



Demand for second-stage land certification in Ethiopia: Evidence from household panel data



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ABSTRACT

Ethiopia has implemented one of the largest, fastest and least expensive land registration and certification reforms in Africa. While there is evidence that this 'first-stage' land registration has had positive effects in terms of increased investment, land productivity and land rental market activities, the government is now piloting another round of land registration and certification that involves technically advanced land survey methods and computer registration. This 'second-stage' land registration differs from the registration system employed in the first round that used field markings in conjunction with neighbors' recollections to identify plot borders. We use panel data from 600 households in southern Ethiopia to investigate household perceptions of and demand for such a new registration and certification. Our study revealed relatively low demand and willingness-to-pay (WTP) for second-stage certificates. The WTP also decreases significantly from 2007 to 2012. Our findings indicate that farmers do not believe that the second-stage certificate enhances tenure security relative to the first-stage certificate except in instances in which first-stage certification was poorly implemented. The demand for second-stage certificates appears to come primarily from governmental authorities, as it can provide a better basis for land administration and produce accessible public documentation of land-related affairs.

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Introduction

Ethiopia has implemented one of the largest, fastest and least expensive land registration and certification reforms in Africa (Deininger et al., 2008). While there is some variation in how land registration and certification has been implemented across, and even within, regions in Ethiopia, the broad-scale first-stage land registration and certification involved the registration and demarcation of land plots using simple local technologies that required little training. The main sources for determining plot boundaries were field markings, in conjunction with the memories of the neighbors whose farm plots border those owned by the households in question. Measuring tapes and ropes were used to measure the farm plots. While the initial cost of this registration was extremely low (approximately 1 US\$ per farm plot or less), its impact in improving tenure security has been significant, as evidenced by increased investment, land productivity and land rental market activity (Deininger et al., 2008, 2011; Holden et al., 2009, 2011a; Bezabih et al., 2012).

However, the first-stage certification had limitations with respect to the maintenance and updating of land registration records. Ethiopia has begun piloting and introducing a second-stage land registration and certification in selected districts in the highland regions. The new registration and certification system involves registering the precise geographical locations and sizes of individual farm plots using technologies such as GPS, satellite imagery or orthography. Farmers receive plot-level certificates with maps rather than a household-level certificate. The aim is that the second-stage land registration and certification effort will enhance tenure security, the maintenance and updating of records, and land management (MOA, 2013b).

The second-stage land registration and certification will likely be substantially more costly than the first-stage certification and will also require much longer to complete. If the primary purpose of the second-stage certificate is to increase tenure security for farmers, it is important to explore their perceptions of, interest in and willingness-to-pay (WTP) for such plot-level certificates that include maps. During the first-stage certification, farmers typically paid a fee to receive their certificates. If planners expect that part of the costs of the second-stage certification will also be recouped through such a fee, given the high budgetary costs associated with this project, the farmers' WTP should be estimated. We use data from 600 households in Oromia region and

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Southern Nations, Nationalities and Peoples (SNNP) region to investigate household perceptions of and WTP for such a second-stage certificate. We assessed the WTP in monetary terms and using the number of labor-days that households were willing to supply in exchange for the second-stage land certificates. Our data cover substantial variation in agro-ecological conditions, market access and urban expansion. The household panel data from 2007 and 2012 allow us to assess how the demand for second-stage certificates has changed over time in our study areas. The findings should be highly relevant for the design of future land administration reforms in Ethiopia and elsewhere, e.g., to identify the types of areas to target first and whether the recipients are willing to pay a large share of the costs of the second-stage reform.

The analyses reveal limited interest in the second-stage certificate, especially compared to the first-stage certificate. Both the general interest in second-stage certificates and the amounts that interested households are willing to pay for such a certificate declined from 2007 to 2012. Our econometric analyses indicate that households that participated in public meetings concerning the first-stage registration and certification and households that experienced land disputes before the first-stage registration are more likely to show interest in a second-stage certificate. However, male headed households for which only the name of the husband appears on the first-stage certificate and households that had sufficient witnesses for border demarcation exhibit low interest in a new certificate. Households that have larger land holdings have lower WTP.

Literature review

Land registration and land titling

A land title is a written document providing proof of ownership, and this ownership is also recorded in a publicly recognized central land registry. Modern land titles are associated with high quality and accurate maps and coordinates that can be used to verify the exact spatial boundaries of such property. Upgrading land-titling systems has been a gradual process in most countries due to the costly and time-consuming nature of the work. In many countries, this has been a demand-based process in which those demanding the title have had to pay for the costs. Such procedures have often been associated with slow bureaucratic processes and numerous steps that have created opportunities for corruption, rent-seeking and “elite capture”. They have also created an unlevelled playing field where the poor and less connected have typically been marginalized. Many have therefore become skeptical of formalizing land rights through land titling in developing countries contexts such as in Africa. Land titling has been perceived as a threat to customary land rights (Benjaminsen et al., 2009; Cotula et al., 2004). Some have challenged the very claim that land registration and titling have the potential to improve production in poor countries, particularly in Africa (Atwood, 1990; Bromley, 2008). They argue that the premises on which this claim is based, such as land registration providing small farmers with access to credit or encouraging them to invest in their land, are themselves based on a simplistic model of rural land rights (Atwood, 1990) and have not been supported by strong empirical evidence (Bromley, 2008).

Feder and Nishio (1999) reviewed successful land registration and titling programs in Asia and Latin America and observed positive effects on investment, credit access, land productivity and land value. Such effects were found in Thailand, The Philippines (urban areas), Indonesia (urban areas), Honduras, Paraguay, and Peru. A study in rural India (Pender and Kerr, 1994) found no significant positive effects on investment or credit access. Studies on Africa (Ghana, Kenya and Rwanda) (Migot-Adholla et al., 1991) found that

land registration had no significant impact on land productivity, land investment or credit access. Jacoby and Minten (2007) also found no significant effects of land titling in Madagascar. Besley (1995), however, found a positive effect of new land rights on investment in trees in one area in Ghana. Feder and Nishio (1999) emphasize that numerous prerequisites have to be in place before the positive impacts of land registration can be achieved, including weaknesses in existing formal or informal tenure systems that therefore do not provide the necessary tenure security that is essential for investment. Positive impacts on access to credit markets and land markets will not occur unless such markets exist. Lending institutions cannot use land as collateral unless there is a well-functioning land sales market. Land laws and land administrations capable of implementing the laws and land registration and titling systems in a transparent and reliable manner and with clear conflict resolution systems are essential. There is a risk that the introduction of a modern registry system to replace a traditional tenure system could result in land grabbing (“elite capture”) by better informed, more influential and wealthier stakeholders. There are fears that the effect could increase landlessness and result in the formalization of land rights having negative effects on the poor. Local participation in the process and simple, efficient and transparent procedures are also important for creating popular demand and success.

Both customary and statutory tenure systems have tended to exhibit a gender bias in favor of men over women. Land titles have typically been allocated to the head of the household, who in most cases is a man. There have been numerous cases in which formalizing land rights through land titling has undermined customary land rights, which have been ignored or disrespected.

Costs of formalizing land rights

The high cost of land titling has forced many countries to establish a system of land titling on demand, and this has made land titles costlier and only available to the wealthy (Benjaminsen et al., 2009; Besley and Burgess, 2000; Cotula et al., 2004; Deininger, 2003). Therefore, there is substantial need for more low-cost, broad-scale and egalitarian systems for land registration in low-income countries. In Honduras, the cost of land titling was estimated at 600 US\$ per title (Lopez, 1996), while in Madagascar it has been estimated at 150 US\$ per household under the conventional system of titling on demand (Jacoby and Minten, 2007). Burns et al. (2007) assessed the variation in costs across numerous countries and found average costs of between 20 and 55 US\$ per parcel. Ayalew et al. (2011) provide an estimate of the costs of hiring private surveyors for titling on demand for urban land owners in Dar es Salaam, Tanzania of approximately 350 US\$. The Ethiopian first-stage land registration and certification system lies at the other extreme, where the cost of registration and certification was estimated to be approximately 1 US\$ per farm plot or 3.5 US\$ per household (Deininger et al., 2008).

