How does the amount of land that youth expect to inherit affect their migration and employment decisions? We explore this question in the context of rural Ethiopia using a 2014 cross-sectional dataset indicating whether or not youth household members from a previous 2010 survey had migrated by 2014, and in which sector they worked in 2014. We estimate a household fixed effects model and exploit exogenous variation in the timing of land redistributions to overcome endogenous household decisions about how much land to bequeath to descendants. We find that larger expected land inheritances significantly lower the likelihood of long-distance permanent migration and of permanent migration to urban areas. Inheriting more land also leads to a significantly higher likelihood of employment in agriculture and a lower likelihood of employment in the non-agricultural sector. Conversely, the decision to attend school is unaffected. These results appear to be most heavily-driven by males and by the older half of our youth sample. We also find suggestive evidence that several mediating factors matter. Land inheritance is a much stronger predictor of rural-to-urban permanent migration and non-agricultural-sector employment in areas with less vibrant land markets, in relatively remote areas (those far from major urban centers), and in areas with lower soil quality. Overall, these results affirm the importance of push factors in dictating occupation and migration decisions in Ethiopia.

Key words: Agriculture, employment, land inheritance, migration, youth.

JEL codes: J61, O13, Q15.

“It’s the youth bulge that stands to put greater pressure on the global economy, sow political unrest, spur mass migration and have profound consequences for everything from marriage to Internet access to the growth of cities” (Sengupta 2015).

How does the amount of land that youth stand to inherit affect their migration and employment decisions? In rural Africa, youth typically rely on inheritance and gift, or informal rental markets, to access parcels under usufruct land rights systems.1 However, population pressures—including a youth bulge in many developing countries—are reducing land availability (Jayne, Mather, and Mghenyi 2010; Muyanga and Jayne 2014) and, potentially, opportunities for youth to work in agriculture. Further, as farms intensify agricultural production to overcome land constraints (Barrett, Bellemare, and Hou 2010; Bellemare 2013; Carletto, Savastano, and Zezza 2013; Headey, Dereje, and Taffesse 2014; Larson

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1 We adopt the World Bank definition of youth, that is, individuals between the age of 15 and 34 (Filmer et al. 2014).
et al. 2014; Sheahan and Barrett 2014; Ali and Deininger 2015), labor-saving technologies may substitute for youth farm labor (Bustos, Caprettini, and Ponticelli 2016). Pessimistic views on inheritance prospects may encourage youth to transition from low-return agricultural to high-return non-agricultural activities (Bezu and Barrett 2012; Nagler and Naude 2017). Alternatively, they may delay labor force entry by encouraging youth to obtain secondary or tertiary education. Understanding how land inheritance impacts such decisions is critical for understanding the likely impacts of demographic and technological changes on development.

Our main objective is to examine whether perceptions of land inheritance prospects (as a proxy for individual land access) affect youth migration and employment decisions in rural Ethiopia. Ethiopia is an ideal setting to study these dynamics. First, it is a primarily agrarian economy where land is central to livelihoods—as in much of the developing world. Second, geographic and temporal variation in land allocation policies, in a context where land is under public ownership, provide a natural experiment for understanding the causal effects of land inheritance.

Our analysis uses a 2014 cross-sectional dataset indicating whether or not youth household members from a 2010 survey had migrated by the time of a 2014 survey of the same households, and in which sector they work. The survey covered 27 rural kebeles (the lowest formal administrative unit in Ethiopia, also known as peasant associations, communities, or sub-districts) of the Amhara and Oromia regions. Information on individual inheritance, migration, and employment were collected for a complete list of descendants (mostly children) of the household head and/or their spouse. We construct a measure of individual expected land inheritance using detailed information provided by household heads on inheritances granted and expected to be granted to each descendant. As in Bezu and Holden (2014), we analyze multiple youth employment outcomes (permanent migration, long-distance permanent migration, rural-to-urban permanent migration, agricultural employment, non-agricultural employment, and being a student). Both employment diversification (via non-agricultural employment, migration, or both) and the pursuit of education are potential risk diversification strategies. We consider how land inheritance impacts each person, and how such relationships vary with gender and age. Lastly, we examine whether our main effects are significantly different in communities with varying levels of three potential mediators: the prevalence of land rental activities, travel time to a major urban center, and average soil quality.

One of the main empirical challenges confronting our analysis is the endogeneity of individual land inheritance. Size of inheritance varies across and within households and is likely shaped by numerous unobservable factors correlated with individual labor activities. We estimate a household fixed-effects model and thus rely on within-household variation in expected land inheritances to explain within-household variation in migration and employment outcomes. We further make use of historical land reforms in Ethiopia to develop an instrumental variable for expected individual land inheritance. Historically, access to land has been influenced by large-scale government efforts to redistribute land. Under such redistributions, the local government expropriated land from some households and reallocated it to others based on household size at the time (with particular attention to adult males). We administered surveys of kebele officials to identify the timing of land redistributions. We exploit spatial variation in this timing and the demographic composition of households to identify the causal impacts of inherited land on youth decision-making.

**Literature Review**

As separate decision-making processes, the decisions to migrate (Abramitzky, Boustan, and Eriksson 2013; Lambert, Ravallion, and van de Walle 2014), to engage in agriculture vs. non-agricultural activities (Bezu and Barrett 2012; Maiga, Christiaensen, and Palacios-Lopez 2015; Nagler and Naude 2017), or to continue one’s education (Estudillo, Quisumbing, and Otsuka 2001) are based on these activities’ expected benefits to the individual (or the household, collectively). Wealth often factors into these decisions through at least two channels. First, wealth signifies the ability of the household to financially support the costs of migration (Abramitzky, Boustan, and Eriksson 2013), education, or entry into labor markets auxiliary to agriculture (Bezu and Barrett 2012). Second, if household wealth is indicative of
individual skill, then the higher skill transferability of an individual will, in turn, augment the expected return to migration, to entering the non-agricultural labor market, or to delaying entry into the labor market to invest in further education.

Land is a unique form of wealth, and thus its impacts on physical and occupational mobility are different than those of other forms of wealth. In many African contexts, land rental and purchase markets are quite limited, making it difficult or impossible to use land as a source of capital for financing investments (Lambert, Ravallion, and van de Walle 2014). Cultural norms and communal rules underlying land allocations introduce additional opportunity costs to diversifying labor across sectors or space. For example, the fear of land expropriation can arise in certain settings, whereby governments or communities threaten to confiscate land from a household if agricultural labor is not visibly productive (de Brauw and Mueller 2012). Shipton and Goheen (1992) and Lambert, Ravallion, and van de Walle (2014) also note that the responsibilities that come with land ownership, including sharing one’s land and farm products, can potentially diminish the benefits of one’s inheritance. Finally, nonlinearities between physical capital endowments, employment, and migration decisions may exist, whereby the gains of staying behind outweigh any expected gains from moving (McKenzie and Rapoport 2007) or diversifying out of agriculture among the extremely land rich (Bezu and Barrett 2012).

Existing literature, much of it recent, generally finds that increased expectations on inherited land incline individuals to either stay in their current residence or remain in the agricultural sector. However, there are nuanced findings. Abramitzky, Boustan, and Eriksson (2013) find in the context of historical Norway that siblings who were expected to inherit land—conditional on their origin region, birth order, and sibling composition—were less likely to migrate. Lambert, Ravallion, and van de Walle (2014) point out, for the case of Senegal, that land inheritance mitigates both migration and employment outside of agriculture only among those who lack the responsibilities of being a head. In the African context, headship requires one to demonstrate that land is being used in order to maintain customary ownership. And in Ethiopia, Bezu and Holden (2014) show that intentions to remain in agriculture increase with land availability through inheritance among youth. They do not find a link between land inheritance and migration, though this may be due to the broad definition of migration that they apply. Presumably, the expected return to migration will be contingent on the probability of employment and the expected wage gap between the origin and destination (Sjaastad 1962; Harris and Todaro 1970); both are likely to be more pronounced in the case of a rural origin and an urban destination. This motivates our use of a range of migration variables, and differentiating impacts by characteristics of the origin.

