IFPRI Discussion Paper 01594

December 2016

The Effect of Land Inheritance on Youth Employment and Migration Decisions

Evidence from Rural Ethiopia

Katrina Kosec

Hosaena Ghebru

Brian Holtemeyer

Valerie Mueller

Emily Schmidt

Development Strategy and Governance Division

INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

The International Food Policy Research Institute (IFPRI), established in 1975, provides evidence-based policy solutions to sustainably end hunger and malnutrition and reduce poverty. The Institute conducts research, communicates results, optimizes partnerships, and builds capacity to ensure sustainable food production, promote healthy food systems, improve markets and trade, transform agriculture, build resilience, and strengthen institutions and governance. Gender is considered in all of the Institute's work. IFPRI collaborates with partners around the world, including development implementers, public institutions, the private sector, and farmers' organizations, to ensure that local, national, regional, and global food policies are based on evidence.

AUTHORS

Katrina Kosec (k.kosec@cgiar.org) is a senior research fellow in the Development Strategy and Governance Division of the International Food Policy Research Institute (IFPRI), Washington, DC.

Hosaena Ghebru is a research fellow in the Development Strategy and Governance Division of IFPRI, Addis Ababa.

Brian Holtemeyer is a research assistant in the Development Strategy and Governance Division of IFPRI, Washington, DC.

Valerie Mueller is a senior research fellow in the Development Strategy and Governance Division of IFPRI, Washington, DC.

Emily Schmidt is an associate research fellow in the Development Strategy and Governance Division of IFPRI, Washington, DC.

Contents

Tables

Figures

ABSTRACT

How does the amount of land youth expect to inherit affect their migration and employment decisions? This paper explores this question in the context of rural Ethiopia using panel data from 2010 and 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 during this time. Inheriting more land is also associated with a significantly higher likelihood of employment in agriculture and a lower likelihood of employment in the nonagricultural 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 several mediating factors matter. Land inheritance plays a much more pronounced role in predicting rural-to-urban permanent migration and nonagricultural-sector employment in areas with less vibrant land markets and in relatively remote areas (those far from major urban centers). Overall, the results suggest that inheritance strongly influences the spatial location and strategic employment decisions of youth.

Keywords: agriculture, employment, land inheritance, migration, youth

ACKNOWLEDGMENTS

This work was undertaken as part of, and partially funded by, the CGIAR Research Program on Policies, Institutions, and Markets (PIM), which is led by the International Food Policy Research Institute (IFPRI) and funded by CGIAR Fund Donors. Financial support from the Ethiopia Strategy Support Program of IFPRI is also acknowledged. We are grateful to Paul Christian, Alan de Brauw, Paul Dorosh, Jessica Heckert, Jordan Kyle, Jessica Leight, and Tewodaj Mogues for comments on previous versions of this manuscript. We also thank Mekamu Kedir for excellent research assistance. Comments or suggestions are welcome and may be sent to Katrina Kosec, k.kosec@cgiar.org. This paper has not gone through IFPRI's standard peer-review process. The opinions expressed here belong to the authors, and do not necessarily reflect those of PIM, IFPRI, or CGIAR.

1. INTRODUCTION

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 youth stand to inherit affect their migration and employment decisions? In rural Africa, youth typically rely on inheritance (or small 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 (Ali and Deininger 2015; Barrett, Bellemare, and Hou 2010; Bellemare 2013; Carletto, Savastano, and Zezza 2013; Headey, Dereje, and Taffesse 2014; Larson et al. 2014; Sheahan and Barrett 2014), labor-saving technologies may substitute for youth farm labor (Bustos, Caprettini, and Ponticelli 2016). Pessimistic views on inheritance prospects may push some youth to delay entering the labor force by seeking secondary or tertiary education. Alternatively, youth may be encouraged to transition from low-return agricultural to high-return nonagricultural activities (Bezu and Barrett 2012; Nagler and Naude 2014). Understanding how land inheritance impacts such decisions is critical for understanding the likely impacts of these artifacts of 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 explore such questions. 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 the context of an authoritarian regime provide a natural experiment for understanding the causal effects of land inheritance. We use a unique dataset on all descendants of household heads and their spouses in 27 *kebeles* (villages) of the Amhara and Oromia regions.[2] 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, nonagricultural employment, and being a student). Both employment diversification (via nonagricultural employment, migration, or both) and the pursuit of education are potential risk diversification strategies. We consider how land inheritance impacts each and, further, how these relationships vary with gender and age. Last, we examine the role of mediating factors like the quality of land rental markets and travel time to a major urban center which may influence the costs of migration, opportunity costs, and barriers to entry into the nonagricultural sector.