In assessing the optimal quality level in a land formalization scheme, it is important to assess the marginal benefits versus marginal costs of increasing the formalization quality of land rights. As Deininger and Feder (2009) note, there are many examples of supply-driven land formalization programs that were implemented based on lobbying by survey professionals and lead to excessively high technical standards relative to the demand for such formalization and the actual land values. Such programs may even have created competition with traditional tenure systems and undermined the latter. This may also explain why some conventional land-titling programs such as in Kenya and Madagascar have not resulted in any significant impacts (Migot-Adholla et al., 1991; Jacoby and Minten, 2007) and others have resulted in speculative behavior that has created conflicts (Benjaminsen et al., 2009). The

degree of precision in plot boundary identification for mapping purposes has a strong influence on the costs of land rights formalization. The costs of technical formalization increase exponentially in the precision level (Deininger and Feder, 2009). The Ethiopian first-stage registration was able to achieve high precision at a very low cost without mapping by adopting field demarcation and using neighbors as witnesses.

The trend in low-income countries is toward intermediate solutions to the classical land-titling approach by unbundling this “one-size-fits-all” approach to specifying land rights by using low-cost, broad-scale registration with high local participation and/or simpler, less costly and less precise technologies, issuing simpler certificates without maps, etc. Technological advances facilitate more low-cost technical approaches that utilize GPS, satellite images, computers, and new software to generate maps and registry systems at a much lower cost than the traditional approach to land titling. Centralized and computerized mapping and registry systems are easier to maintain and update. Such “intermediate” systems have recently been introduced in a number of countries, including at a broad scale in Rwanda and at the pilot level in Ethiopia and Tanzania. The least expensive of these methods imply certain sacrifices in the accuracy of the identification of plot boundaries, as the accuracy of the low-cost GPS systems that are commonly used may only be at the 5–10 m level. Nevertheless, this resolution may be sufficient for mapping purposes. However, such maps cannot be used as a basis for resolving plot boundary disputes related to small-scale encroachment by neighbors. The latest low-cost approaches using satellite images can increase precision to the range of to 1–2 m and may therefore reduce the potential risk of border disputes due to inaccuracy.

Review of land registration and certification in Ethiopia

We will begin this section by defining the term *land registration* as used in this paper. Land registration is a process of locating, measuring and registering farm plots belonging to rural farm households in Ethiopia. For individual households, certificates are not issued when their land is registered. Typically, certificates are issued once all village (*kebele*) land has been registered and verified. In addition to the inevitable lag between registration and certification, border and inheritance disputes may also delay the issuance of certificates for lands that have been registered.

First-stage land registration and certification

Land registration in Ethiopia began with a registration program in Tigray in 1998 followed by one in the Amhara region in 2002. The other two highland regions, Oromia and the Southern Nations Nationalities and Peoples (SNNP), initiated registration in 2004. According to the Rural Land Use Directorate at the Ministry of Agriculture, more than 90% of farming households in these regions received their land certificates through the first-stage registration (MOA, 2013a).

Attributes, strengths and weaknesses

Main Attributes

The following are the main attributes of Ethiopia's low-cost first-stage land registration and certification scheme:

- Broad-scale registration: Communities were registered in a single, sweeping exercise within a short period of time. Approximately 6 million households and 20 million plots were registered and certified within a few years (Deininger et al., 2008).
- Participatory registration process: There was high degree of involvement by locals in the identification and demarcation of plot boundaries, with neighbors serving as witnesses.

- Registration was performed using simple, user-friendly technology: Ropes were used for plot measurement, and simple, handwritten forms were employed to record information. Registry books with information on households are maintained at the community and district levels.
- The certificates given to individual households include: Information on the plots belonging to these households, name (and photo of household head and other household members in some regions), location name, plot size, land quality, and the names of neighbors for each plot.

Strengths.

- No need for skilled surveyors: Existing or temporarily hired staff with only short-term training registered the land.
- Low cost registration and certification.
- Less time was required to register millions of farm plots relative to technically demanding registration.
- Transparency was achieved through broad participation.
- The conflict resolution system builds on existing systems through the use of local conflict mediators and social courts and is supplemented with newly established local Land Administrative Committees (there is variation across regions and over time).

Weaknesses.

- Maintenance of records: The registry books are difficult to update in the event of land inheritances, gifts or divisions due to divorce.
- Households, but not plots, have unique identification numbers.
- The certificate does not contain maps of the farm plots.
- Accessing information for the purpose of land administration and policy analysis is difficult, as data registration is paper-based and not easily available.

Deininger et al. (2008) provided an overview of the Ethiopian low-cost approach. In a survey of 2315 households, they asked about the willingness to pay (WTP) for lost certificate to obtain information on households' valuations of the certificates. The WTP was highest in the Oromia region (mean 22 EB¹), followed by Amhara (mean 9 EB), SNNP (mean 7 EB) and Tigray (mean 5 EB). Based on existing registration practices in Amhara, they estimated a first-registration cost of 30 EB per household and 8.3 EB per plot, indicating that even in the first-stage registration system, the full cost may not be recovered through registration fees.

Impacts of the first-stage land registration and certification in Ethiopia

A number of studies have investigated the impacts of this low-cost land registration and certification process in Ethiopia. Holden et al. (2009) provide evidence of the investment and land productivity effects of land registration and certification in the Tigray region. They found evidence of significant and positive investment impacts on tree planting and the maintenance of soil conservation structures. Land productivity was found to be approximately 40% higher on plots with certificates than on plots without certificates. Holden et al. (2011a) found that land certification enhanced tenure security, the willingness to rent out land and the amounts of land rented out by landlord households in the Tigray region, especially for female-headed landlord households. Holden and Ghebru (2013) investigated this issue further and found that productivity on rented-out land has improved to a greater extent on plots rented out by female landlords than those owned by male landlords. They also found that welfare improvements, measured as real per adult equivalent consumption expenditures, increased

¹ EB-Birr, the Ethiopian currency. Current exchange rate, 1 USD ≈ 18.70.

significantly in duration of land certificate ownership, particularly for female certificate holders.

Deininger et al. (2011) observed similar early impacts on tenure security, land renting and investment in the Amhara region of Ethiopia but did not carefully investigate the gender dimensions. Bezabih et al. (2012) employed the same data from the Amhara region and found a stronger productivity impact of certification on rented land, and this impact was the most substantial for female owners.

Holden and Tefera (2008) assessed the early impacts of joint first-stage land certification in southern Ethiopia (5 districts in the Oromia and SNNP regions). For male heads of households, one can discern two effects: (a) a positive effect of registration and certification in the form of enhanced tenure security for the household and (b) a negative effect for the male head in the form of reduced intra-household control over the land if the joint certification enhances women's positions and land rights within households. Their study revealed that the large majority of male heads of households perceived there to be a net positive effect from the process and therefore welcomed the joint land certification.

Holden et al. (2011b) investigated the impact on land disputes, particularly that on land border disputes in Tigray, using a sample of 405 local conflict mediators from 85 villages. The local conflict mediators perceived land border disputes to be among the most difficult disputes to mediate. Of the mediators surveyed, 68% believed that such conflicts had declined after the registration and certification while 12% perceived that there had been an increase. Econometric analysis revealed that the increase in border disputes was associated with low-quality land registration work with respect to plot boundary demarcation and measurement and failures to demarcate community borders. However, such low-quality work appeared to have only been performed in a fairly small share of the communities considered. In a similar study of 180 conflict mediators in the Oromia and SNNP regions, Holden and Tefera (2008) found that there was a significant reduction in disputes after registration and certification in areas where such disputes were common before registration.