Our analysis aims to contribute to this existing literature by evaluating the causal impact of an individual’s expected land inheritance on migration, sectoral shifts, and schooling in villages in the Amhara and Oromia regions of Ethiopia. Although our instrumental variables identification strategy—for which our instrument is strong overall, but weak in sub-populations of interest—cannot help us say causally how mediating variables condition the relationship between inheritance and employment and migration decisions, we can nonetheless explore mediators through suggestive ordinary least squares (OLS) regressions. These regressions allow us to consider how local land rental markets, access to urban centers, and soil fertility might mediate youth land-employment and land-migration relationships—an area of research which we argue merits empirical analysis. We first test whether inheritance has a statistically significantly different effect on migration and employment decisions in areas with strong vs. thin land rental markets. The fact that these markets may substitute for a lack of land inheritance offers one reason why a traditionally disadvantaged subpopulation, youth, is the most prominent group engaging in these markets in sub-Saharan Africa (Deininger, Xia, and Savastano 2015). We posit that youth migration and employment decisions may be less sensitive to expectations concerning inheriting land in areas with robust rental markets. Although rental markets provide youth with access to land, we do not expect rented and inherited land to serve as perfect substitutes. There is likely a premium to having ownership or longer-term usage rights. This premium may be due in part to inheritance conferring more secure property rights than do rental contracts. We next test for differential inheritance effects on migration and employment.
decisions in areas near vs. far from a major urban center. If jobs are plentiful in urban locations, then lowering moving costs to these places can render rural-urban migration more desirable than other forms of internal migration (Sjaastad 1962). However, the wage gap between one’s origin and destination may be much smaller in areas close to cities, offsetting the benefits of more probable employment (Harris and Todaro 1970). Thus, how youth employment and migration responds to inheritance size in areas closer to towns remains largely an empirical question. Finally, we consider whether the impact of land inheritance is statistically significantly stronger in places with more vs. less fertile soil; to the extent that soil fertility indicates the value of land, more fertile plots may exhibit an especially large pull, enticing individuals to stay in agriculture (Gray 2011). At the same time, if soil is sufficiently fertile, very little may be needed to keep individuals in agriculture, and thus small reductions in land access may do little to drive individuals out of agriculture and/or to spur migration.

Background and Context

To understand how the expected size of land inheritance in rural Ethiopia is likely to affect the migration and employment decisions of youth, it is important to understand the context. This includes the means of accessing land in Ethiopia (including government redistribution policies), norms of inheritance, and the broader patterns of migration and employment present in the country.

Access to Land in Ethiopia

Ethiopia has long faced severe problems of land scarcity. Population density is growing rapidly, leading farm sizes to dwindle. During 2011–2012, more than half of rural farm households in Ethiopia cultivated less than 1 hectare of land (Central Statistical Agency of Ethiopia 2012). Further, a youth bulge promises to intensify these problems for youth in particular; according to the Central Statistical Agency of Ethiopia (CSA 2015), as of 2015, 37% of the population was aged 15 to 34. In land-constrained countries under usufruct land rights systems like Ethiopia, youth rely on periodic land redistributions, inheritance, and informal rental markets for access to land.

The Derg regime ruled Ethiopia from 1974 to 1991; land was formally owned by the government, which aimed to ensure a degree of equality in household access. The current Ethiopian People’s Revolutionary Democratic Front (EPRDF) regime has been in place since 1991, following the collapse of the Derg. Land continues to be formally owned by the government, with formal land markets (sales) outlawed. The EPRDF regime introduced the land use certification program in the late 1990s to enhance land tenure security by issuing land holders a certificate granting perpetual land use rights (including transfer rights via inheritance). Land certification in our sample kebeles was common by 2014; 20 of the 27 had 90% or more of their land area certified, and 25 of the 27 had 80% or more of their land area certified. Although large-scale administrative land redistributions have been halted by the land use regulation of 2005 (Federal Democratic Republic of Ethiopia 2005), sporadic or occasional administrative land redistributions continue to be justified as a means of reallocating abandoned land to landless households.

Twenty of our 27 sample kebeles had experienced a large-scale land redistribution affecting the majority of households since 1991. Under such redistributions, the local government takes land from land-abundant households and reallocates it to land-scarce or landless households, based on household size at the time (with particular attention to adult males). Because redistribution is decentralized, its timing hinges on the capacity, preparedness, and land availability of each kebele and its woreda (district), resulting in significant geographic variation in their timing, which we exploit to construct an instrumental variable for land inheritance. As shown in online supplementary appendix

2 Rental and sharecropping provide access to agricultural land, but contracts are often tenuous and require sharecroppers to frequently change contracts and work different plots (Deininger et al. 2003, 2011).

3 While communal grazing land and woodland are occasionally distributed to households, this is not nearly at the scale of the major land redistributions of the post-Derg era (Demekie 1999).

4 In the Amharic language used for the survey, we describe land redistribution as “land adjustment among households”—not injection of new lands into the kebele. This is reflected in our survey data, which capture the amount of land under individual cultivation in 2010 and 2014; in the sample of 27 kebeles as a whole, as well as among the subset of kebeles that experienced land redistribution between 2010 and 2014, the median change in land area under individual cultivation is 0 (i.e., no change).
table A1, the median year for land redistribution is 2003, but it ranges from 1992 to 2013.5
We constrain our analysis to evaluate inheritance decisions associated with land redistributions after 1991 (when the current EPRDF was firmly established) for three main reasons: (a) to avoid potentially confounding effects of changes in political regimes and national land policies; (b) because the average child in our sample is under age 20 and thus an infant or not yet born at the time of pre-1992 land distributions, and (c) because we were concerned that asking individuals to recall land reforms pre-dating the most recent set was likely to generate recall issues and accordingly yield noisy and inaccurate data.6

Individual land users in the study regions have the legal right to transfer usufruct rights to children or other family members (Amhara National Regional State ANRS 2006, 2007; Oromia National Regional State 2007). Individuals can also rent their land use rights to any person—with some region-specific restrictions on the size and duration of the rental.7 Land inheritances in Ethiopia are not uniform across descendants of the head—due to both cultural factors such as norms associated with gender and birth order, and restrictions on land fragmentation.8

In our sample, 41% of household heads reported that they would unequally divide land among their descendants.

Norms of Inheritance

Although statutory land tenure and inheritance laws in Ethiopia provide land to all rural citizens wishing to engage in agriculture, customary norms and practices tend to favor men (Fafchamps and Quisumbing 2005).9 First, marriage is primarily patrilocal, with the wife residing with or near the husband’s parents. Second, sons (especially the first-born) typically care for parents in old age (Kumar and Quisumbing 2012). Finally, customary beliefs limit the agricultural activities in which females can engage (plowing, sowing seeds, and threshing are exclusively male activities), necessitating male labor participation on any agricultural plot.

Existing research has explored sibling competition and its effects on parental and youth decision making in a variety of contexts.10 Fafchamps and Quisumbing (2005) suggested that a groom’s number of brothers (but not sisters) has a strong negative effect on land inheritance at marriage. Gibson and Gurmu (2011) found that having more older brothers decreases a sibling’s agricultural productivity (younger male siblings receive land that is less productive) and diminishes marriage opportunities (via fewer assets brought to the marriage). Lastly, previous research contends that the presence of not only older brothers but also younger siblings may affect youth employment decisions. Gibson and Gurmu (2012) analyzed sibling out-migration in a district of Ethiopia close to the capital of Addis Ababa (in the Oromia region) and found that the birth of a younger sibling doubled the odds of out-migration. The primary reason for migration was to seek secondary education or non-agricultural employment.

Migration and Employment in Rural Ethiopia

Recent analysis of migration in Ethiopia suggests that migrants are predominantly “pushed” from their homes rather than attracted by an urban “pull” of higher returns on human capital investments. For example, the Ethiopian Urban Migration Study (World Bank 2010) reported that more than 42% of migrants stated that they would not have migrated if they had been able to make a living back home. Zeleke et al. (2008) reported that

5 We also asked about the latest (most recent) redistribution to ensure that respondents recalled redistributions following the Derg regime. In 20 kebeles, a land redistribution occurred after 1991; in 7 it did not. The post-Derg major land redistributions in the Amhara region were predominantly implemented during 1997–1998 (Benin and Pender 2001).

6 We also show the robustness of results to alternative years of land redistributions in online supplementary appendix figure 2.

7 For example, while the restrictions are more relaxed in Amhara, the Oromia land proclamation decrees that individuals can rent out only up to half of their land; it also limits the duration of the rental to a maximum of 3 years for those who employ traditional farming and 15 years for mechanized farming (Oromia National Regional State 2007).

8 Farm fragmentation is a challenge in Ethiopia—partly induced by population growth over the last 20–25 years. In response, many regions have introduced restrictions on plot size. Oromia sets a floor of 0.50 hectares for annual crops and 0.25 hectares for perennial crops (Oromia National Regional State 2007), while the minimum in Amhara is 0.25 and 0.11 hectare for plots under rainfed agriculture and irrigation, respectively (Amhara National Regional State 2006, 2007).

9 For further discussion of customary law and inheritance, see North (1990), Fafchamps and Quisumbing (2002), and Mekonnen and Worku (2011).

10 See, for example, research on the effects of sibling composition and rivalry on health outcomes (Kumar and Quisumbing 2012; Mekonnen and Worku 2011; Kushnick 2010; Garg and Morduch 1998; Morduch 2000), educational outcomes (Butcher and Case 1994; Lloyd, Mete, and Grant 2009; Gibson and Sear 2010; Congdon Fors, Houngbedji, and Lindskog 2015), and inheritable wealth (Keister 2003; Grawe 2010; Abramitzky, Boustan, and Eriksson 2013).
young men in the Amhara region were the most likely to migrate, and respondents cited a lack of sufficient means of subsistence, shortage of land, and shortage of employment opportunities in rural areas as the primary motivations. Likewise, Dorosh et al. (2012) find that households with less agricultural land were more likely to send out migrants, as were poorer households and households afflicted by communitywide drought shocks. Further, de Brauw (2014) and Lee and Mueller (2016) reported similar relationships between migration and land. As of 2013, rural-rural and rural-urban migration shares in Ethiopia were almost equivalent at 35% and 33% of total migrants, respectively (National Labor Force Survey 2013).