One of the main empirical challenges confronting our analysis is the endogeneity of individual land inheritance. Size of inheritance varies even within households and is likely shaped by numerous unobservable factors correlated with individual labor activities. We estimate a household fixed-effects model and make use of historical land reforms in Ethiopia to develop an instrumental variable for expected individual land inheritance. Specifically, under Ethiopia's authoritarian regime, land access is influenced by large-scale government efforts to redistribute land. Under such redistributions, the local government takes land from some households and reallocates it to others based on household size at the time (with particular attention to adult males). There is significant spatial variation in the timing of such redistributions, which we exploit. Our data consist of inheritance, migration, and employment information for a complete list of descendants of the head and spouse, provided by the head, in addition to kebele official surveys that identify the timing of any redistribution.

[1] We adopt the World Bank definition of youth: individuals between age 15 and 34 (Filmer et al. 2014).

[2] Heads were asked to list their and their spouse's children. Accordingly, 98 percent of descendants are children of the head or spouse, while 2 percent are other close relatives—mostly stepchildren or grandchildren whom the head considers to be on the same level as children.

We find that larger expected land inheritances significantly lower the likelihood of long-distance permanent migration and rural-to-urban permanent migration during the time period studied, despite overall null impacts on permanent migration; that is, permanent migrants are induced to form households nearby rather than in other districts or urban areas. Expecting to inherit more land is also associated with a significantly higher likelihood of employment in agriculture and a lower likelihood of employment in the nonagricultural sector. Conversely, the decision to study is not robustly impacted by one's expected land inheritance.

These effects are largely driven by men; inheriting more land does not significantly predict migration or employment in the nonagricultural sector for women, though it does predict female employment in agriculture. Land inheritance is also a stronger predictor of long-distance permanent migration and employment in the nonagricultural sector for youth aged 20–34 (older than the median) than for those aged 15–19. This result may be driven by the fact that older youth are closer to receiving their inheritance or, for men, closer to the time of financial independence and marriage (Honwana 2012). Land inheritance plays a more pronounced role in predicting rural-to-urban permanent migration and nonagricultural-sector employment in areas with less vibrant land markets than in areas with more vibrant markets. Similarly, it is in relatively remote places (far from a major urban center) that one's land inheritance most strongly predicts migration and employment decisions. This relationship suggests the importance of context in studying the effects of inheritance. Overall, the results suggest that inheritance strongly influences the spatial location and strategic employment decisions of youth. Youth pursue nonagricultural labor opportunities in large part as a response to land shortages.

The paper is organized as follows. Section 2 presents the conceptual framework, reviewing existing literature and identifying knowledge gaps we seek to address. Section 3 describes access to land in Ethiopia, the norms that govern land inheritance, and the current state—and potential drivers—of youth migration and employment decisions. Section 4 outlines the data source and method of measuring land inheritance and outcomes. Section 5 describes our empirical strategy, including our method for identifying causal effects of land inheritance. Section 6 presents the main results as well as suggestive evidence on how they vary with gender, age, land rental market quality, and proximity to a major urban center. Finally, Section 7 concludes.

2. CONCEPTUAL FRAMEWORK

Two relationships between factor inputs (labor, land capital, and nonland capital) in agricultural production are likely to influence demand for youth labor. The first is the complementarity between labor and land capital. This relationship can be quite complex in Africa south of the Sahara (SSA), depending on land and labor constraints (Headey, Dereje, and Taffesse 2014). Consider the case in which land is constrained, as in Ethiopia, but labor and land are perfect complements; if the household has excess labor, then the demand for youth farm employment will be relatively low. The second relevant factor-input relationship is the one between labor and nonland capital.