The above studies reveal important benefits of the first-stage land certification through: (1) enhanced tenure security due to a reduced risk of land redistribution; (2) improved plot boundary demarcation through the use of witnesses and thus a reduced risk of encroachment by neighbors; and (3) improved transferability of land through the rental market.

Second-stage land registration and certification

The website of the Ethiopian Ministry of Agriculture (2013) describes the first-stage certification as "a process of providing "simple" temporary landholding certificates... Under Stage 1, farmers receive temporary certificates with no geo-referencing or mapping of land parcels" (MOA, 2013a). The more permanent second-stage certificate, therefore, "seeks to rectify the weaknesses in the Stage 1 land certification, particularly the need to geo-reference and map individual parcels to avoid or minimize boundary disputes." The objective of the second-stage certification, according to MOA, is to enhance tenure security for smallholder farmers. Land administrators across the four large regional states of Ethiopia have been piloting the second-stage land registration and certification scheme since 2005. Registrations conducted during the pilot stage benefited from donor support through various programs.

One of the largest programs is the USAID-funded ELTAP/ELAP program that covers 24 districts (*woredas*) across the four large regions. Cadastral surveying is performed using hand-held GPS devices, while the data were processed and stored on computers. There are some indications that this method of land registration

will be scaled up at national level for rural land registration (Wood et al., 2012). Handheld GPS devices are not particularly expensive, with prices in the range of USD 200–USD 600, but their accuracy level is 5–15 m. There have also been other pilot programs that employed alternative land surveying methods. A SIDA-funded project in Amhara used total stations and precision GPS devices, which are believed to be accurate to the millimeter but are highly expensive (USD 40,000) and require cars to transport from place to place (SARDP, 2010). The Finland-funded REILA (Responsible & Innovative Land Administration) project is currently conducting trials in four Ethiopian Regions using orthophotos that are produced from aerial photographs and satellite images. One district is selected from each of the four regions for the trial. The estimated cost of the second-stage land registration scheme based on the imagery trial completed thus far is USD 8.5 per parcel (Hailu and Harris, 2013). While there seems to be a consensus among implementers regarding the desirability of a new land certificate with plot maps and geo-referencing, it is unclear which of the land survey methods will eventually be adopted to register rural farmland at the national level. It may be possible that different regional states will adopt different land surveying methods or a combination of thereof depending on the type of landscape, the value of land and the precision required.

From a study that covers 2315 households across Ethiopia, Deininger et al. (2008) found that approximately 90% of the sample stated that they would like to have a map on their certificates and were willing to pay for such a map. However, no questions were asked on how much they would be willing to pay for the map. The study also provides cost estimates for high-precision land registration using electronic total stations of 49 EB per plot and 175 EB per household and for low-precision registration using handheld GPS of 13 EB per plot and 45 EB per household. There are an estimated 50 million land parcels in Ethiopia (Hailu and Harris, 2013). Whichever land survey method is used, the costs of mapping all parcels will be tremendous. However, the mapping and registration costs are not the only costs involved or the only logistics to be considered. While updating and maintaining the data with computerized registration is easier than paper-based registration, the associated costs are not negligible, and access to electricity is also a challenge (see Deininger et al., 2008).

The second-stage certificates produced through the pilot programs thus far have often been distributed to farmers free of charge. It is unclear, however, whether this practice will continue if and when the second-stage registration is scaled up. If farmers believe that the second-stage certificate will provide additional private benefits, they may be willing to pay for the service, and thus they may be expected to cover part of the costs of the new registration and certification in the form of certificate fees.

Implementation of land registration and certification in the Oromia and SNNP regions

Oromia region

The land registration and certification process began in the Oromia region in 2003/04, with regional employees training district-level land administration staff. Land Administration Committees (LACs) were established at the community (*kebele*) level with representatives from the villages (*sub-kebelles*). Registration began with the demarcation of community and village borders, communal land and public land. Individual land was demarcated, and a form was filled in the field. Another form was subsequently filled and kept at community level. The social court addressed complaints. The registration books and certificates are prepared at district level, while only the forms are maintained at the community level. Household heads provide photos (4 EB, compulsory)

before certificates are issued. Certificates can be collected at the *kebelle* level at a price of 5 EB (Holden and Tefera, 2008).

The certificate contains the name of the household head under 'land holders' in the first line and the spouse's name under 'name of spouse' in the second line, followed by a list of the names of other household members. The certificate only contains a photograph of the household head. If the household is polygamous, the photo of the husband and his name as 'land holder' only appears on one of the certificates (for the household and land that he frequents or prefers). The other wives who live on separate plots will have certificates for their respective parcels with their names written under 'land holders' and displaying their photographs instead of the husbands'. The name of the husband will be written in the second line under 'name of spouse'. If a polygamous household does not have separate land for each wife (which is not particularly common), the wives' names will appear under the 'name of spouse' line on a single certificate. The certificate does not explicitly state that the husband and wife have equal land rights, unlike in SNNP as we see below.

Second-stage registration is carried out by surveyors and registrars in the pilot districts. The surveyors and the registrars collaborate to take GPS measurements, prepare temporary sketches in the field, prepare maps on a computer, and combine the plot-level measurements with household information. The second-stage plot level certificates are printed on water resistant paper and include (side by side) the names of both husband and wife, the size of the plot, GPS coordinates, a map of the plot, a unique plot code and the plot code and holder names of the neighboring farms. The regional government provides funding for the pilot areas and priority areas where the second-stage registration and certification takes place. In addition, donor support has been received for some of the pilot areas. Households retain both the first-stage certificate (book) and the second-stage plot maps.

Southern Nations, Nationalities and People (SNNP) region

Land registration began in SNNP in 2004. Community-level Land Administration Committees (LACs) were established and trained alongside Development Agents (agricultural extension staff). The demarcation of individual plots of land proceeded based on the assumption that community and public land borders were known. Complaints and disputes were resolved locally and, if necessary, by district courts. Registry books were prepared at the community level. District-level books were compiled but only contained summarized information at household level. Land certificates were prepared and signed at the district level, while photos were added and certificates stamped at the community level. The cost of certificates included a card fee of 2 EB and 4 EB for photos (Holden and Tefera, 2008). In SNNP, the certificate is supposed to contain the names and photos of both the husband and wife on the same page. While this guideline has nearly always been followed in Sidama, it was not strictly followed in Wollaita. The rights and responsibilities section of the certificate indicates that both the husband and wife have equal rights to the land. The first-stage land certification scheme has been discontinued or was never implemented in certain communities in Sidama where the second-stage registration process has begun in the form of pilot projects. For example, in Wondo Genet district, which has been selected for the ELTAP pilot project, only 30% of the households received a first-stage certificate.

The second-stage registration is performed using hand-held GPS devices to measure the plot dimensions and computers to register the data. Once the registration is completed, households are issued a single book listing all of their plots and containing the names of both the husband and wife as landholders. In addition, separate maps are issued for each plot. As in Oromia, households in SNNP have not thus far been required to pay for the second-stage certificate. In SNNP, most of the cost of the certificate was

covered through the ELTAP/ELAP project, but the regional government also covered part of the cost. In contrast to Oromia, where households are able to retain both the first- and second-stage certificates, in SNNP, households return the first-stage certificate when they receive the second-stage certificate. Land administration officials seem to believe that the first-stage certificate is obsolete once a second-stage land registration and certification starts. This may also explain why they suspended first-stage registration in pilot districts.