There are few rural employment opportunities outside of agriculture. Among rural-urban migrants aged 15–65 in a study of four African countries, only 36% were motivated to migrate in search of work (Mueller et al. 2015). Education was the strongest motivation for rural-urban migration (de Brauw, Mueller, and Woldehanna 2013; Mueller 2015), following large national education investments during the last decade (World Bank 2016). Schmidt and Bekele (2016) showed in the case of Ethiopia that only 23% of the economically active population primarily worked in the non-agricultural sector. Among non-agricultural-sector laborers, the largest share (30%) is engaged in sales. The remainder is divided among construction and mining (11%), food processing and craft work (8%), teaching (6%), and a variety of other service jobs. These are largely low-skilled occupations with limited labor demand, possibly explaining why youth are often pushed rather than pulled into them.

Data

Our analysis uses a 2014 cross-sectional data set that draws on data from round 1 (July 2010) and round 2 (December 2014) of a panel survey implemented by the International Food Policy Research Institute (IFPRI) in collaboration with the Ethiopian Development Research Institute (EDRI; IFPRI 2010, 2014). Our universe consists of all direct descendants (98% of them are children) of the round 2 household head and their spouse who were household members and between the ages of 15 and 34 (i.e. youth) at the time of round 1.11 We code two types of outcomes for these descendants: whether or not they had migrated by 2014, and in which sector they worked in 2014. Analysis of the 2014 sector of employment of not only non-migrants but also migrants (who are by our definition no longer household members) is feasible since round 2 uniquely collected inheritance, employment, and migration information on all descendants of the head and their spouse.

Round 1 covered 1,810 households from 27 kebeles in 9 woredas; approximately 200 households were surveyed per woreda. The sample was drawn from a list of woredas in the Blue Nile Basin in the Amhara and Oromia regions.12 The locations of sample woredas are shown in figure 1.13 In round 2, 1,748 of the households interviewed in round 1 were located and their heads interviewed again, representing a household attrition rate of 3.4% over four years. Among households present in both rounds, 834 have youth (aged 15–34) descendants; they contain 1,717 youth descendants. Of these 834 households, 625 have at least one descendant who expects a non-zero land inheritance; this is important since we log the inheritance variable in our main specifications. These 625 households contain 1,170 individuals. As we discuss in detail below, our identification strategy hinges on using household fixed effects to reduce omitted variable bias. Doing so implies that identification is coming from the 338 households with multiple youth descendants; in total, these households contain 883 descendants (i.e., 75.5% of the 1,170), which averages out to 2.6 descendants per household.

We focus on both men and women as nearly two-thirds of sample women are either employed in agriculture, the non-agricultural sector, or are students. While less likely than men to migrate out of their woredas, they are even more likely to migrate to an urban area (see online supplementary appendix table A2).

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11 Further, 2% are other close relatives—mostly stepchildren or grandchildren the head places at the same level as children.

12 To be eligible for selection, a woreda had to contain at least one kebele in these regions’ Sustainable Land Management Program. Three kebeles were then randomly selected in each woreda.

13 For more information on sample selection and site location, see Schmidt and Tadesse (2014).
Variable Measurement

We measure youths’ expected land inheritance by asking household heads about each of their descendants: how much land the person has already received (the average is 0.15 hectares for our main estimation sample) and how much land the head expects to provide in the future (0.33 hectares on average). We consulted the head of the household as heads are generally the primary decision makers regarding inheritances. Summing the two quantities gives the total expected inheritance (0.48 hectares on average). Even if expectations are not fulfilled, we argue that it is expectations that drive behavior and decision-making.

We measure migration in three ways. First, we code a dummy variable for permanent migration that takes a value of 1 for any youth who was a household member in 2010 but is no longer a household member by 2014. Individuals cannot simply be temporarily absent; they must no longer be considered a household member. Second, we code a dummy for long-distance permanent migration, which takes a value of 1 provided that the individual has permanently migrated since 2010 and, by 2014, lives outside of the woreda in which he or she resided in 2010. Finally, we code a dummy for permanent migration to an urban area (i.e., rural-to-urban permanent migration), which takes a value of 1 provided that the individual has permanently migrated since 2010 and, by 2014, lives in an urban area (all origin households are rural). Long-distance permanent migration and rural-to-urban permanent migration are neither mutually exclusive nor exhaustive.

Figure 1. Spatial distribution of survey sites

Source: Authors’ calculations based on IFPRI’s Watershed Surveys of 2010.

14 We asked how much land they had received from either the household or the peasant association.

15 We focus on permanent migration rather than temporary migration due to the relative importance of the former in the study context. While we documented those who were employed seasonally in a location outside of their kebele, there were too few observations (89) to consider temporary migration as an outcome.
individuals may move to an urban area in another woreda and both dummies would take a value of 1, or they may move to another rural area in the same woreda and both dummies would take a value of 0.

We consider two employment outcomes: the individual’s primary occupation is in the agricultural sector and the primary occupation is in the non-agricultural sector. We further examine whether or not the individual’s current primary occupation is attending school (i.e., acquiring human capital).16

Descriptive Statistics

We apply a natural logarithmic transformation to land inheritance to reduce the tendency for extreme outliers to drive inference in the regression analysis. This implies that those who inherit positive amounts of land (71% of the sample) are driving our slope coefficients. Table 1 summarizes the outcomes, inheritance measures, and individual and household characteristics for these individuals.17

Panel A summarizes the outcome variables; 45% of youth permanently migrated between survey rounds. Of these, nearly half moved to locations outside their 2010 woreda, and 62% moved to an urban area.18,19 The primary occupation was most often agriculture (37%) or school (29%), but 16% worked in the non-agricultural sector, and 13% did domestic work; only 4% were unemployed. Looking at sector of employment by migration status is revealing. Among long-distance migrants, only 3% work in agriculture and 11% work in the non-agricultural sector (with the remainder studying, working as domestics, or unemployed). In contrast, among those who did not migrate long-distance, 29% work in agriculture and 8% work in the non-agricultural sector. Statistics are similar when we consider rural-to-urban

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16 There are two other primary occupations, domestic employee and unemployed, as summarized in table 1.

17 Descriptive statistics for the full sample can be found in online supplementary appendix table A3.

18 These numbers come from the following calculations: $\frac{570}{210} = 0.47$ and $\frac{228}{280} = 0.62$. Note that moving out of woreda and moving to an urban area are not mutually exclusive.

19 Our sample implies an annual out-of-woreda (district) migration rate of 5.0%. This is slightly larger than the rate computed using 2007 census data, 1.1% (Mueller et al. 2015), perhaps due to the focus on youth, who have greater rates of mobility (Lee and Mueller 2016) and increasing migration trends.
Table 1. Descriptive Statistics for Sample with Nonzero Expected Land Inheritance

| Variable | Mean | SD  | N   |
|----------|------|-----|-----|
| Panel A: Outcomes |      |     |     |
| Dummy—permanent migrant | 0.45 | 0.50 | 1170 |
| Dummy—permanent migrant out of woreda | 0.21 | 0.41 | 1167 |
| Dummy—permanent migrant to urban area | 0.28 | 0.45 | 1167 |
| Primary occupation is . . . |      |     |     |
| In agriculture | 0.37 | 0.48 | 1,167 |
| In non-agriculture | 0.16 | 0.36 | 1,167 |
| As a student | 0.29 | 0.45 | 1,167 |
| Domestic | 0.13 | 0.34 | 1,167 |
| Unemployed | 0.04 | 0.19 | 1,167 |
| Dummy—did not permanently migrate out of woreda & occupation is in . . . |      |     |     |
| Agriculture | 0.35 | 0.48 | 1,164 |
| Non-agriculture | 0.07 | 0.26 | 1,164 |
| Dummy—permanently migrated out of woreda & occupation is in . . . |      |     |     |
| Agriculture | 0.02 | 0.13 | 1,164 |
| Non-agriculture | 0.09 | 0.28 | 1,164 |
| Dummy—did not permanently migrate to urban area & occupation is in . . . |      |     |     |
| Agriculture | 0.35 | 0.48 | 1,164 |
| Non-agriculture | 0.06 | 0.23 | 1,164 |
| Dummy—permanently migrated to urban area & occupation is in . . . |      |     |     |
| Agriculture | 0.02 | 0.12 | 1,164 |
| Non-agriculture | 0.10 | 0.30 | 1,164 |
| Panel B: Land access |      |     |     |
| Dummy—inherited or expects to inherit land | 1.00 | 0.00 | 1,170 |
| Total land inheritance (hectares) | 0.48 | 2.54 | 1,170 |
| Land already inherited (hectares) | 0.15 | 2.22 | 1,170 |
| Additional land inheritance anticipated (hectares) | 0.33 | 1.21 | 1,170 |
| Log land inheritance | −1.36 | 0.92 | 1,170 |
| Panel C: Individual controls |      |     |     |
| Dummy—male | 0.67 | 0.47 | 1,170 |
| Age | 19.9 | 4.09 | 1,170 |
| Dummy—child of head | 0.98 | 0.13 | 1,170 |
| Dummy—married | 0.05 | 0.23 | 1,170 |
| Dummy—> 1 male descendant immediately follows in birth order | 0.25 | 0.43 | 1,170 |
| Number of older male direct descendants | 1.37 | 1.48 | 1,170 |
| Number of older female direct descendants | 1.17 | 1.38 | 1,170 |
| Dummy—age 18+ at time of land redistribution | 0.17 | 0.38 | 1,170 |
| Dummy—completed cycle 1 of primary school (grade 4) | 0.68 | 0.47 | 1,170 |
| Panel D: Household characteristics |      |     |     |
| Household size | 7.16 | 2.28 | 625 |
| Number of men 18+ in household | 2.00 | 1.09 | 625 |
| Number of women 18+ in household | 1.68 | 0.89 | 625 |
| Number of direct descendants of household head | 7.11 | 2.74 | 625 |
| Dummy—metal roof | 0.67 | 0.47 | 625 |
| Dummy—improved floor | 0.03 | 0.17 | 625 |
| Dummy—head of household is male | 0.83 | 0.37 | 625 |
| Head of household age | 52.8 | 10.99 | 625 |
| Dummy—head of household has no education | 0.58 | 0.49 | 625 |
| Dummy—Orthodox Christian | 0.71 | 0.46 | 625 |
| Dummy—Protestant | 0.25 | 0.43 | 625 |
| Dummy—Muslim | 0.01 | 0.11 | 625 |
| Share of land that household describes as having high or mixed soil quality | 85.2 | 24.0 | 625 |
| Share of males 18+ at time of land redistribution | 0.17 | 0.30 | 625 |
| Panel E: Instrument |      |     |     |
| Excluded instrument* | 0.02 | 0.10 | 1,170 |

