. Identification and Results

In this section, we quantify the impact of perceived limited land rights on land allocation decisions, exploiting the variation across households in the changes of transfer rights during the apparent land policy uncertainty in the study area after the land reform in Amhara region and the start of land registration in Tigray. Our variable of interest is land allocated to perennial crops, and panel data allow us to implement this analysis using household fixed effects, so that all effects are identified via

[15] We only have these data for 1995, before the first round of the data used in this paper. Nevertheless, this is after the current government came to power, suggesting political influence and allegiance in the current regime.

changes over time. The basic model simply regresses land allocation to these trees and shrubs on perceived transfer rights and household fixed effects.

The implication is that even though we are using subjective perceptions of land rights, fixed household level heterogeneity is being controlled for. This means that we control for a rather wide array of variables that may well affect planting decisions, such as agro-climatic conditions, land quality, general risk aversion, agronomic knowledge, and the overall policy and economic uncertainty that has affected Ethiopia for considerable length of time. However, a number of further controls are relevant. First, land allocation decisions are bound to be influenced by price movements, affecting profitability of different crops. To capture this, we will allow for different village fixed effects for each time period. As a consequence, we force all effects to be identified by within-village variation in changes in perceived land rights – a much more restrictive test biasing against finding significant impacts of land rights on crop allocation decisions. For example, it is a period of increased political tension in the country due to the conflict with Eritrea, so that land allocation may change not specifically due to perceived land policy changes but more general uncertainty. Time-varying village fixed effects, as they are equivalent here to a village-specific time-dummy, will control for this. Secondly, imperfect markets may result in the lack of separability in production from other household decisions, so that household characteristics may matter in terms land allocation decisions. Obviously, fixed household characteristics are included in the fixed effects. We explore the robustness of our results by including a set of time-varying household characteristics, such as family labour availability, wealth (in terms of livestock) and total land size. Note that due to the inclusion of household fixed effects, they are only identified to the extent that they are time-varying.

Clearly, this procedure would allow us to come up with a relationship between land rights and land allocation superior to standard cross-sectional analysis, as implemented in most research on Ethiopia. However, some concerns may remain, before causality can be convincingly established. Our analysis must also allow for

possible reverse causality (planting perennial crops causing land rights)[16] and more generally endogeneity (for example, decisions on land and perceptions of land rights may be driven by a third factor, such as particular changing attitudes or preferences, unobserved to the researcher). Even though some of the most obvious factors ('risk averse', 'pessimistic tendencies', 'general economic insecurity') are addressed via the household fixed effects and the time-varying community effects, the problem may still be relevant.

To allow a more robust causal interpretation of our findings, we use an instrumental variable approach. The policy uncertainty in terms of local implementation of the new land clauses in the constitution, given the lack of clear policy pronouncements in the region, but also in the wake of the rather unexpected land reform in Amhara region and the start of land registration in Tigray, provides an exogenous source of variation. If this were to have a homogenous impact on the households in our sample, then identification would still not be possible. However, the extent to which it affected households' expectations is bound to be heterogeneous, as the descriptive analysis in table 3 already showed. Some of the household characteristics reported in table 3 may well be candidates for suitable instruments, affecting changes in land allocation to particular crops only via changes in land rights perceptions.

We will explore using as instruments for *changing* perceptions of land rights over time: different modes of acquisition, a history of powerful positions in the Peasant Association (measured in 1995, before the first round of the data used here) and whether land was lost during previous land re-allocations. A first stage regression will therefore be specified including these variables, allowing for a *time-varying* coefficient, capturing the differential change in perception due to the land policy turmoil across households with different backgrounds and characteristics. It should be stressed again that this procedure does not depend on assuming that mode of acquisition, power or land reform history only has an impact on land allocation to trees and shrubs via land right perceptions. This would be erroneous, as land that has been inherited is possibly more likely to have trees on it, than land that has been allocated by the local authority. The point is that this procedure assumes more

[16] In his analysis on Ghana, Besley (1995) formally analyzes this, but finds no evidence consistent with this reverse causality. Deininger and Jin (2006) explicitly model this in the case of Ethiopia.

reasonably that any *change* in land allocated to coffee, chat or eucalyptus is only affected by the history of land reform, land acquisition and power in the village *via* the way these factors impact on the *change* in land rights perceptions in this period of relative turmoil in land policy. Below, the robustness of these assumptions for each of these factors is assessed further.