Data and descriptive statistics

A stratified random sample of 620 households was surveyed in 2007 in five districts in the Oromia and SNNP regions. Of these households, 580 were surveyed again in 2012 with an additional 40 new households to maintain the 620-household sample size. Locations were stratified to capture the differences between the two regions. The sample includes districts with cereal-based, crop-livestock systems; perennial systems with irrigation producing cash crops; and perennial systems for subsistence production without irrigation. In addition, communities with varying distances to the district center were selected to capture variations in market access and urban expansion pressure. In these two regions, land certificates were allocated jointly to husbands and wives and were, therefore, intended to strengthen women's land rights. It is possible that this gender focus affected the WTP for second-stage certificates.

There are two components of the demand and WTP questions used in these surveys. The first set of questions explores WTP for a first-stage certificate by asking household heads how much they would pay to replace a lost first-stage certificate and whether and how much they would pay for a first-stage certificate if they did not have one. The second set of questions explores interest in a second-stage certificate. The second-stage certificate is described to household heads as a certificate with separate maps for each plot. In the 2007 and 2012 surveys, household heads are asked about their interest in receiving a second-stage certificate and how much they would be willing to pay for it in cash and labor. In addition, husbands and wives were separately asked about their assessments of the proposed second-stage certificate in the 2012 survey.² It is possible that such questions lead to an overestimation of the WTP for second-stage land certification because the questions are hypothetical and the WTP is derived from those households that wish or would prefer to have such a certificate. On the other hand, while we believe the description of the second-stage certificate provided to farmers is enough for their evaluation of its effect on tenure security, we did not go further and elaborate on the potential benefits of the second-stage registration and certification. It is possible that farmers may not realize the potential private benefits related to a computerized registration system such as facilitated inheritance to children. The results should therefore be interpreted in light of these caveats. The WTP cash amounts were inflation adjusted to ensure that the results obtained from the two survey rounds are comparable.³

Table 1 indicates that more than 91% of households had their land registered by 2007 and three-fourths had received a land certificate by 2012. In 2012, as many as 96% of households without certificates report interest in obtaining a first-stage certificate, an increase of 4% relative to 2007. Regarding the demand for second-stage certificates, only 54% reported being interested in obtaining such a certificate, a 17% decline in demand from 2007. This may be an indication that farmers consider the first-stage certificate

² The specific questions are reported in Appendix.

³ We used 2006 as a base year. The exchange rate was 8.4 EB per US\$ in June 2006.

Table 1
Household land certification status and demand for second-stage certificate, Oromia and SNNP.

	2007		2012	
	Percent	N ^a	Percent	N ^a
Households whose land is registered	0.91	576	0.94	619
Households who have land certificate	0.68	576	0.74	616
Households who do not have land certificate but want one	0.92	186	0.96	161
Want second-stage certificate with maps for each plot	0.71	530	0.54	610
Willing to sell land if it becomes legal	0.31	572	0.11	610

Source: Own survey data.

^a N refers to number of respondents for each question. 576 households participated in the land related questions in 2007 and 620 in 2012.

Table 2
Real value of land certificate^a and land in 2006 Birr and in labor days.

	2007				2012				Median ratio 2012/2007
	Median	Min	Max.	CV	Median	Min	Max.	CV	
Maximum WTP for first-stage certificate	5.75	0.0	959	3.94	3.36	0.0	672	3.00	0.58
Maximum WTP for lost first-stage certificate	5.75	0.0	1918	4.98	3.36	0.0	672	3.00	0.58
Maximum WTP for second-stage certificate in Birr	9.59	0.0	671	2.16	3.36	0.0	336	3.33	0.35
Maximum WTP for second-stage certificate in labor days	3	0.0	160	2.00	2	0.0	30	1.00	0.67
Minimum compensation acceptable if land is demanded for public service (in Million EB per hectare) ^b	0.11	0.0	134	5.95	0.45	0.0	3360	7.71	4.24
Minimum price to sell land (in Million EB per hectare) ^b	0.11	0.0	7670	17.17	0.67	0.0	1510	6.00	6.34

Source: Own survey data.

^a The WTP for first-stage certificate is reported for those without a certificate, WTP for lost first-stage certificate is reported for those households who already have one. The WTP for second-stage certificate is reported by those who want a second-stage certificate. The land values are reported by those households who were willing to report it.

^b Minimum land values are less than 10,000EB which appear as zero here since values are reported in Millions EB. Eg. 0.002.

sufficient and their confidence in this certificate has grown over time. Households may also be wary of displacement if they associate the second round of measurement and registration with possible state expropriation of land for urban expansion. This is particularly notable in Shashemene district, which is located near the town of Shashemene, and the district's residents have witnessed land expropriation in the past. A fear of tax increases may be another reason for the decline in interest if farmers reported owning smaller parcels than they actually held during the first-stage registration. During the second-stage registration, a number of such cases were uncovered in Oromia, possibly indicating corruption or inaccuracy during the first-stage registration. This was not, however, particularly common.

The table also includes information on the respondents' willingness to sell their land if it became legal.⁴ Only a small percentage of farmers indicated an interest in selling their farms. The rate of positive responses on this question declined from 31% in 2007 to 11% in 2012. This could indicate that land has become more valuable to farmers or that they expect even higher prices in the future, meaning that most would prefer to retain their land for the present.

Table 2 presents inflation-adjusted WTP estimates for first- and second-stage certificates in 2006 EB. The median WTP for a first-stage certificate declined from 5.8 EB in 2007 to 3.4 EB in 2012, while the median WTP for a second-stage certificate declined from 9.6 EB in 2007 to 3.4 EB in 2012. The alternative median measure, the maximum WTP for second-stage certificates in labor days, also declined from 3 to 2 man-days from 2007 to 2012. However, the inflation-adjusted value of land increased substantially over this period. The minimum willingness to accept (WTA) price per hectare of land increased by between four and six fold over the

Table 3
Demand for second-stage certificate. Disaggregate by year and district.

District	2007		2012	
	Interested households (%)	N	Interested households (%)	N
Shashemene	92	149	50	96
Arsi Negelle	73	150	59	140
Wondo Genet	58	40	48	135
Wollaita	56	191	57	203
Total	71	530	54	610

Source: Own survey data.

5 years between the two surveys.⁵ This gives us good reasons to question why we see this significant decline in WTP not only for second-stage certificates but also for first-stage certificates. Moreover, the median WTP we observed in our sample is much lower than the lowest estimated cost for second-stage certificates (refer to "Second-stage land registration and certification" section).

Table 3 provides more disaggregated information on the demand for first-stage and second-stage land certificates by year and district. The two first districts (Shashemene and Arsi Negelle) in the Oromia region have cereal-based production and lack irrigation but have good market access. Wondo Genet is a high-potential perennial zone featuring cash crops, irrigation and good market access. This district was also selected by ELTAP for second-stage certification. Wollaita is a low-potential perennial zone characterized by poorer market access and very high population density. We note that the demand for second-stage certificates declines over the period from 2007 to 2012 in all zones except Wollaita.

⁴ In Ethiopia, land is owned by the state and hence cannot be sold or mortgaged. Farmers have only user right.

⁵ A significant share of the sample refused to assign a value to the land, a sort of refusal to accept that land can be taken or sold, which indicates the sensitivity and insecurity felt by farmers.

Table 4

Median willingness to pay for land certificate and median land values, disaggregated by district and year.

	2007				2012			
	Shashemene	Arsi Negele	Wondo Genet	Wollaita	Shashemene	Arsi Negele	Wondo Genet	Wollaita
Maximum WTP for lost certificate	5.75	9.59	9.59	4.79	3.70	6.72	6.72	3.36
Maximum WTP for first-stage certificate	9.59	9.59	4.79	3.84	3.36	6.72	6.72	3.36
Maximum WTP for second-stage certificate	9.59	19.18	9.59	9.59	3.36	5.04	5.38	3.36
Minimum compensation considered fair if land is demanded for public service (in Millions EB per hectare)	0.10	0.11	0.45	0.07	0.90	0.45	0.85	0.27
Minimum price to sell land (in Millions EB per hectare)	0.10	0.12	0.45	0.07	1.34	0.74	0.67	0.45

Source: Own survey data.