Note: Asterisk * indicates that the excluded instrument is the share of male descendants who were older than 18 at the time of the redistribution interacted with a dummy for having more than one male descendant immediately following oneself. Long-distance permanent migration and rural-to-urban permanent migration are neither mutually exclusive nor exhaustive. Land redistribution always refers to the most recent redistribution. Improved floor refers to being made from concrete, stone, cement, tile, bricks, or wood (not made from earth or cow dung). Households without a descendant in the sample are not included in household descriptive statistics. Households with only one descendant in the sample are included in household descriptive statistics (but these only children will not affect the estimates of a household fixed-effects model). Religion is that of the household head.

Source: Authors’ calculations based on IFPRI’s Watershed Surveys of 2010 and 2014.
migration (panel A). The average individual expected to inherit 0.48 hectare of land (panel B).

Panel C shows that the sample is 67% male; this is an artifact of its demographic composition. The average age of the head at baseline is 53, which is well beyond the peak reproductive years of couples. Because women in Ethiopia tend to marry younger than men—half marry by age 18 (Hervish 2011)—many of the head’s daughters were no longer household members at the time of the baseline survey. Thus, our findings reflect decisions made by the population of youth who reside in households led by heads entering a later phase in their life cycle; 83% of heads were male. The descendants’ average age in round 1 was 20 years, 17% were at least 18 years old at the time of the last land redistribution, 68% had finished the first educational cycle (grades 1–4), and few (5%) were married. One-quarter of descendants had more than one male sibling directly following them in birth order. On average, descendants had 1.4 older male descendants and 1.2 older female descendants. Panel D summarizes household characteristics. Although about two-thirds of households had a metal roof, indicating some measure of freedom from extreme poverty, only 3% had an improved floor.

Empirical Strategy

We investigate the effect of land inheritance on youths’ decisions concerning migration and sector of primary employment by estimating the following linear probability model (LPM):

$$E_{ij} = \beta_0 + \beta_1 L_{ij} + \gamma X_{ij} + \alpha_j + \epsilon_{ij}$$

where $i$ indexes individuals and $j$ households. Here, $E_{ij}$ denotes migration and employment indicators: employment in agriculture, employment in the non-agricultural sector, permanent migration, long-distance permanent migration, and rural-to-urban migration.\footnote{In online supplementary appendix A, we instead model simultaneous choices, considering four choices of sector and location of employment: migrated long-distance and works in agriculture; migrated long-distance and works in non-agriculture; did not migrate long-distance and works in agriculture; and did not migrate long-distance and works in non-agriculture. We further examine the same four choices for the case of rural-to-urban migration instead of long-distance migration.}

We denote by $L_{ij}$ the logged expected land inheritance. $X_{ij}$ is a vector of control variables described below, and $\alpha_j$ are household fixed effects. We use control variables from round 1 to avoid reverse causality. Standard errors are clustered at the kebele level, the relevant administrative unit in which land redistribution policies are executed. We employ a LPM to accommodate the use of household fixed effects, which are important to our identification strategy (see below).

Identification

A potential concern of this analysis is that the size of land inheritance is endogenous to migration, employment, and education decisions. There are several possible sources of omitted variable bias likely to bias ordinary least squares (OLS) estimates of $\beta_1$.

First, across households, observed and unobserved covariates may influence both land inheritance and migration and employment decisions. One candidate is a household’s land endowment and wealth; migration is costly and requires payment of up-front costs to finance it (Carrington, Detraigiache, and Vishnawath 1996). At the same time, households with larger endowments can give out larger inheritances. A second candidate is the level of tenure security of households (e.g., whether or not the household has a land use certificate); households that feel more tenure secure (i.e., have less fear of land loss and/or disputes) are more likely to feel that they have a claim to land and can give it out to descendants as inheritance. However, such land tenure security may also reduce the need for households to attach descendants to land as a means of holding onto it, facilitating migration by those descendants. Another candidate concerns skills and networks; heads that are highly-skilled or who have strong networks and connections may find it easier to send a migrant, but these connections might also be used to foster local employment opportunities for descendants. A fourth candidate is experience in agriculture and knowledge of good farming practices; these may have helped the household obtain more land, but could also facilitate employment in agriculture (Bezu and Barrett 2012). While the magnitude of omitted variable bias would shrink as we added household-level controls, it would be impossible to eliminate all bias.
Further, many sources of omitted variable bias are difficult to observe and measure. This motivated us to include household fixed effects.

Second, within a household, parents may select descendants with particular traits—such as physical aptitude for agriculture—for larger inheritances. This would be problematic if such traits also drive employment and migration decisions. Similarly, within a household, parents may prioritize children with good marriage prospects in the village (Fafchamps and Quisumbing 2005). Because such children face lower search costs in finding a partner, they may find higher-quality partners and marry at an earlier age, thus reducing the likelihood of long-distance and rural-to-urban permanent migration. Parents could also prioritize the children most likely to help them in old age (Bernheim, Shleifer, and Summers 1985). Such children may be more or less likely to migrate or to work in agriculture; helpful children may be those who are helpful due to superior physical and mental endowments, but they may also be those who are helpful due to inferior endowments and thus lower opportunity costs of staying behind and serving parents. These potential omitted variables may bias OLS estimates in different directions. Adding to the empirical challenge, another possible source of endogeneity is reverse causality. Our measure of total land inheritance (from 2014) may itself be influenced by the employment and migration decisions already taken by youth as of 2014. A final concern is measurement error; incorrect recall, poor math skills, or simply issues of rounding could lead inheritance to be measured with error. One way of dealing with omitted variables, reverse causality, and measurement error is instrumental variables (IV; Angrist and Pischke 2008, 2010).

We address threats to identification in two main ways. First, we control for factors that may influence both expected land inheritances and migration decisions already taken by youth as of 2014. A final concern is measurement error; incorrect recall, poor math skills, or simply issues of rounding could lead inheritance to be measured with error. One way of dealing with omitted variables, reverse causality, and measurement error is instrumental variables (IV; Angrist and Pischke 2008, 2010).

We address threats to identification in two main ways. First, we control for factors that may influence both expected land inheritances and migration decisions already taken by youth as of 2014. A final concern is measurement error; incorrect recall, poor math skills, or simply issues of rounding could lead inheritance to be measured with error. One way of dealing with omitted variables, reverse causality, and measurement error is instrumental variables (IV; Angrist and Pischke 2008, 2010).

We allow the kebele of residence at baseline to have different impacts on individuals of different gender, age, and marital status by including interactions of kebele fixed effects with a male dummy, with fixed effects for the descendant’s age, and with a dummy for being married at baseline. This flexibly allows different kebeles to differentially treat males, youth at distinct ages, or the married when redistributing land.