The general econometric model can be written as:

$$L_{it} = \alpha_i + \beta R_{it} + \gamma X_{it} + \delta V_i \otimes dum_{1999} + \varepsilon_{it} \quad (1)$$

$$R_{it} = \delta_i + \phi Z_i \otimes dum_{1999} + \varphi X_{it} + \nu X_{it} \otimes dum_{1999} + \eta V_i \otimes dum_{1999} + \theta_{it} \quad (2)$$

with L land allocation to coffee, chat and eucalyptus, R perceived land rights, X a set of time-varying household characteristics, α_i and δ_i household fixed effects, V_i a set of village dummies, dum_{1999} a dummy that is one if t=1999 and zero if t=1997. Z_i is a set of fixed household characteristics relevant for the impact of a changed land policy environment on land rights perceptions. Z_i and X_{it} include variable such as household land acquisition and land reform history, and power in the village committees relevant for land allocation, as well as labour, land and wealth characteristics of the household. A number of interactions between Z_i and X_{it} were also explored, and the results reflect this.

Table 4 reports first the results for (2), the first stage regression explaining transfer rights. Perceived transfer rights are measured as before as the plot size weighted average rights per household, with one signifying full land transfer rights and zero no transfer rights. Other regressors, and excluded from the 2nd stage regression, are those variables that may well have shaped perceptions of transfer rights, and only affected crop allocation decisions via these transfer rights. As these are fixed characteristics, only the effect interacted with the time dummy for 1999 is included, reflecting the heterogeneous impact of the land policy uncertainty post-1997. The results show strong effects at the village level: relative to the base (the PA in the district of Garagodo), the other villages experienced a strongly negative impact on land transfer rights. Among the modes of acquisition (relative to the base, land allocated by the government), the shift in how sharecropped land affects transfer rights is strongly

significant.[17] While in 1997, the share of sharecropped land has the expected negative effect, the extent of its negative effect is strongly reduced (by two-thirds) by 1999. We have to be cautious in terms of interpretation: it may reflect the fact that households may expect to be able to retain sharecropped plots in the long-run, where land reform or land registration to take place. However, (and contrary to table 3), the variable here is a household level variable, referring to the share of land sharecropped. The strong effects may then also reflect that having sharecropped land may provide a clear signal that the household is facing land scarcity and therefore it may have considered its *own* land (whether allocated, purchased or inherited) less at risk relative to other households, in this time of increased policy uncertainty. This interpretation also opens the door for strategic behaviour, whereby households try to engage more in sharecropping during the period of policy turmoil, in order to signal a position of relative land shortage if land reform were to take place. This will be explored below further.[18]

[17] As mentioned in section 3, there were some changes in the reported percentages of land by mode of acquisition between 1997 and 1999. First, sharecropped land increased further, as sharecropping and rental throughout the country became legal and more widespread. There is also an increase in the percentage purchased plots, which could be genuine but is more likely the consequence of some households feeling more secure in reporting this means of land. The data support the latter interpretation, as while for the other sources of land (allocated or inherited), the number of years plots have been cultivated on average, increased by about 2 years between 1997 and 1999, it actually increased by more than 5 years between these two rounds of data collection, suggesting that households have reported not only different plots as being purchased in 1999 as compared to 1997, but also plots that were acquired well before 1997 and should have been reported as such in 1999. As in none of the regressions below, the share of land purchased is significant, this measurement interpretation may well be correct.

[18] It may also do so in order to acquire the land in subsequent land reform, but it is unclear why a land owner would allow this, unless they have very different assessments of the perceived risks involved.

Table 4 Explaining perceived transfer rights 1997-99 (n=300). OLS with household fixed effects

	General model		Parsimonious model	
	Coefficient	p-value	Coefficient	p-value
Constant*1999	0.341	0.017	0.356	0.000
Durame*1999	-0.762	0.000	-0.788	0.000
Dilla*1999	-0.775	0.000	-0.768	0.000
Cheha*1999	-0.615	0.000	-0.578	0.000
Share inherited land	-0.045	0.750		
Share inherited land*1999	0.097	0.478		
Share purchased land	-0.174	0.490		
Share purchased land*1999	0.111	0.652		
Share sharecropped land	-1.170	0.001	-1.152	0.001
Share sharecropped land*1999	0.790	0.021	0.762	0.015
Land lost *1999	-0.079	0.410		
High post in PA*1999	0.712	0.026	0.800	0.008
Low land holding*1999	-0.085	0.297		
PA high post*land lost*1999	0.153	0.668		
PA high post*low land*1999	-0.816	0.023	-0.906	0.010
R-Squared	0.2886		0.2808	
Partial R-Squared excluded instruments (modes of acquisition, land lost, high post in PA and interactions)	0.1424		0.1313	

Note: OLS regression with household fixed effects. Base groups are: share of land allocated by government and PA in Garagodo. '*' refers to interaction term of both variables. '1999' is a dummy for 1999.