Note: Figures are median WTP in 2006 Ethiopian Birr (EB).

Table 5

Distribution of WTP values for second-stage certificate and households' land valuation in 2012 (in 2006 EB).

District	Willingness to pay for second-stage certificate (in EB per household) ^a				Per hectare (compensation) land values (in Millions EB per hectare) ^b			
	Median	Min	Max	CV	Median	Min	Max	CV
Shashemene	3.70	0	336.02	2.73	0.90	0.007	134	3.209
Arsi Negele	4.20	0	33.60	0.92	0.45	0.018	896	6.996
Wondo Genet	5.38	0	168.01	2.11	0.85	0.005	3360	5.214
Wollaita	3.36	0	16.80	0.91	0.27	0.002	672	6.736

Source: Own survey data.

^a Reported for households who reported interest in second-stage certificate.^b Reported for households who were willing to report the land values.

Table 4 provides data on median WTP in 2007 and 2012 in the same four districts. The results indicate that the median WTP values declined in all districts from 2007 to 2012, particularly for second-stage certificates. The table also contains median land values in terms of farmers' assessments of fair compensation in the event of a land taking or the acceptable sales price if land sales were allowed. Here, we observe a sharp increase in land values from 2007 to 2012, particularly in Shashemene district, which is experiencing rapid urbanization. Wondo Genet, the zone featuring cash crop cultivation and irrigation, had the highest land values in 2007, but land values increased relatively less in this area than in the others from 2007 to 2012. The decision by the ELTAP/ELAP to target Wondo Genet for second-stage land certification does not seem to have stimulated the interest in or WTP for second-stage certification in this cash cropping area focusing on cash crops. A potential explanation for this is that residents already consider their tenure secure. Shashemene has experienced land takings related to urban expansion, but this does not seem to have affected the WTP for second-stage certificates. This could also indicate that households do not believe that these certificates provide them with any additional security or more reliable information on land expropriation. To provide more detailed information on variation across districts, we present the distribution of the WTP and land compensation values in 2012 in Table 5. Although we only report the WTP for second-stage certificate for those households interested in obtaining one, the minimum value is zero, indicating that some households that are interested in the second-stage certificate do not wish to pay for it. There is substantially more variation in land values than in WTP values. There is relatively less variation in WTP for second-stage certificates across households in Wollaita, which also has the lowest average WTP. Conversely, the highest land values are observed in Shashemene, where the variation in evaluations across households is the lowest.

As indicated earlier, husbands and wives were also separately asked to evaluate the importance of the proposed second-stage

certificate. The available responses are: Bad/unnecessary, acceptable/indifferent and good. Table 6 summarizes the responses of men and women.

Approximately 40% of men and women believe that second-stage certification is an unnecessary or bad idea. Proportionately, more men have a positive attitude toward second-stage certification than women.

We also explored farmers' perceptions of their tenure security. We identified two indicators: (1) whether they believe that the existing first-stage certificates protect against encroachment and (2) whether farmers feel secure that they will not be subject to further state land redistribution. Table 7 summarizes the results. The responses to the first question were at a household level, but we have separate responses from men and women on the second question.

It is clear from the table that farmers feel they have become more secure over time with respect to the land certificates protecting their land from other non-state threats such as encroachment by neighbors. The proportion of households that believe that the land certificate will protect them from encroachment doubled over the 5 years between the two surveys. The fear of land redistribution has also declined but not to as great an extent. Of the farmers and their spouses, one-fifth still expects land redistribution. This could be a potential source of tenure insecurity and a reason for their

Table 6

Attitude of men and women toward second stage certificate in 2012.

	Male (% of respondents)	Female (% of respondents)
Indifferent-acceptable	15	25
Good	47	34
Bad-unnecessary	38	41
Observation (N)	579	627

Source: Own survey data.

Table 7
Farmers' perception of tenure security.

	2007 (% respond yes)	2012 (% respond yes)
Existing land certificate protects against land encroachment (household head)	35	72
Expect land re-distribution (female respondents)	32	20
Expect land re-distribution (male respondents)	35	21

Source: Own survey data.

reluctance to participate in further land registration. Further efforts to raise awareness and assure farmers may alleviate some of their concerns.

Conceptual framework and empirical model

We can conceptualize formalization of land rights as a continuum of formalization intensity and quality where the cost of formalization increases with greater intensity and quality. Technological advances imply a reduction in the costs to achieve a given intensity of formalization. This may be visualized as a forward shift in the formalization supply curve. Identifying the socially optimal level of formalization intensity requires identifying the formalization demand curve. This demand curve will shift outward with the wealth of a society, the size and quality of land, as captured by the (potential) value of land, the individual demand for tenure security, the extent to which such security is threatened and the extent to which formalized land rights are believed to increase this security. The demand may also depend on the expectations and quality of other services provided by the land administrative system such as fair conflict resolution in land disputes and the effectiveness of this formalized system relative to a traditional conflict resolution system. The demand may also be influenced by the level of knowledge and thus realism of expectations concerning the services that can be provided and the ability to access the benefits of the system. Furthermore, if formalization is also associated with strengthening statutory law, this may have implications for whether the bundle of rights and obligations and their distribution among landowners are changed. For example, if formalization is combined with a new policy to strengthen the land rights of women within households, there is a redistributive element that goes beyond recognizing the land rights that existed before the formalization. This may then affect the demand among old and new rights holders. New laws and regulations that go further in specifying the obligations of landowners as part of a formalization process, such as conservation obligations, may also affect landowners' level of demand for formalization.

Our aim in this study is to examine the demand for second-stage certification. The second-stage certificate is expected to contain more detailed and precise information than the first-stage certificate. However, it is not obvious that the high level of precision implied by a second-stage certificate is worth the additional cost. The low-cost, participatory approach in which neighbors serve as witnesses employed in the first-stage registration in Ethiopia may provide a substantially higher level of precision than the low-cost GPS devices that have been used in most of the pilot areas. The added value of this technology is therefore not boundary identification and protection against encroachment, but map creation and computerized registration. It is questionable whether such maps enhance tenure security. It is then appropriate to ask who should pay for such intensified formalization. A computerized registry may facilitate bequeathing of land to children, but owners may not be aware of such benefits, and it is uncertain whether such a registry

would substantially enhance WTP. It is likely that the benefits of computerization and mapping are primarily social and only to a small extent private. The tenure security effect of formalization is private, and we should expect it to be reflected in the demand and WTP for registration and certificates. However, it is possible that the entire tenure security effect is captured in the first-stage certification. This may also be the case for women in the household where there is joint certification. The other broader benefits associated with land titling, such as credit access and the transferability of land, are irrelevant or less important under the restricted rights regime in Ethiopia where land sales and mortgaging of land are prohibited.

Specifically, the study tests the following hypotheses using data from the 2007 and 2012 surveys.

H1. *Demand and willingness to pay (WTP) for upgrading to second-stage land certification is low:* We argue that there are fewer private benefits to upgrading to a second-stage land certificate. The main private benefit of formalizing land rights in the Ethiopian context is tenure security, which is already provided by the first-stage certification.

H2. *WTP for second-stage certificates will be higher the higher the value of land.* Farmers who have larger or higher-quality plots of land, both in terms of productivity and location, are likely to pay higher prices to protect their assets. These qualities are reflected in the subjective value of the land, as land markets do not exist in Ethiopia.