Within households, there is variation in expected inheritance across descendants. Some of this variation may be explained by individual characteristics for which we control—being male, being the oldest male, age, marital status, being a child of the head, having completed the first cycle of primary school (up to grade 4), and being at least 18 years old at the time of the last land redistribution—which could influence the extent to which they were taken into account when the government redistributed land. The set of older descendants a youth has is also likely to influence our outcomes because older descendants are: (a) likely to inherit land and other assets ahead of the individual in question, and (b) may help younger siblings find employment or educational opportunities. Following Vogl (2013), we include fixed effects for the permutation of older descendants (e.g., no older descendants, Boy (B)-Girl (G)-Boy (B), GB, BG, BBBB, G, and so on). Vogl (2013) argues that, with this control set, the gender of the next sibling after a descendant (conditional on having one) can be taken as if random. We also control for having more than one male sibling immediately follow oneself in birth order. In our dataset, the median male land inheritance is 60% greater in total area than that of the median female.21 Thus, brothers pose a larger threat to inheriting land than do sisters.

21 This is despite legal provisions giving women equal rights to access, use, and manage land (Amhara National Regional State 2006, 2007; Oromia National Regional State 2007).
Our IV strategy leverages a unique feature of Ethiopia: land access is influenced by large-scale government efforts to redistribute land. Since the installation of Ethiopia’s current government in 1991, 20 of our 27 sample kebeles experienced a large-scale land redistribution affecting a majority of households. Our in-depth interviews with kebele officials suggest that males aged over 18 received priority in redistributions. This suggests that households with a greater share of their male descendants over 18 at the time of the redistribution should have relatively more land to allocate.

Within a household, we might expect “marginal” individuals—those at high risk of receiving very little inheritance—to benefit most from having a greater share of their male co-descendants be older than 18 at the time of the redistribution. Our data reveal one such vulnerable group: those with more than one male sibling immediately behind them in birth order, whose household head will soon after them have multiple boys reaching the age of inheritance.

We use a single interaction term as an instrument for expected land inheritance: the share of male co-descendants who were older than 18 at the time of the last land redistribution interacted with a dummy for having more than one male sibling immediately following the person in birth order. Our data reveal one such vulnerable group: those with more than one male sibling immediately behind them in birth order, whose household head will soon after them have multiple boys reaching the age of inheritance.

We use a single interaction term as an instrument for expected land inheritance: the share of male co-descendants who were older than 18 at the time of the last land redistribution interacted with a dummy for having more than one male sibling immediately following the person in birth order.22 Because we have one excluded instrument (an interaction term), our model is exactly identified. The instrumental variable is summarized in Table 1; its mean is 0.02. The first-stage equation states that an individual’s expected land inheritance, $L_{ij}$, is a function of

$$L_{ij} = \delta_0 + \delta_1 r_{ij} \times m_{ij} + \delta_2 m_{ij} + \theta X_{ij} + \pi_i + \eta_{ij}$$

where $r_{ij}$ is the share of male descendants in the household who were older than 18 at the time of the most recent land redistribution, $m_{ij}$ is a dummy for having more than one male sibling immediately following the descendant in question, and $\pi_i$ are household fixed effects.23

The validity of this instrument rests on a single identifying assumption: that the difference in the effect of having a larger share of male descendants in the household be older than 18 at the time of land redistribution on those with vs. without more than one male sibling immediately following in birth order only affects migration and employment decisions through its effect on expected land inheritance. Importantly, the individual components of the excluded instrument, $m_{ij}$ and $r_{ij}$, are included in the main specification of equation (1); the latter through use of household fixed effects. In so doing, we avoid making the assumption that these components only affect migration and employment outcomes through their effect on the size of inheritance.

A number of other papers have used interaction terms as excluded instrumental variables. For example, Nunn and Qian (2014) study the effect of U.S. food aid on conflict in recipient countries; they use panel data to construct the interaction of last year’s U.S. wheat production and the average proportion of years over the full sample period that a country receives U.S. food aid and use this as an instrument for the amount of food aid received by a country in a given year. Miguel, Satyanath, and Sergenti (2004) examine the effects of economic growth on civil conflict, experimenting with several interaction terms as instruments for growth, including the following: the interaction of current and lagged rainfall growth, the interaction of rainfall growth with the share of agricultural sector value added in national GDP, and the interaction of rainfall growth with the share of the national population that is rural. Alderman et al. (2001) consider how child health impacts child education; they use past price shocks as instruments for child health, interacting these with levels of parental education to induce variability in these shocks at the household level. Further, Bartik (1987) more broadly notes the usefulness of interaction terms as excluded instruments when an instrument does not have the same impact on all observations.

Table 2 (columns 1 and 2) shows that this instrument satisfies the inclusion restriction: it is a strong predictor of the size of individual $i$’s land inheritance. In the baseline specification with the full control set (column 2), a standard deviation (0.11 unit) increase in the excluded instrument makes one’s land inheritance 1.3 times greater.24 The F statistic on the excluded instrument is 26.6, suggesting no problems of weak instruments. We argue that

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22 In the 7 kebeles without redistributions, we code that the share of descendants older than 18 at the time of the most recent land redistribution is 0, to reflect that none of the descendants helped the household obtain more land by virtue of their age.

23 Variable $r_{ij}$ does not appear in the regression in its level form because it is collinear with the household fixed effects.

24 This comes from taking $\exp(2.478 \times 0.11) = 1.3$. 

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Table 2. IV First-stage Results

| Excluded instrument | (1)      | (2)      | (3)      | (4)      | (5)      | (6)      | (7)      | (8)      |
|---------------------|----------|----------|----------|----------|----------|----------|----------|----------|
| Dummy for > 1 male descendant immediately following in birth order × share of male descendants 18+ at time of land redistribution | 2.501*** | 2.478*** |          |          |          |          |          |          |
| (0.460)             | (0.480)  |          |          |          |          |          |          |          |
| Dummy for > 1 male descendant immediately following in birth order × share of male descendants 18+ at time of land redistribution | 3.307*** | 3.287*** |          |          |          |          |          |          |
| (0.641)             | (0.642)  |          |          |          |          |          |          |          |
| Share of male descendants among the 2 descendants immediately following in birth order × share of male descendants 18+ at time of land redistribution |          |          |          |          |          |          |          |          |
| (1.595)             | (1.613)  |          |          |          |          |          |          |          |
| Dummy for > 1 male descendant immediately following in birth order | −0.082   | −0.079   | −0.096   | −0.094   |          |          |          |          |
| (0.061)             | (0.065)  | (0.069)  | (0.075)  |          |          |          |          |          |
| Share of male descendants among the 2 descendants immediately following in birth order |          |          |          |          | 0.080    | 0.089    | 0.119    | 0.126    |
| (0.151)             | (0.139)  | (0.152)  | (0.139)  |          |          |          |          |          |
| Observations        | 1,170    | 1,170    | 1,170    | 1,170    | 1,011    | 1,011    | 1,011    | 1,011    |
| R-squared           | 0.902    | 0.902    | 0.903    | 0.903    | 0.909    | 0.910    | 0.906    | 0.907    |
| Number of households| 625      | 625      | 625      | 625      | 557      | 557      | 557      | 557      |
| First-stage F stat  | 29.59    | 26.63    | 26.65    | 26.24    | 3.05     | 3.02     | 1.44     | 1.44     |
| Full set of individual-level controls? | No       | Yes      | No       | Yes      | No       | Yes      | No       | Yes      |

Note: The share of male descendants among the 2 descendants immediately following in birth order takes a value of 0, 1, or missing if there are fewer than two descendants following in the birth order. All specifications include fixed effects for exact permutation of older sibling sex, for kebele × age fixed effects, for kebele × marital status, and for kebele × gender. Individual-level controls include dummies for being a child of the head of household, for being at least 18 years old at the time of the kebele’s last land redistribution, for completing cycle 1 of primary school (grades 1–4), and for being the oldest direct descendant and being male. The first-stage F statistic is the t-statistic on the excluded instrument squared. Standard errors appear in parentheses and are clustered at the kebele level. Asterisks *** indicate p < 0.01; ** indicate p < 0.05; and * indicates p < 0.10.

Source: Authors’ calculations based on IFPRI’s Watershed Surveys of 2010 and 2014.
the exclusion restriction holds because the precise timing of land redistributions in a kebele—and specifically, the difference between its effect on those with vs. without multiple male siblings immediately behind them in birth order—should be exogenous to the within-household selection mechanism determining the size of individual land inheritances. We also show in online supplementary appendix B that this F statistic is maximized when we use the actual year of land redistribution rather than a date up to 15 years later or earlier—evidence that it is indeed the extra land made available by redistributions that drives this result.

We also experiment with several possible alternative instrumental variables in columns 3–8 of Table 2. Specifically, we consider new variants on $m_{ij}$ and $r_{ij}$, respectively: using the share of the next two descendants who are male in place of a dummy for having multiple males, and using the share of all descendants (not only male, but also female) who were over age 18 at the time of the last land redistribution. We show the first stages emerging from all possible combinations of these new variants on $m_{ij}$ and $r_{ij}$ and our original variants. We find very similar coefficients across all 8 specifications, but greater statistical significance for our original instrument (columns 1–2); we thus use this instrument. That this instrument is stronger suggests that there are nonlinear rather than linear impacts associated with having multiple brothers immediately follow in the birth order, and that having brothers over the age of 18 at the time of distribution was more helpful than having sisters over the age of 18, from the perspective of total inheritance.