Having lost land in previous land allocation or having low or high land holdings does not appear to contribute to explaining transfer rights. However, there is strong and significant impact by 1999 of having held an influential post in the PA before 1997, increasing the measure of transfer rights by 0.71.[19] The most straightforward interpretation is that given that they would be the implementing agents in any new land re-allocation that appeared plausible after the Amhara land reform, their own perception of their land rights may well have been improving considerably. Interestingly, this effect is only present for those with influential posts that also have

[19] The use of information from 1995 on holding posts in the PA has the advantage of not being able to be considered liable to endogeneity: for example, those with improving transfer rights between 1997 and 1999 for other reasons being able to get political influence and join the committee by 1999.

considerable (above the median) land holding – since for the low land holding group the interaction effect is in size entirely neutralizing the impact on transfer rights of having a high position (0.712-0.816). Overall, these effects are suggestive of changes in perceived land rights driven by certain groups (share croppers, and those with a high position in the PA) expecting opportunities of capture if and when a new land reform were to occur.

The partial R-squared of the excluded instruments (modes of acquisition, history of land losses and having a high position in the PA) is relatively high. However, a substantial number of the excluded instruments are insignificant and therefore creating inefficiencies that may well affect the diagnostics on the instruments in the second stage regression. In the rest of the analysis, a parsimonious specification as reported in table 4 is used focusing on the significant land acquisition variables, the variable related to power in the PA and relevant interactions. Still, it should be emphasized that the estimated coefficients in the 2nd stage regression were virtually unaffected in size and significance when different subsets of the instruments were used (as long as land acquisition and/or power variables remained as excluded instruments, as will be shown below).

Table 5 reports the regressions on the impact of transfer rights on land allocation to perennial crops. The dependent variable is the share of land allocated to perennial crops (shrubs and trees, including coffee, eucalyptus and chat). Only 1 percent of households has no perennial crops in this period, no-one has all land planted with these crops and the highest average share in this period is 78 percent, so a linear model appears appropriate. Again, all regressions control for household fixed effects, and village-level time varying fixed effects. The first column reports the basic fixed effects model, without instrumenting or further controls beyond time-varying community fixed effects. Column (2) gives the 2SLS results (using the parsimonious set of instruments), including a number of diagnostics on the IV-procedure. We report the Cragg-Donald test of overall identification (which is χ^2 distributed under null of an underidentified regression), the Sargan overidentification test statistic and the Cragg-Donald weak instrument test statistic, which in 2SLS and with one endogenous variable equates to the F-statistic of the excluded instruments, even though the

relevant critical variables to reject weak instruments are more demanding. We use the critical values as calculated by Stock and Yugo (2004).

Table 5 Impact of transfer rights on land allocation to perennial crops 1997-99 (n=300)

	OLS (1)		2SLS (2)		2SLS (3)		2SLS (4)	
	coeff	p-value	coeff	p-value	coeff	p-value	Coeff	p-value
Transfer rights?	0.045	0.02	0.140	0.01	0.115	0.04	0.132	0.02
Share of land sharecropped							-0.172	0.01
Cragg-Donald identification χ^2			47.49	0.00	41.54	0.00	45.36	0.00
Sargan Overidentification χ^2			13.19	0.11	7.93	0.09	5.36	0.15
C-D weak instruments F			5.07		8.09		11.04	

Note: All models control for household fixed effects and time-varying community fixed effects. P-values report significance levels for two-sided tests of equality of the coefficient to zero.
Column (1) is linear fixed effects model assuming transfer rights exogenous; (2) is 2SLS fixed effects regression based on parsimonious version of first stage regression with modes of acquisition and position in PA, with time interactions and land size interactions as in table 4, column (2); (3) is 2SLS a fixed effects regression based on the parsimonious version of first stage regression, but using the share of land sharecropped for at least 2 years as an instrument, rather than any sharecropped land; (4) is 2SLS a fixed effects regression based on the parsimonious version of first stage regression, but not treating the share of land sharecropped as an excluded regressor.