H3. *WTP for upgrading from first-stage to second-stage certificate increases over time.* This is based on the assumption that the benefits from the first-stage land registration and certification deteriorate over time due to poor updating and maintenance of records; therefore, farmers become more interested in upgraded registration. Alternatively, we may argue that

H4. *WTP for second-stage certificates declines over time* due to a loss of momentum in the land registration and certification process and reduced expectations concerning benefits from upgrading. This could also result from a beneficial effect of first-stage certification on tenure security that is enhanced over time.

H5. *WTP is higher for households that have been exposed to informational meetings concerning the benefits of land registration and certification.* Information such as the implications of a computerized registration system regarding facilitating land transfers through bequests and gifts may create greater interest and demand in second-stage certificates in farming communities with low levels of literacy.

H6. *WTP is higher for households that lack witnesses for their plot boundaries from the first-stage registration or have experienced land disputes.* This is simply because such households may hope to gain additional security through a new land registration system and obtain certificates that include maps of individual plots.

The empirical model for the willingness to pay for a second-stage certificate is given by:

$$WTP2C_{ht} = \beta_0 + \beta_1 A_{ht} + \beta_2 C_{ht} + \beta_3 RQ_{ht} + \beta_4 CY_{ht} + \beta_5 M_{ht} + \beta_6 V_{ht} + \beta_7 D_t + \alpha_h + \varepsilon_{ht}$$

where $WTP2C_{ht}$ is the willingness to pay for a second-stage certificate for household h in period t , A is farm size, C is a dummy for exposure to land conflicts, RQ is registration quality, CY is land certificate information, including whether one possessed a first-stage land certificate and whose name(s) is/are on the certificate, M is a dummy for whether the household has been exposed to informational meetings regarding land certification, V is a vector of village dummies, which captures market access, population pressure and

urban expansion, D is a year dummy, α_h represents unobservable household factors, and ε_{ht} is a random error term.

The household-level WTP is given both in cash and in labor. As indicated above, approximately 30% of households in 2007 and 46% in 2012 were not interested in the second-stage certificate. Thus, we only observe WTP values for those who express interest in obtaining one. Ordinary Least Squares (OLS) is not an appropriate regression framework to estimate the model, as it does not control for the censoring of the WTP values at zero and may thus result in negative predicted values. This model is best estimated using Cragg's (Cragg, 1971) two-part truncated normal hurdle model. Cragg's specification disaggregates the decision into a participation equation and an amount equation and yields positive predicted values for the amount equation. This model specification employs a probit for the participation equation and a truncated normal model for the amount equation. The model assumes that, conditional on a set of observed covariates, the mechanisms determining participation and amounts are independent. In our WTP model, the two components are: (1) a probit model for 'interest in a second-stage certificate' using the full sample and (2) a truncated normal model for 'maximum willingness to pay' using the sub-sample of interested households.

Because we are using panel data, we can control for unobserved heterogeneity in addition to the observed covariates. In our model, we employ a Correlated Random Effect (CRE) model following Mundlak (1978) and Chamberlain (1982) because fixed effects estimation is difficult to implement for nonlinear models due to the incidental parameter problem. The estimation procedure in CRE involves adding the mean of time-varying variables as an additional set of explanatory variables. The inclusion of these means controls for time-constant unobserved heterogeneity (Wooldridge, 2010).

Results and discussion

Estimation result

The results of the Double-Hurdle model are reported in Table 8. The first two columns report the results from the probit model for the probability of being interested in second-stage certificate (hurdle 1). The next four columns report results from the truncated regression models for WTP (hurdle 2).⁶ The observations in the probit model include all households in both periods, while the truncated regression model includes only those households that are interested in a second-stage certificate. We estimated WTP in both cash (middle two columns) and labor-days (last two columns).

We first analyze the factors influencing the probability of being interested in a second-stage certificate. We find that households that experienced a land dispute before the first-stage land registration was implemented are more likely to be interested in a second-stage certificate, indicating that experiences of conflict result in greater tenure insecurity and thus greater demand for certificates beyond what the first-stage certificates have provided. Respondents who attended public informational meetings regarding land registration are also more likely to be interested in a second-stage certificate. This is perhaps because they are more informed of land registration, the various types of certificates and their benefits. However, households that reported having sufficient witnesses during the first-stage registration are less likely to wish to obtain a second-stage certificate, indicating that the first-stage certificate provides sufficient plot boundary security for such

households. Having a land certificate was not significantly associated with interest in second-stage certificates, but households that only have the husband's name listed on the first-stage certificate are less likely to exhibit interest in second-stage certificates. We may speculate that male heads of households perceive there to be an advantage of retaining the certificate that only includes their name instead of obtaining a second-stage certificate that may include both the husband's and his wife's names. The age of household head was negatively associated with interest in obtaining a second-stage certificate, which could be because older household heads feel more secure with respect to their land tenure. However, it could also be due to resistance to change, as they have witnessed frequent land redistributions in the past. Controlling for other factors, interest in obtaining a second-stage certificate declined significantly from 2007 to 2012, indicating that the decline in momentum and farmers' expectations regarding second-stage certification dominates any concern farmers might have concerning an erosion of the benefits of first-stage certification. We also find that households in Wondo Genet and Wollaita, the two most densely populated areas, are less likely to exhibit interest in second-stage certificates than households in Shashemene.

We next examine factors that influence the willingness to pay (WTP) for second-stage certificates among interested households. Farm size is now negatively correlated with the willingness to pay, whether reported in cash or in labor-days. This could be a land scarcity effect, such that more land-scarce households are willing to pay more to secure their rights, *ceteris paribus*. However, if land scarcity is correlated with poverty and poor market access, this could limit WTP and possibly explain the lower WTP observed in Wollaita. Compared to Shashemene, the WTP for households in Wollaita was 17% and 8% lower in cash and in labor, respectively. Similarly, WTP declined significantly from 2007 to 2012, with a 5% decline in WTP in cash and a 1.5% decline WTP in labor. All of the above variables were significant at the 1% significance level. Female-headed households were no more or less likely than male-headed household to demonstrate interest in obtaining a second-stage certificate. But, among interested households, female-headed households had 6.7% lower WTP in cash but their WTP in labor was not statically different from that of other households. This may be related to the greater liquidity constraint faced by most female-headed households in rural areas. Attending a public meeting before registration was positively correlated with WTP, but it was only significant at the 10% level. Having only the husband's name on the certificate was negatively correlated with WTP in the labor equation but only significant at the 10% level.

It is possible that there are two forces working in opposite directions with respect to farm size. On the one hand, as farm size typically affects the value of the land for which a second-stage certificate may be issued, the willingness to pay may be higher for larger farms. On the other hand, a fear of land expropriation, which may be more pronounced on larger farms, may negatively influence the WTP for the new certificate. Although land sales are prohibited in Ethiopia, and farmers have only user rights, they have a subjective valuation of their land that depends, among other things, on farm size, the quality of the land, the proximity to urban areas, the presence of irrigation and household characteristics. Table 9 reports estimation results from the regression models that include farmers' subjective values of their land. These values are the minimum compensation households were willing to accept in the event that their land is expropriated for public use. Because a significant percentage of households were unwilling to report these values, the number of observations considered in this analysis is reduced by 40%. We include this model to assess the robustness of our results. In addition to the land values, we also allowed for variation in the WTP for land of a similar value depending on how near a household is located to an urban area using a dummy variable that takes value

⁶ It is possible that the two decisions are correlated, even after controlling for observed covariates. If this is the case, the WTP equation has to be corrected for selection. Our test for selection bias using the Heckman selection model does not indicate a selection problem.

Table 8
Factors associated with the demand and willingness to pay for second-stage certificate in cash and in labor. Double-Hurdle Model.