Results

In this section, we present OLS and IV results showing the impacts of the expected size of land inheritance on migration and employment outcomes. Exploratory OLS analysis using subsets of the sample (for which we cannot carry out IV analysis due to weak instruments) helps us ascertain how land inheritance as a predictor of migration and employment varies with gender, age, and three mediating factors: the prevalence of land rental and thus quality of rental markets; proximity to a major urban center; and soil fertility.

Migration

Online supplementary Appendix table A4, Panel A, presents OLS results from regressions of permanent migration (to any area) (columns 1–2), long-distance permanent migration (columns 3–4), and permanent migration to an urban area (columns 5–6) on a youth’s logged expected land inheritance. We present specifications with (even-numbered columns) and without (odd-numbered columns) the full control set; all specifications include household fixed effects. Regardless of the control set used, OLS results suggest strong and statistically significant negative relationships between inheritance and long-distance migration and between inheritance and rural-to-urban migration.\(^{25}\)

Table 3, panel A compares these OLS estimates (columns 1–3) with IV estimates (columns 4–6).\(^{26}\) The IV estimates are for all three outcomes larger in magnitude. For the case of permanent migration to any area, the coefficient is only statistically significant in the IV results. As for OLS, the IV results reveal strong negative impacts of expected land inheritance on long-distance permanent migration and rural-to-urban permanent migration. A 10% increase in a youth’s land inheritance is associated with an 8.1 percentage point decrease in the incidence of long-distance permanent migration and a 4.8 percentage point decrease in the incidence of rural-to-urban permanent migration.\(^{27}\) Relative to the means of each of these outcomes, these figures indicate a 30.0% and a 14.1% reduction in long-distance permanent migration and rural-to-urban migration, respectively. Impacts of receiving a larger land inheritance on migration therefore

\(^{25}\) While a full 71% of the sampled youth expect to inherit land, 29% did not and are accordingly omitted since our regressions use logged land inheritance. We explore whether or not their omission is consequential for our main findings by considering two alternate measures of expected inheritance: a dummy for having inherited or expecting to inherit land (takes on 1 for all with positive expectations, and 0 for the 29% not inheriting land; see online supplementary appendix table A5), and total land inheritance in hectares (not logged; see online supplementary appendix table A6). Our main findings are unchanged; land inheritance predicts less migration—especially long-distance and rural-to-urban migration. Finally, we show that our results are robust to using data collected from descendants themselves on whether or not they expected to inherit land (see online supplementary appendix table A7). These data are often missing for migrants and thus yield a smaller and non-representative sample, but show the same broad pattern of results.

\(^{26}\) We use the Stata package –xtivreg2– written by Schaffer (2010).

\(^{27}\) Given the level-log model, here and elsewhere, the effect of a 10% increase in land inheritance is obtained by taking the coefficient on expected land inheritance $\times \ln(1.1)$.  

Electronic copy available at: https://ssrn.com/abstract=3577939
seem to operate through their tendency to reduce long-distance and rural-to-urban migration, and not other, more local types of moves (including the formation of a new household close to the origin).

**Employment**

Table A4, Panel B presents OLS results from regressions of dummies for primary employment in agriculture (columns 1–2), primary employment in non-agriculture (columns 3–4), and primary status as a student (columns 5–6) on the logged amount of expected land inheritance in hectares. Once again, even-numbered columns do not include our full control set, while odd-numbered columns do, and all specifications include household fixed effects. The OLS results suggest a strong positive relationship between inheritance and employment in agriculture that is always statistically significant.\(^{28}\)

In panel B of table 3, we compare these OLS estimates (columns 1–3) with IV estimates (columns 4–6). The IV results reveal a significant, positive impact of inheriting more land on employment in agriculture, which supports the OLS results but is even larger in magnitude and more statistically significant. Specifically, a 10% increase in expected land inheritance increases the incidence of employment in agriculture by 6.2 percentage points, which is a 19.4% increase relative to the mean incidence of employment in agriculture (significant at the 0.01 level). The impact of land inheritance on employment in the non-agricultural sector is also larger in the

\(^{28}\) Once again, these findings are robust to using a dummy for having inherited or expecting to inherit land (see online supplementary appendix table A5), using total land inheritance in hectares (not logged; see online supplementary appendix table A6), and using data collected from descendants themselves on whether or not they expected to inherit land (see online supplementary appendix table A7).

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**Table 3. Comparison of OLS and IV Results Showing how the Amount of Land Inheritance Predicts Migration and Employment Decisions**

|                  | OLS          | IV           |
|------------------|--------------|--------------|
|                  | (1)          | (2)          | (3)          | (4)          | (5)          | (6)          |
| **Panel A: Migration** |              |              |              |              |              |              |
| Dummy - migrated. |              |              |              |              |              |              |
| Anywhere         |              |              |              |              |              |              |
| Log land inheritance | \(-0.165^{**}\) | \(-0.252^{**}\) | \(-0.283^{***}\) | \(-0.198\) | \(-0.855^{***}\) | \(-0.508^{***}\) |
| Observations     | 1,170        | 1,167        | 1,167        | 1,170        | 1,167        | 1,167        |
| R-squared        | 0.783        | 0.788        | 0.800        | 0.783        | 0.727        | 0.791        |
| Number of households | 625          | 624          | 624          | 625          | 624          | 624          |
| First Stage F-Stat | 21.73        | 21.73        | 21.73        | 21.73        | 21.73        | 21.73        |

| **Panel B: Employment** |              |              |              |              |
| Dummy - primarily employed. |              |              |              |              |
| In agriculture |              |              |              |              |
| Log land inheritance | \(0.262^{**}\) | \(-0.180\) | \(-0.050\) | \(0.655^{***}\) | \(-0.427^{***}\) | \(-0.171\) |
| Observations     | 1,167        | 1,167        | 1,167        | 1,167        | 1,167        | 1,167        |
| R-squared        | 0.815        | 0.753        | 0.778        | 0.799        | 0.742        | 0.776        |
| Number of households | 625          | 625          | 625          | 625          | 625          | 625          |
| First Stage F-Stat | 22.61        | 22.61        | 22.61        | 22.61        |

Note: Migrated is defined as living in the household during round 1, and living elsewhere in round 2. All specifications include dummies for being a child of the head of household, for being at least 18 years at the time of the kebele’s last land redistribution, for completing cycle 1 of primary school (grades 1–4), for being the oldest direct descendant and being male, and for having multiple male descendants immediately following in birth order. Also included are fixed effects for exact permutation of older sibling sex, for kebele × age fixed effects, for kebele × marital status, and for kebele × gender. Standard errors are in parentheses and clustered at the kebele level. Asterisks ** indicate \(p < 0.01\); ** indicate \(p < 0.05\); and * indicates \(p < 0.10\).

Source: Authors’ calculations based on IFPRI’s Watershed Surveys of 2010 and 2014.
IV results than in the OLS results, and significant at the 0.01 level; a 10% increase in land inheritance leads to a 4.1 percentage point increase in employment in the non-agricultural sector, or a 21.6% increase relative to the variable’s mean. Both OLS and IV results, however, reveal no impact of receiving a larger land inheritance on the probability of being a student. Inheriting land seems to powerfully impact one’s sector of employment but not the choice of whether or not to study.29

Estimates by Gender and Age

Although we have thus far identified average impacts of the size of land inheritance on youth migration and employment outcomes, we have not examined how these impacts differ across youth with different characteristics. However, from a policy perspective, it is important to understand which individuals in the sample drive the results the most. Of special importance are the differential impacts on men vs. women, and on youth of below-median (15 to 19) vs. above-median (20 to 34) age. As cultural and social norms often disfavor women in land inheritance (Fafchamps and Quisumbing 2002) and in educational and employment opportunities (Croppenstedt, Goldstein, and Rosas 2013), one might expect land inheritance to have a significantly different impact on young women than on their male co-descendants. In addition, a lack of financial independence can delay other social and political milestones in youths’ lives (Honwana 2012). Thus, the very young may not be poised to make major migration and employment decisions in response to an inheritance, while older youth may be at critical junctures at which land strongly influences their decision-making.

Unfortunately, we face problems of weak instruments when we split the sample, and thus must estimate an OLS model.30 However, to the extent that the bias in the OLS estimates is uncorrelated with gender, the relative size of the coefficients on land inheritance for men vs. women is informative. Table 4, panel A, estimates a model that interacts all explanatory variables with gender; this allows us to compare how well land inheritance predicts migration and employment outcomes for men vs. women, and to test for any statistically significant differences.

What is immediately apparent is that men drive the results for migration. Land inheritance is not a significant predictor of permanent migration by women, but it predicts a significantly lower likelihood of long-distance permanent migration and rural-to-urban permanent migration for men. Further, these differences are both significant at the 0.01 level. We also find that larger inheritances predict a greater likelihood of working in agriculture for both genders, though this finding is statistically significantly larger in magnitude for men. That is, increasing a man’s inheritance increases his likelihood of working in agriculture more than it increases a woman’s chances. Although inheriting more land predicts a lower probability of working in the non-agricultural sector for both genders, this finding is statistically significant only for men. A small land inheritance may drive men to the non-agricultural sector, but women do not take up these non-farm opportunities—possibly due to the above-hypothesized higher barriers to entry that they face. This difference between the findings for men and women is statistically significant at the 0.05 level. Finally, inheriting more land does not predict a higher probability of being a student for either gender.