The first column reports the OLS results, i.e. treating transfer rights as exogenous. We find that a household with full perceived transfer rights allocates 4.5 percentage points more land to perennial crops than a household that perceives to have no transfer rights (which is about 15 percent of the mean allocation of land to perennial crops which was 30 percent of total land in 1999).[20] The second regression reports the 2SLS regression based on a parsimonious 1st stage model as in table 4. As we can see, the Cragg-Donald identification tests suggests that the null of underidentification can be rejected, while the Sargan tests suggests, albeit at 11 percent only, that the regressors are exogenous. The Cragg-Donald weak instruments test (equivalent to the F of the joint significance of the excluded instruments, F(9, 288)) has a value of 5.07, which is below the Stock-Staiger benchmark of 10, but passing the (weakest of the) critical values reported by Stock and Yogo (2004) (with one endogenous variable, a 5 percent significance level, and a maximal desired bias of 0.30 of the IV estimator relative to OLS). However, we doubt to be faced with a true weak instrument problem. For example, since with one endogenous variable, one instrument would actually be

[20] Note that the time-varying community fixed effects were highly significant in all regressions, suggesting that relative price changes and other community-wide effects explained the changes in perennial crop allocation beyond the land rights issue on which the paper focuses.

enough, so restricting the set further to only contain the variables related to sharecropped land (dropping the variables related to the position in the PA and its interactions), the Cragg-Donald statistic reaches 12.22, comfortably passing the critical values with a maximal bias of 0.10, as well as all other diagnostics, while the coefficient on transfer rights remains significant at 1 percent, albeit somewhat larger (0.20).

Column (2) finds a coefficient on transfer rights of about 3 times higher (0.14) than in column (1), suggesting that moving from no land transfer rights to full rights would be equivalent to allocating 14 percentage points more land to perennial crops – a 46 percent increase. Before expanding on its implications, it is necessary to ensure that these results are robust. First, the regression does not control for other time-varying household characteristics that may affect planting decisions. Given imperfect factor markets, the household's own supply of labour, total land size and liquid wealth may be constraining factors in land allocation. However, in all regressions performed, we found that introducing these factors in the regressions showed that they were all individually and jointly insignificant (p-value=0.90), so they are not being reported. Note that this does not mean that factor markets are perfect, but rather, given that household fixed effects are being used, that the time-varying component in these characteristics does not appear to affect planting decisions over time in this relatively short period.

Secondly, there may be good reasons to use the share of sharecropped land, allowing for a time-varying coefficient, as instruments to explain transfer rights and their changes in this period: in particular that the impact of the emerging prospect of land reform after 1997 may be different dependent on the extent to which the household engages in sharecropping. However, it may also have opened the door for strategic behaviour. In particular, if sharecroppers have a better chance of being able to keep their other plots of land during land reform, there would be incentives to try to engage in sharecropping in this period. The data may well be consistent with this. In general, sharecroppers have relatively long leases. On average in the sample, sharecroppers have held on the current plot for about 6 years. In 1997, about 20 percent of the sharecropped land was only acquired in the last 2 years. In 1999, sharecropping had increased with just over 2 percent more land being cultivated under sharecropping.

One likely explanation is that before 1997, sharecropping was in fact not legal, and only became legal when the new constitution was adopted. Still, the fact that by 1999, about 43 percent of the sharecropped land was leased in the last 2 years may also be consistent with this strategic behaviour. A key issue would then be that sharecropping may be a joint (and endogenous) decision with all other land allocation decisions, including related to allocating land to perennial crops, so that it would not be a legitimate instrument. To address this, we checked the robustness of the results if a distinction is made between 'recent' sharecropped land (up to 2 years) and land acquired as part of sharecropping more than 2 years ago. In the regression, we used then only land acquired more than 2 years ago (i.e. before the new constitution and subsequent policy uncertainty period for 1999), so that no land acquired for sharecropping post 1997 is included as an instrument.