	Interested in second-stage certificate Probit model		Amount/willingness to pay (in Cash) Truncated regression		Amount/willingness to pay (in labor-days) Truncated regression	
	Marginal effects	Robust Std. Err	Elasticities	Robust Std. Err	Elasticities	Robust Std. Err
Farm size per capita (ha)	0.000	0.000	-0.173***	0.057	-0.177***	0.049
Experience land dispute before land registration	0.074**	0.034	0.011	0.027	0.003	0.020
Have sufficient witnesses to confirm plot borders	-0.123**	0.049	0.037	0.140	-0.116	0.103
Household has land certificate	-0.062	0.060	0.035	0.146	-0.028	0.096
Only husband name on the certificate	-0.155***	0.051	0.010	0.013	-0.017*	0.010
Attended public meeting before land registration	0.090***	0.034	0.140*	0.085	0.066	0.059
Female headed household	-0.039	0.110	-0.067**	0.030	-0.010	0.021
Age of household head	-0.003**	0.001	-0.002	0.153	-0.048	0.113
Total number of male members	-0.010	0.017	0.231	0.182	0.012	0.142
Household size	-0.002	0.010	0.038	0.141	-0.003	0.149
District dummies: baseline-Shashemene						
Arsi Negele	-0.068	0.043	0.023	0.037	0.003	0.027
Wondo Genet	-0.179***	0.060	0.016	0.020	-0.007	0.015
Wollaita	-0.136***	0.039	-0.165***	0.044	-0.082***	0.028
Year 2012, dummy	-0.111***	0.032	-0.501***	0.049	-0.153***	0.036
Constant (Coefficient)	1.110***	0.234	2.404***	0.263	1.636***	0.179
Sigma constant			1.024***	0.046	0.726***	0.036
Chi ²	92.3		205.5		66.4	
Prob > chi ²	0.000		0.000		0.000	
Loglikelihood	-642.9		-813.7		-578.2	
Number of observations	1029		605		589	

Note: The dependent variables in the amount equations (cash and labor days) are log-transformed. The mean of time varying variables are included as additional regressors in these models, but they are not included in the table to save space.

* Significance at 10%.

** Significance at 5%.

*** Significance at 1%.

one if the household is located in a village near to an urban area and include the interaction between this dummy variable and the land value variable.

The results from the probit model in Table 9 indicate that households that have larger land values are less likely to be interested in a second-stage certificate. The coefficient is significant at the 1% level of significance. This may indicate that households do not believe that second-stage certificates provide protection against expropriation, as more valuable land may be near urban areas, where such risks are higher, or those with more valuable land do not fear the loss of their land and therefore do not believe that they need second-stage certificates. However, among households that were interested in obtaining second-stage certificates, those with larger land values had a higher WTP in cash, and the location of the highly valued land (peri-urban or not) did not affect the magnitude (Table 9, second model). This indicates that the willingness to pay of those who perceived benefits from second-stage certificates increased in their valuations of their land. Farm size had the same effect in the new models as before with even larger negative elasticities in both WTP in cash and labor. A 1 percentage point decrease in per capita farm size is associated with a 2 percentage point increase in the amount households are willing to pay for second-stage certificates, indicating that increasing land scarcity is driving up the WTP for second-stage land certificates. Households located in peri-urban areas had higher WTP. The coefficients for all other variables had the same signs as in the model without land values, but we have fewer statistically significant coefficients in the current models, perhaps because of the significant reduction

in the number of observations and hence variation in the data.

Predicted willingness-to-pay in Oromia and SNNP

We tried to obtain an estimate of WTP for households in Oromia and SNNP based on our empirical model. Table 10 reports the predicted values of WTP based on the Double-Hurdle model but only considers the most recent data (2012 data) in the prediction. The median WTP is approximately 7 EB for Arsi Negele, Wondo Genet and Shashemene and 3.5 EB for Wollaita. When disaggregated by farm size, WTP exhibits some variation across the three comparable districts. The highest WTP is to be expected from households in Shashemene. Compared to the three other districts, households in Wollaita have the lowest WTP. In all districts, households that were willing to pay the most were those with land sizes in the third quartile.

Fig. 1 provides a more visual presentation of the relationship between predicted WTP and farm size. We use a two-way graph with local polynomial smoothing to plot the relationship between WTP and farm size. The WTP values are never more than 8 EB. We find that for Shashemene and Arsi Negele, the predicted WTP is higher, with values not falling below 6 EB for all farm size levels, but there is more dispersion in the WTP in Shashemene. In Wondo Genet, the WTP is mostly close to that of the two Oromia districts but it declines and the dispersion increases after approximately 1.3 ha of land. In Wollaita, the WTP is lower than 4EB at all land size levels. Wollaita also has the least dispersion in predicted WTP.

Table 9
Factors associated with the demand and willingness to pay for second-stage certificate in cash and in labor. DH Model (with land values).

	Probability of being interested in second-stage certificate		Amount interested households are willing to pay (in cash)		Amount interested households are willing to pay (in labor-days)	
	Marginal Effects	Robust Std. Err	Elasticities	Robust Std. Err	Elasticities	Robust Std. Err
Ln (land values)	-0.075***	0.027	0.060**	0.030	-0.030	0.019
Household farm size (ha)	0.000	0.000	-0.222**	0.062	-0.191***	0.051
Experience land dispute before land registration	0.051	0.042	-0.003	0.033	0.001	0.027
Have sufficient witnesses to confirm plot borders	-0.034	0.058	-0.159	0.157	-0.095	0.121
Household has land certificate	-0.007	0.072	0.131	0.172	0.027	0.122
Only husband name on the certificate	-0.181***	0.065	-0.007	0.016	-0.021*	0.013
Attended public meeting before land registration	0.108**	0.042	0.131	0.111	0.084	0.071
Female headed household	0.054	0.139	-0.060**	0.029	-0.009	0.017
Age of household head	-0.001	0.001	-0.088	0.192	-0.051	0.142
Total number of male members	-0.007	0.021	0.307	0.221	0.125	0.161
Household size	-0.003	0.013	0.120	0.209	-0.209	0.170
District dummies: baseline-Shashemene						
Arsi Negele	-0.112*	0.063	0.042	0.035	0.001	0.027
Wondo Genet	-0.148*	0.084	-0.025	0.037	-0.005	0.028
Wollaita	-0.255***	0.053	-0.102	0.084	-0.127***	0.048
Farm located in peri-urban area	0.098	0.263	0.217*	0.116	-0.062	0.086
Peri-urban area × land value	-0.014	0.019	-0.163	0.112	0.054	0.078
Year 2012, dummy	-0.021	0.049	-0.516***	0.077	-0.108**	0.051
Constant (coefficient)	1.444***	0.435	1.789**	0.445	1.827***	0.283
Sigma constant			1.004**	0.059	0.714**	0.049
Chi ²		68.451	157.8			51.4
Prob > chi ²		0.00	0.00			0.00
Loglikelihood		-397.442	-516.2			-369.6
Number of observations		649	388			381

Note: The dependent variables in the amount equations (cash and labor days) are log-transformed. The mean of time varying variables are included as additional regressors in this model, but they are not included in the table to save space.

- * Significance at 10%.
- ** Significance at 5%.
- *** Significance at 1%.