In SSA, smallholder farmers have recently tended to adopt labor-intensive technologies to increase production—such as intensification of fertilizer use, cultivation of high-yield varieties, and other input-intensive practices—leading to an upward shift in demand for youth labor (Barrett, Bellemare, and Hou 2010; Headey, Dereje, and Taffesse 2014; Headey and Jayne 2014; Larson et al. 2014; Muyanga and Jayne 2014; Sheahan and Barrett 2014). Elsewhere, farmers have shifted to labor-saving technologies, causing an exodus of labor from agriculture (Bustos, Caprettini, and Ponticelli 2016).

Of course, the presence of local nonagricultural employment and income opportunities may draw youth out of agriculture (de Brauw and Mueller 2012). Opportunity costs of working on the family farm put pressure on youth employment decisions. Recent work suggests the opportunity costs posed by the agricultural wage (Dillon and Barrett 2014) and nonagricultural self-employment sectors may be low (Bezu and Barrett 2012; Nagler and Naude 2014), the latter being driven by high barriers for youth in starting their own nonagricultural enterprises. Thus, among households with excess labor, youth may be pushed to take advantage of the monetary returns to migration by traveling to destinations that offer higher wages (de Brauw, Mueller, and Woldehanna 2013a).

Existing literature has not come to firm conclusions about the impacts of land access on subsequent youth migration and employment decisions. An important study from southern Ethiopia found a robust negative relationship between farm size per child and off-farm employment, with weaker evidence on migration (Bezu and Holden 2014). But estimated effects of land access on migration and off-farm employment may be biased by at least two factors. First, using the ratio between farm size and children of the household head may result in an inaccurate measure of individual inheritance. Eligible candidates for inherited land include migrant children of the head and spouse, as well as extended family members (Holden and Bezabih 2008). Second, even a measure of lagged household farm size may fail to account for land transfers that occurred prior to the initial interview. If an individual's expectation of additional land inheritance in the future is negatively correlated with the amount of land received prior to the initial interview, and transfers before the initial interview decrease migration and nonagricultural employment, then estimates of the impacts of expected individual inheritance in the future on migration and employment may be upward biased. These factors motivate analysis of the impacts of land access that takes into account the full history of descendants (children) of the household head or spouse—regardless of whether or not they still live at home—and that further takes into account all inheritances already granted, in addition to those expected to be granted in the future.

We also account for how recent developments in migrant labor and land rental markets might mediate youth land-employment relationships. First, we examine how expected land inheritance differentially predicts employment decisions depending on whether the individual is in close proximity to a major urban center. The expected returns to migrant labor will be higher if moving costs are lower—either due to proximity or due to knowledge of the local language, which increases the probability of securing employment at the destination (Sjaastad 1962). Yet the wage gap between one's origin and destination may be much smaller in areas close to cities (Harris and Todaro 1970) and could very well make youth migration less sensitive to inheritance size in areas closer to towns. This is an empirical question meriting analysis.

Second, we consider whether the presence of more robust local land rental markets reduces youth tendencies to migrate or work in the nonagricultural sector. Local rental markets provide youth with opportunities to establish their own farms outside of inheritance. For this reason, youth are one of the most prominent groups engaging in these markets in SSA (Deininger, Xia, and Savastano 2015). In areas with robust rental markets, youth migration and employment decisions may be less responsive to expectations concerning inherited land. Although rental markets provide youth with access to land, we do not expect the presence of rental markets to perfectly offset responses we might observe between expected land inheritance and employment; 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 does rental.

3. 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 other factors potentially influencing such decisions.