Column (3) reports these results. In the first stage regression, the results were very close to those reported in table 3 (with the land rights perceptions linked to sharecropped land for more than two years significantly and substantially different in 1999 compared to 1997), while transfer rights were found to be significant in the 2nd stage regression. The Sargan test is passed at (only) 9 percent, but the Cragg-Donald weak instrument test is passed at 5 percent when allowing a 15 percent maximal bias. The coefficient on transfer rights is strongly significant and slightly smaller at 0.115. Overall, this suggests that the results are robust to the possibility of strategic behaviour regarding sharecropping.

Nevertheless, one may object to the use of sharecropped land altogether as an instrument. In particular, for all other plots (inherited, allocated and purchased), the farmer is the only relevant decision maker: he/she decides what to plant. However, this may be different for sharecropped land, irrespective of perceived land rights. For example, the cultivator may need to consult the owner and agree what crops to grow. As a consequence, to understand the allocation to perennial crops, it matters how much of the land is sharecropped relative to other types of land, irrespective of any perceived land rights. In other words, it may then not be a suitable excluded instrument. To account for this, we included the share of land sharecropped as an independent variable in the second stage regression. Column (4) reports these results. Controlling for transfer rights, sharecropped land is indeed associated with a lower

share planted with perennial crops. The coefficient of transfer rights remains very similar to before, at 0.132, and significant. In other words, even when dropping sharecropped land as an excluded instrumental variable, it does not affect the underlying conclusions: transfer rights matter. The diagnostic tests show in fact that the remaining instruments perform even better, with, for the Cragg-Donald weak identification test, the maximal bias reduced to about 10 percent given a 5 percent significance level. Note that the reported regression still excluded the interaction term of sharecropped land with the 1999 time dummy from the 2nd stage regression (since there is no reason for the impact of sharecropped land on crop decisions, controlling for transfer rights, to be *different* in 1999 compared to 1997). To check further robustness, this interaction term was also dropped as an excluded instrument (and sharecropping and its interaction were entered in the 2nd stage regression). We find robust results: the coefficient on transfer rights remains significant at 2 percent with a value of 0.138, while all the diagnostic tests for the instruments are passed at least 5 percent, with the Cragg-Donald weak identification statistic becoming even 12.16. An alternative route to check for robustness is to drop *all* plots that are sharecropped from the analysis, so the entire analysis is in terms of own land and the transfer rights related to this land (with own land acquired via local government allocation, inherited or purchased). Again, the results are very robust and virtually identical, with transfer rights strongly significant, and identified via whether the household has held an important position in the PA (and the relevant interactions as in table 3). The coefficient on transfer rights is 0.125.[21] In other words, we do not require an argument based on using sharecropped land as an instrument, since identifying transfer rights via local political economy variables, is shown to be statistically convincing, and yields a clear and robust causal link between transfer rights and land allocation for perennial crops.

Is there evidence of planting perennial crops in order to achieve better land rights? A comparison between the OLS and the 2SLS results can shed light on this, and offers evidence not consistent with such behaviour. In particular, the 2SLS estimates are higher than the OLS estimates, suggesting a missing variable in the OLS model, positively correlated with transfer rights but negatively with allocating land to

[21] The Cragg-Donald weak identification F-statistic was 14.7, and the other tests similarly did suggest appropriate and relevant instruments.

perennial crops. If planting were to occur to achieve transfer rights, then the 2SLS effects would have been expected to be smaller. The increase of the coefficient is nevertheless consistent with measurement error, causing attenuation bias in the OLS.[22]

How should we interpret the size of this effect? By 1999, on average, households report to have transfer rights on about 56 percent of their land, and about 93 percent of land was not sharecropped. Suppose farmers would trust that they could determine the long-term use of all the land they own (whether inherited, purchased or allocated), including determine that someone else could benefit so that they have full transfer rights, then on average perceived transfer rights would move from 56 percent to 93 percent (since they should have no transfer rights on land they cultivate in the form of a sharecropping or rental arrangement). Using the results from equation (4), and moving transfer rights perception to 93 percent, an increase by 37 percentage points, would result in about 5 percentage points higher share of land allocated to perennial crops, or an increase by 16 percent in the total land allocated to perennial crops.