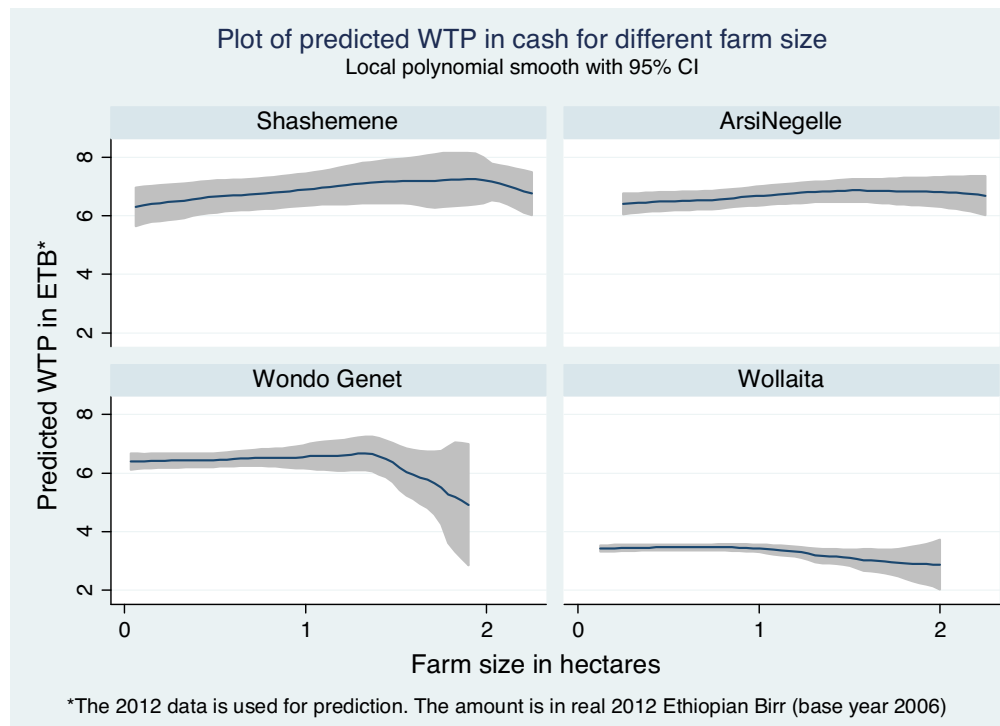


Fig. 1. Expected willingness-to-pay for second-stage certificate for districts in Oromia and SNNP.

Table 10
Expected willingness to pay by farm size and district.

Farm size	Shashemene			Arsi Negele			Wondo Genet			Wollaita		
	Min.	Med.	Max.	Min.	Med.	Max.	Min.	Med.	Max.	Min.	Med.	Max.
Quartile 1	3.50	5.90	18.13	3.95	6.40	10.36	3.96	6.43	8.54	1.80	3.42	4.49
Quartile 2	3.95	6.62	12.06	4.85	7.03	8.12	3.96	6.42	10.30	1.77	3.53	5.09
Quartile 3	3.15	6.81	25.29	3.24	6.55	11.89	3.54	6.66	8.09	1.87	3.65	4.79
Quartile 4	4.85	6.99	11.50	4.66	6.69	9.42	3.06	6.84	9.78	1.89	3.04	4.53
Total	3.15	6.71	25.29	3.24	6.63	11.89	3.06	6.60	10.30	1.77	3.49	5.09

Source: Model prediction from the HD model estimated in section 6

Note: We use only the 2012 survey data for prediction since it is the most recent; District specific quartiles are computed to group household by their farm size.

To summarize the assessment of our hypotheses, we cannot reject **Hypothesis 1**, that demand and WTP for second-stage certificates are low, as we found that the WTP is substantially lower than the administrative costs of implementing the second-stage certification.

We cannot reject **Hypothesis 2** that WTP increases with land values, but the evidence is weak. While we observed a strong, negative correlation between *interest* in obtaining a second-stage certificate and land values, which inclines us to reject the hypothesis, we also observed a positive relationship between values and the *amount* that interested households are willing to pay. However, this positive relationship is only weakly significant. Land values may also be correlated with farm size within areas, and we find that greater land scarcity within the household was associated with higher WTP for second-stage certificates. Therefore, this also supports rejection of the hypothesis. Thus, it seems to be poverty in land rather than in land values that increases WTP.

Hypothesis 3 that WTP increases over time, is rejected. We found no indications that the effect of the first-stage certification has deteriorated. Rather, it may be the case that the tenure security effect of the first-stage certification grew over the period from 2007 to 2012 as first-stage certificates gained recognition (see **Table 6**). However, we could not reject **Hypothesis 4**, which states that WTP has declined over time. This result may be due to a loss of momentum and interest and more realistic expectations regarding the benefits. Second-stage certification may also be associated with fears of land expropriation and been implemented in areas facing more dynamic developments and land use changes such as urban expansion. Informal discussions with farmers revealed that they were somewhat concerned that parcel-level registration may increase their land tax liability. Currently, the tax on agricultural land is collected as a fee per hectare of land cultivated regardless of the location or productivity of the land. The fear is that each plot may be used as a basis for a separate land tax, perhaps according to the quality, instead of a flat land use fee per hectare. Although we do not know how widespread this belief is, it is clear that a lack of information regarding the purpose of the new land registration plays an important role.

We cannot reject **Hypothesis 5**, stating that WTP is higher for households that have been exposed to informational meetings on land registration and certification. It is clear that those who attended these meetings had significantly higher interest in and WTP for second-stage certificates. This may not only be an informational effect, however. It could also be a demand effect, as those with higher levels of demand for documentation of their land rights were also more likely to attend meetings on the subject. The informational meetings we consider in this analysis were primarily awareness meetings during the first-stage registration and certification. Our assessment from our discussions with farmers, development agents and officials is that, as opposed to the case for the first-stage land registration and certification, little effort was devoted to raising awareness of the second-stage land registration and certification.

Finally, we cannot reject **Hypothesis 6**, which states that WTP for a second-stage certificate is higher for households that are more insecure of their land tenure due to exposure to land conflicts or lack of witnesses.

Conclusion

Our study has revealed a relatively low demand and WTP for second-stage certificates. The added value of these second-stage certificates is perceived to be low. The impression is that they do not substantially enhance tenure security relative to first-stage certificates unless there was a problem during the first-stage certification. Most households believed that they had sufficient witnesses in the neighborhood that could assist in verifying the correct placement of plot borders. Inaccurate maps created based on measurements obtained via handheld GPS devices provide less reliable information on the location of plot borders. That we noted a significant reduction in WTP for second-stage certificates from 2007 to 2012 while perceived land values increased dramatically over the same period may indicate that the first-stage certification was successful in creating the demanded tenure security. The strong negative correlation we observe between farm size and demand for second-stage certificates indicates that poverty in land drives up WTP for second-stage certificates.

The benefits from second-stage certification appear small for the individual farmers, while they may provide a better basis for land administration and generate public documentation of land-related affairs. The present study exclusively focuses on the private benefits of second-stage certificates to farm households. However, other social benefits of the second-stage registration and certification may be more important and justify its implementation. If that is the case, a detailed cost-benefit analysis should examine all relevant benefits and costs, including the time required to complete the registration and continuously update the data. In the mean time, caution should also be taken so that second-stage certification does not undermine the positive effects of the first-stage certification such as the joint certification of husbands and wives. We believe that further pilot testing of the second-stage certification is needed and may be useful to prioritize to specific areas such as those subject to rapid urban expansion and may be used to improve the coordination of urban and rural land registration and certification in ways that can enhance the tenure security of land holders and ensure appropriate compensation in cases of land expropriation.

Appendix

Willingness to pay questions from the survey questionnaire

WTP for **first-stage certificate** is explored using the following question:

1. If you lose your certificate, how much would you be willing to pay for a replacement? (WTP in cash)

2. If you do not (did not) have a certificate, do (would) you want to get a certificate? 1 = Yes, 0 = No
3. If yes, how much would you be willing to pay for it at the maximum?

The following questions explore the demand and WTP for **second-stage certificate**.

1. Would you prefer to receive a new land certificate with a map of each of your plots, with clear identification of the location and size and shape of the plot? 1 = Yes, 0 = No
2. If yes
 - a. How much is your maximum willingness to pay for such a certificate for each of your plots?
 - b. How many separate parcels (plots) do you have?
 - c. What is your maximum WTP for all parcels (one certificate with map for each plot)
3. If yes, how many days are you maximum willing to work for the kebele to obtain such certificates for all your plots?

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