Panel B of table 4 estimates a model that interacts the full set of individual-level controls with a dummy for being 20 years old or older—the median age in our sample. We see that the migration results are mostly driven by those aged 20–34 (older youth), as are reductions in employment in the non-agricultural sector. However, land inheritance predicts similar increases in employment in agriculture for both groups. Neither age group is less likely to be a student as a result of inheriting more land; in general, land inheritance does not matter much for whether or not one

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29 Online supplementary Appendix table A8 considers whether our results are robust to considering the decision of the sector and the location in which to work jointly using the following four outcomes: migrated long-distance and works in agriculture; migrated long-distance and works in non-agriculture; did not migrate long-distance and works in agriculture; and did not migrate long-distance and works in non-agriculture. Inheriting more land is always correlated with a higher likelihood of staying in the wereda to work in agriculture (statistically significant at the 1% level in both OLS and IV results) and with a lower likelihood of any of the other three outcomes. In the case of the IV results, these findings are always statistically significant at conventional levels, with the exception of the outcome of staying in the wereda to work in non-agriculture. online supplementary Appendix table A9 presents analogous results instead considering rural-to-urban migration as opposed to long-distance migration, and shows substantially similar findings.

30 Due to degrees-of-freedom considerations in analyses by gender and youth age group, we estimate a slightly modified specification that uses gender, marital status, and age fixed effects instead of fixed effects for kebele × gender, kebele × marital status, and kebele × age fixed effects.
studies—either in the aggregate, or for a particular gender or age group. This finding is consistent with the overall low prioritization of education among rural households in Ethiopia relative to other countries (Dillon and Barrett 2014). Overall, these findings are consistent with older youth being those most vulnerable to having their decisions impacted by land inheritance, while the relatively young are not yet making major life decisions in response to an expected inheritance. On the other hand, it could also indicate that there is greater uncertainty surrounding the land inheritance expectations of the very young compared to their older co-descendants.

Estimates by Rental Markets, Proximity to Urban Center, and Soil Fertility

It is unlikely that land inheritance has the same impact on youths’ decisions in all settings. In particular, various factors may influence the costs and benefits associated with employment and migration decisions, thus moderating the relationship between inheritance and these decisions. We identify three such factors: the prevalence of land rental and thus the quality of land rental markets, proximity to a major urban center, and soil fertility. We differentiate kebeles with relatively low land rental activity from those with relatively high land rental activity by examining whether a kebele is below or above the median in terms of the share of households renting out land. We distinguish kebeles that are relatively close to and far from a major urban center by dividing kebeles into those that are below and above the median in terms of travel times, respectively. (Following the Ethiopia Central Statistical Agency, we define major urban centers as all regional capitals plus other cities with populations of 100,000 or more in 2007 (Central Statistical Agency of Ethiopia 2014).) We also divide kebeles into

Table 4. Analysis of Impacts of Size of Land Inheritance on Migration and Employment Outcomes by Gender and by Age (OLS)

|                      | Dummy - migrated... | Dummy - primarily employed... |
|----------------------|---------------------|-----------------------------|
|                      | Anywhere (1)        | Out of woreda (2)           | To urban area (3)  | In agriculture (4) | In non-agriculture (5) | As a student (6) |
| Log land inheritance (women) | 0.097 (0.073) | 0.024 (0.044) | −0.022 (0.053) | 0.154*** (0.047) | −0.078 (0.047) | −0.082 (0.065) |
| Log land inheritance (men)   | −0.003 (0.062) | −0.155*** (0.047) | −0.188*** (0.051) | 0.226*** (0.047) | −0.163*** (0.042) | −0.058 (0.061) |
| Observations             | 1.170 (0.418) | 1.167 (0.449) | 1.167 (0.415) | 1.167 | 1.167 | 1.167 |
| R-squared                | 0.418 (0.041) | 0.449 (0.055) | 0.415 (0.058) | 0.563 | 0.436 | 0.525 |
| Number of households     | 625 (0.11) | 624 (0.002) | 624 (0.004) | 625 | 625 | 625 |
| p-value of difference    | 0.11 (0.002) | 0.002 (0.004) | 0.004 (0.005) | 0.093 | 0.022 | 0.614 |
| **Panel B: By age**      |                     |                             |                     |                   |                   |                   |
| Log land inheritance (20-34) | −0.010 (0.068) | −0.104* (0.055) | −0.149** (0.058) | 0.220*** (0.053) | −0.139*** (0.040) | −0.011 (0.058) |
| Log land inheritance (15-19) | −0.024 (0.09) | −0.028 (0.056) | −0.107 (0.066) | 0.221*** (0.046) | −0.061 (0.048) | −0.082 (0.077) |
| Observations             | 1.170 (0.407) | 1.167 (0.425) | 1.167 (0.393) | 1.167 | 1.167 | 1.167 |
| R-squared                | 0.407 (0.047) | 0.425 (0.056) | 0.393 (0.066) | 0.542 | 0.424 | 0.501 |
| Number of households     | 625 (0.799) | 624 (0.096) | 624 (0.317) | 625 | 625 | 625 |
| p-value of difference    | 0.799 (0.096) | 0.096 (0.317) | 0.317 (0.069) | 0.984 | 0.069 | 0.181 |

Note: Migrated is defined as living in the household during round 1, and living elsewhere in round 2. Estimates are from completely interacted models where gender and age (15–19 years vs. 20–34 years) dummies are interacted with all controls. All specifications include dummies for gender, for age, for marital status, for being a child of the head of household, for being at least 18 years at the time of the kebele’s last land redistribution, for completing cycle 1 of primary school (grades 1–4), for being the oldest direct descendant and being male, and for having multiple male descendants immediately following in the birth order. Also included are fixed effects for exact permutation of older sibling sex. The p-value of difference refers to the p-value for the interacted log land inheritance variable.

Standard errors are in parentheses and clustered at the kebele level. Asterisks *** indicate p < 0.01; ** indicate p < 0.05; and * indicates p < 0.10. Source: Authors’ calculations based on IFPRI’s Watershed Surveys of 2010 and 2014.

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those with relatively low-quality and high-quality soil by considering whether the kebele is below or above median in terms of the share of owned land that has either mixed or high quality soil, as opposed to low quality soil. The use of kebele-level averages helps reduce concerns related to the endogeneity of household-level data.

Dummies for living in a kebele with above-median land rental markets, above-median proximity to a major urban center, or above-median soil quality are clearly collinear with our household fixed effects; we are thus unable to estimate their individual impacts on migration and employment outcomes. Instead, we are interested in estimating whether land inheritance interacted with these kebele-level dummies is statistically significant. That is, does the impact of receiving a large land inheritance vary according to the richness of land rental markets, the proximity of an urban center, or the level of soil quality? Again, we estimate a model by OLS that interacts the full set of individual-level controls with one of these three dummies.32

As shown in table 5, the size of land inheritance is a more powerful predictor of spatial and sectoral location decisions in areas with less vibrant land rental markets (panel A), in areas further from major urban centers (panel B), and in places with lower soil fertility (panel C). We consider each of these in turn.

First, where land rental market activity is low (below the median), a reduction in one’s land inheritance predicts a significantly greater tendency to migrate to an urban area and be employed in the non-agricultural sector than that seen in areas with richer rental markets. Rental may be a viable alternative to inheritance, but where such markets are thin, youth not inheriting land tend to migrate and enter the non-agricultural sector in higher numbers. This evidence is consistent with the partial substitutability of inherited land access via land rental markets.

As these are OLS estimates (given that our excluded instrument is weak in sub-samples), they may be affected by the endogeneity of land rental markets to employment and migration decisions. Arguably the most likely source of endogeneity comes from the fact that places with vibrant land markets are also likely to be places in which land scarcity is high; scarcity creates value, and this value (demand) stimulates the creation of markets. However, where land is scarce and thus more valuable, we would expect inheritance to exhibit a relatively greater pull on individuals, making them even more likely to stay in agriculture and forgo migration. This source of endogeneity would accordingly bias us against finding the results that we do—that is, inheritance exhibits a lesser pull to stay in agriculture (and forgo migration) when land markets are more vibrant. Even if the magnitude of our estimates is wrong, our broad conclusion about the likely partial substitutability of inheritance and rental land is thus likely to hold.

Travel time to a major urban center appears to matter as well; for those far away (with greater than median travel time), a reduction in one’s land inheritance is a significantly greater predictor of long-distance and rural-to-urban permanent migration, and of employment in the non-agricultural sector, than it is for those nearby. When an urban center is nearby, youth employment in the non-agricultural sector is largely unaffected by the size of land inheritance, and we see little impact on long-distance or rural-to-urban migration, reflecting greater off-farm employment opportunities close to home.