Access to Land in Ethiopia

Ethiopia has long faced severe problems of land scarcity. Population density is growing rapidly, leading farm sizes to dwindle. In 2011–2012, more than half of rural farm households in Ethiopia cultivated less than 1 hectare of land (CSA 2012). Further, a youth bulge promises to intensify these problems for youth in particular; as of 2015, 37 percent of the population of Ethiopia was between the ages of 15 and 34 (CSA 2015). In such land-constrained countries under usufruct land rights systems, like Ethiopia, youth rely on periodic land redistributions, inheritance, and small rental markets for any access to land.[3]

The Communist Derg dictatorship ruled Ethiopia from 1974 to 1987; land was formally owned by the government, which aimed to ensure some degree of equality in household access. The current Ethiopian People's Revolutionary Democratic Front regime has been in place since 1991, following the collapse of the Derg dictatorship. Land continues to be formally owned by government, with formal land markets (sales) outlawed. Similar to policies under the Derg regime, large-scale administrative land redistributions have been justified as a means of equalizing land quality and providing land to landless households.

In the study regions of Amhara and Oromia, 20 of 27 sample kebeles had experienced a large-scale land redistribution since 1991 affecting the majority of households.[4] 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).[5] Because redistribution is decentralized, its timing hinges on the capacity, preparedness, and land availability of each kebele and its woreda, resulting in significant geographic variation in their timing, which we exploit to construct the instrument. As shown in Table 3.1, the median redistribution year is 2003, but it ranges from 1992 to 2013.[6]

Individual land users in the study regions have the legal right to transfer land use rights to children or other family members (ANRS 2006; 2007; ONRS 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

[3] 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; Deininger, Ali, and Alemu 2011).

[4] 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 (Demeke 1999).

[5] In the Amharic language used for the survey, we describe land redistribution to mean "land adjustment among households"—not any injection of new lands into the kebele. This is reflected in our survey data, which capture the total 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 (that is, no change).

[6] We asked about the latest (most recent) redistribution to ensure that respondents recalled redistributions following the Derg dictatorship. In 20 kebeles, a land redistribution occurred after 1991; in 7 it did not. The post-Derg major land redistributions in the Amhara region (one of the two regions the data come from) were predominantly implemented during 1997–1998 (Benin and Pender 2001).

[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 and limits the duration of the rental to a maximum of 3 years for those who employ traditional farming and 15 years for mechanized farming (ONRS 2007).

as norms associated with gender and birth order, and restrictions on land fragmentation.[8] In our sample, 41 percent of household heads reported that they would unequally divide land among those descendants aged 15–34 at baseline.

Table 3.1 Observations by year of last land redistribution

Panel A: Year of most recent post-Derg era land redistribution

Kebele	Year
Tulugura	1992
Fundisa	1993
Arjo	1993
Agemi Nijar	1997
Kaka	1997
Gesges Shibirime	1997
Wajarba	1997
Taime Abekidan	1997
Esey Debr Ganba Gubiya Jantega	1997
Yetijan Shebelima	2003
Kenge Abo Amesha	2003
Atsed Mariya	2004
Leklekitaq	2005
Cholmana Mntura	2005
Disbasfilira	2005
Kersa Wolega	2006
Gombo Kiltu Jale	2006
Belita Amijye	2010
Dat Giyorgis	2012
Shemagile Giyorigis	2013
Kologelan	none
Wanesha Dabus	none
Aintodele	none
Hadaresa Bila	none
Kolba Anchabi	none
Meksaleku	none
Kela Beroda	none

Panel B: Distribution of year of most recent land redistribution within estimation sample

Year	Share of observations
1992	3.4
1993	9.5
1997	21.8
2003	6.5
2004	4.4
2005	9.5
2006	9.2
2010	4.0
2012	1.7
2013	3.6
none	26.6

Source: Authors' calculations based on IFPRI's Watershed Surveys of 2010 and 2014.
Notes: Number of observations, 1,989, is based on the sample used for estimation.

[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 hectare for annual crops and 0.25 hectare for perennial crops (ONRS 2007), while the minimum in Amhara is 0.25 and 0.11 hectare for plots under rainfed agriculture and irrigation, respectively (ANRS 2006; 2007).

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 firstborn) 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 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).