It is possible to repeat this analysis for specific crops as well. However, while 99 percent of all farmers in the sample grow some perennial crops, not all farmers grow all three, possibly creating an inference problem making a linear model unsuitable. Most farmers (96 percent) grow coffee in this period, so the problem is unlikely to be relevant in this case, but only about 31 grow chat and 39 grow eucalyptus, requiring a non-linear model, such a censored fixed effects model, for example a Least Absolute Deviation Tobit Model (Powell 1986). Given that coffee dominates perennial crops, it is unlikely that we gain much more insight from going this route in this case for the other crops. Table 6 offers the results for the identical regressions as in table 5, but this time focusing on the share of land allocated to coffee.

[22] Note that this is a similar result and interpretation as in Besley (1995).

Table 6 Impact of transfer rights on land allocation to coffee trees 1997-99 (n=300)

	OLS (1)		2SLS (2)		2SLS (3)		2SLS (4)	
	coeff	p-value	coeff	p-value	coeff	p-value	Coeff	p-value
Transfer rights?	0.031	0.06	0.178	0.00	0.160	0.00	0.170	0.00
Share of land sharecropped							-0.131	0.03
Cragg-Donald identification χ^2			44.09	0.00	38.91	0.00	42.24	0.00
Sargan Overidentification χ^2			11.76	0.16	8.92	0.06	5.30	0.15
C-D weak instruments F			5.07		8.09		11.04	

Note: All models control for household fixed effects and time-varying community fixed effects. P-values report significance levels for two-sided tests of equality of the coefficient to zero.
Column (1) is linear fixed effects model assuming transfer rights exogenous; (2) is 2SLS fixed effects regression based on parsimonious version of first stage regression with modes of acquisition and position in PA, with time interactions and land size interactions as in table 4, column (2); (3) is 2SLS fixed effects regression based on parsimonious version of first stage regression, but using the share of land sharecropped for at least 2 years as an instrument, rather than any sharecropped land; (4) is 2SLS fixed effects regression based on parsimonious version of first stage regression, but not treating the share of land sharecropped as an excluded regressor.

The results are very similar. For example, based on the model in column (4), focusing on the share of land allocated to coffee found rather similar effects as allocation to any trees and shrubs, with all diagnostics convincingly supporting the use of the instruments. Transfer rights, controlling for land as part of a sharecropping arrangement, affect the share of land allocated to coffee, with a coefficient of 0.17. This implies that if transfer rights were improved to 93 percent from its 1999 level, this would imply that the total land area allocated to coffee would increase by about 22 percent. With coffee the most important source of export earnings, this would be very substantial for the Ethiopian economy.

5. Conclusions

This paper used household panel data set for the period 1997-99 on land rights and land allocation to different crops, including coffee, to investigate the impact of limited land rights on investments in coffee, chat and eucalyptus. The period is a time of changing policy context. Even though land has remained state owned throughout, the first year of the analysis is just after a new constitution promised, in contrast to earlier land law frameworks, long-term tenure rights with possibility of transfers at least to offspring, providing better incentives for long-term investments without a threat of

repeated land reform. However, in late 1997 and in 1998, in one region, Amhara, a rather unexpected large new period of land reform took place while in Tigray, land registration started. In the region from which the data stemmed, SNNP State, a lack of clarity on the future direction of land policy, including on whether new land reforms were to take place, affected perceived land rights. We find that the perception of one particular aspect of land rights, the perceived right to transfer to relatives or others, changed considerably in this period, but with considerable heterogeneity. For example, and seemingly opportunistically, it appeared that some of those with relatively powerful positions in the Peasant Associations or those currently sharecropping perceived to have stronger perceived transfer rights than before, possibly because they may well have gained during new periods of land reallocation, while others felt that their transfer rights had weakened.

Exploiting the variation caused by the policy turmoil, interacted with local political economy indicators and modes of acquisition as identifying instruments for changes in land rights perceptions, we find a strong causal link between perceived land rights and land allocated to perennial crops, with meaningful economic meaning. For example, offering full transfer rights to all 'own' land cultivated (whether inherited, purchased or allocated by the government) is predicted to increase the total land area allocated to coffee to increase by about 22 percent.

The results do not simply suggest that land titling or full privatization is necessary to provide these incentives; other means of offering long-term and transferable tenure rights may be able to offer sufficient incentives. What matters, nevertheless, is the credibility of any property and land tenure right system. During the period investigated, our evidence shows that the institutions of land rights do not offer this credible long-term perspective, whatever general policy statements were made or even whatever is implied by the constitution regarding these rights. The deficiencies in land and property rights matter for efficiency, investment and growth, and this paper offers conclusive evidence from one of the poorest countries in the world.

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