Finally, where soil quality is low (below median), a reduction in one’s land inheritance predicts a significantly greater tendency to migrate to an urban area and be employed in the non-agricultural sector than that seen in areas with higher quality soil. This is consistent with youth requiring more land to attract them to stay at home (and not work in the non-agricultural sector) when soil is of poorer quality (a quantity-quality trade-off).

Discussion

We find strong relationships between expected land inheritance and youths’ (ages 15–34) likelihood of engaging in long-distance permanent migration, rural-to-urban permanent migration, and non-agricultural-sector employment in rural Ethiopia. Our empirical model employs household fixed effects to examine how well within-household variation in expected land inheritances predicts within-household variation in migration and employment outcomes. We exploit

32 These regressions further include fixed effects for kebele × gender, kebele × marital status, and kebele × age fixed effects, as well as their interactions with one of the two dummies (for rental market activity or for travel time to a major urban center).
exogenous variation in the timing of land redistributions to overcome the endogeneity of the size of land inheritance. The analysis reveals that a 10% increase in inheritance size reduces rural-to-urban migration and employment in the non-agricultural sector by 4.8 and 4.1 percentage points, respectively. These findings are largely driven by the male and 20- to 34-year-old sub-populations. The period from 20 to 34 years of age is crucial because it is the stage of the life cycle when individuals typically form new households. The fact that the employment decisions of older youth are most susceptible to expected

Table 5. Analysis of Impacts of Size of Land Inheritance on Migration and Employment Outcomes by Depth of Land Rental Markets and by Travel Time to a Major Urban Center (OLS)

| Panel A: By land rental market activity | Dummy–migrated… | Dummy–primarily employed… |
|----------------------------------------|------------------|---------------------------|
|                                        | Anywhere (1)     | Out of woreda (2)         | To urban area (3)                            |
| Log land inheritance (low activity)     | -0.337***        | -0.181*                   | -0.514***                                  |
|                                        | (0.108)          | (0.094)                   | (0.080)                                    |
| Log land inheritance (high activity)    | -0.179           | -0.378**                  | -0.267***                                  |
|                                        | (0.119)          | (0.151)                   | (0.077)                                    |
| Observations                           | 1.170            | 1.167                     | 1.167                                      |
| R-squared                              | 0.830            | 0.848                     | 0.850                                      |
| Number of households                   | 625              | 624                       | 624                                        |
| p-value of difference                  | 0.335            | 0.280                     | 0.035                                      |

| Panel B: By distance to major urban center | Dummy–migrated… | Dummy–primarily employed… |
|-------------------------------------------|------------------|---------------------------|
|                                        | Anywhere (1)     | Out of woreda (2)         | To urban area (3)                            |
| Log land inheritance (close)             | 0.430***         | 0.173                     | -0.071                                     |
|                                        | (0.079)          | (0.131)                   | (0.064)                                    |
| Log land inheritance (far)               | -0.126           | -0.330**                  | -0.317***                                  |
|                                        | (0.100)          | (0.158)                   | (0.073)                                    |
| Observations                           | 1.170            | 1.167                     | 1.167                                      |
| R-squared                              | 0.841            | 0.849                     | 0.871                                      |
| Number of households                   | 625              | 624                       | 624                                        |
| p-value of difference                  | 0.000            | 0.021                     | 0.018                                      |

| Panel C: By kebele soil quality | Dummy–migrated… | Dummy–primarily employed… |
|---------------------------------|------------------|---------------------------|
|                                | Anywhere (1)     | Out of woreda (2)         | To urban area (3)                            |
| Log land inheritance (lower quality) | -0.327*          | -0.318***                 | -0.569***                                  |
|                                | (0.171)          | (0.090)                   | (0.129)                                    |
| Log land inheritance (higher quality) | -0.182           | -0.350**                  | -0.269***                                  |
|                                | (0.139)          | (0.149)                   | (0.081)                                    |
| Observations                           | 1.170            | 1.167                     | 1.167                                      |
| R-squared                              | 0.830            | 0.849                     | 0.856                                      |
| Number of households                   | 625              | 624                       | 624                                        |
| p-value of difference                  | 0.516            | 0.857                     | 0.059                                      |

Note: Migrated is defined as living in the household during round 1 and living elsewhere in round 2. We calculate the share of households in each kebele with at least one parcel of land either rented, sharecropped, or temporarily loaned. The median share across the kebeles is 22.5%. Low and high activity refers to being below and above the median share of households, respectively. Close and far refer to a household’s being greater than or less than (respectively) the median travel time (107 minutes) to a major urban center (regional capital or city with a population of 100,000 or more in 2007). For the soil quality models, the share of land that is “fertile” or “mixed” quality (as reported) is calculated for each kebele. This share ranges from 55.8% to 99.8%. A soil quality dummy is constructed for a kebele having more than the median share of fertile or mixed quality land. Estimates are from completely interacted models in which rental market activity, distance, and soil quality dummies are interacted with all controls. All specifications include dummies for being a child of the head of household, for being at least 18 years old at the time of the kebele’s last land redistribution, for completing cycle 1 of primary school (grades 1–4), for being the oldest direct descendant and being male, and for having multiple male descendants immediately following in the birth order. Also included are fixed effects for exact permutation of older sibling sex, for kebele × age fixed effects, for kebele × marital status, and for kebele × gender. The p-value of difference refers to the p-value for the interacted log land inheritance variable. Standard errors are in parentheses and clustered at the kebele level. Asterisks *** indicate p < 0.01; ** indicate p < 0.05; and * indicates p < 0.10.

Source: Authors’ calculations based on IFPRI’s Watershed Surveys of 2010 and 2014.

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land inheritance evokes the African concept of *waithood* (Honwana 2012), whereby older youth postpone major employment decisions until they attain financial independence.

We additionally examine whether our main effects are significantly different in communities with varying levels of three mediating factors that might influence the costs of migration, opportunity costs, and barriers to entry into the non-agricultural sector: the quality of land rental markets, travel time to a major urban center, and soil quality. This analysis offers suggestive evidence on the contexts in which land inheritance is likely to matter most for youth decision-making.

First, access to land rental markets could provide an alternative to inherited land and facilitate youth self-employment in agriculture. The relationship between land inheritance and rural-urban migration appears to weaken, and that between land inheritance and non-agricultural employment is entirely eliminated, in areas of high rental market activity. This reaffirms the notion that push factors dominate pull factors in dictating migratory decisions in Ethiopia (World Bank 2010). These results highlight youth preferences to use migration or non-agricultural employment as a last resort after exhausting other means of accessing land (such as rental markets). They also support the notion that rural inhabitants diversify sectorally (Schmidt and Bekele 2016), particularly in areas constrained by land availability, rather than exit agriculture altogether.

Second, a reduction in either moving costs or search costs, captured by being closer to an urban area, may mediate the effect expected inheritance has on employment and relocation. There is no apparent relationship between land inheritance and either migration or non-agricultural-sector employment in areas closest to urban areas (those with below-median travel times). The wage gap between rural and urban areas is likely negligible in such settings, disincentivizing migration. Moreover, employment in places close to urban areas is likely driven by labor demand. In contrast, in remote areas, youth are most likely pushed to diversify through non-agricultural sector employment or migration when subject to liquidity constraints, such as under periods of income variability (Gray and Mueller 2012) or land scarcity (Deininger, Ayalew, and Alemu 2007; Bezu and Holden 2014). We show that when land constraints on youth in remote areas are relaxed, their proclivity to engage in long-distance migration or rural non-farm employment is greatly reduced.

Finally, a lower-quality land inheritance, captured by poor soil quality, may mediate the relationship between inheritance and employment and migration decisions. When land is of lower quality, more of it may be necessary to produce the same output. Even a small reduction in one’s inheritance may push households to the point at which staying at home and working in agriculture is not as profitable as other opportunities. Indeed, we find that where soil quality is low (below median), a reduction in one’s land inheritance predicts a significantly greater tendency to migrate to an urban area and be employed in the non-agricultural sector than that seen in areas with higher-quality soil.

Our findings have broader implications for the development strategies available to Ethiopia. Effective and non-distortionary government policies are needed to ensure that youth remain economically engaged and productive. In this regard, relaxing policy-induced frictions in the land rental market in the country (Holden and Ghebru 2016) or otherwise freeing up land for individual use can result in far-reaching impacts in reducing youth unemployment. Educational campaigns, starting at a young age, in conjunction with investments in the service and manufacturing sectors, will be crucial to absorb youth with limited opportunities for land ownership. The government has signaled its commitment to the latter under its Five-Year Growth and Transformation Plan (2015/2016–2019/2020) (Schmidt and Bekele 2016). Finally, there is a growing need to initiate modernization in the agricultural sector by increasing access to extension and encouraging the widespread adoption of agricultural technologies. Under such conditions, agricultural growth will increase rural household welfare, thus generating the demand for auxiliary services and goods, which landless rural youth can provide.

**Supplementary Material**

Supplementary material are available at *American Journal of Agricultural Economics* online.
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