Finally, previous research has contended 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 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 nonagricultural 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 percent 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 young men in Amhara region are the most likely to migrate, and respondents cite 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. de Brauw (2014) and Lee and Mueller (2016) reported similar relationships between migration and land. According to a report from 2013, rural-rural and rural-urban migration shares were almost equivalent at 35 and 33 percent of total migrants, respectively (National Labor Force Survey [NLFS] 2013).

There are few rural employment opportunities outside of agriculture. Among rural-urban migrants aged 15–65, only 36 percent are motivated to migrate in search of work (Mueller et al. 2015). Education is the strongest determinant of rural-urban migration (de Brauw, Mueller, and Woldehanna 2013b; Mueller et al. 2015), following large national education investments during the last decade (World Bank 2016). Schmidt and Bekele (2016) showed that only 23 percent of the economically active population primarily works in the nonagricultural sector (NLFS 2013). Among nonagricultural-sector laborers, the largest share (30 percent) is engaged in sales. The remainder is divided among construction and mining (11 percent), food processing and craft work (8 percent), teaching (6 percent), 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.

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

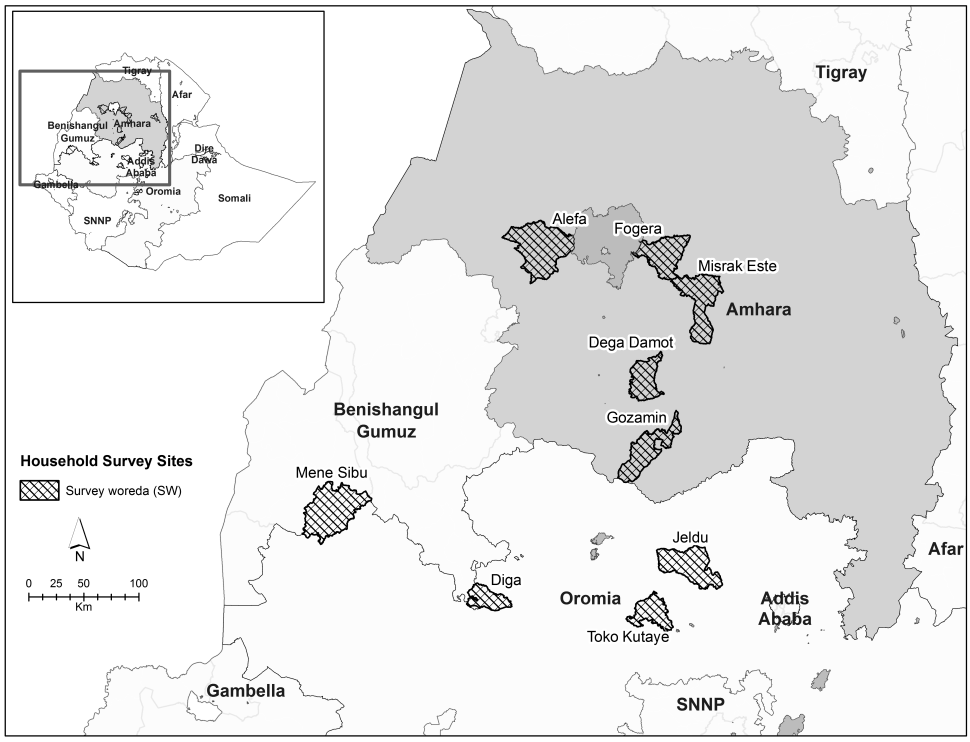
[10] See, for example, research on the effects of sibling composition and rivalry on health outcomes (Kumar and Quisumbing 2012; Mekonnen and Worku 2011; Kushnick 2010; Garg and Morduch 1998; Morduch 2000), educational outcomes (Congdon Fors, Houngbedji, and Lindskog 2015; Gibson and Sear 2010; Lloyd, Mete, and Grant 2009; Butcher and Case 1994), and inheritable wealth (Grawe 2010; Keister 2003).

4. DATA

We take advantage of a panel survey conducted in 2010 (round 1) and 2014 (round 2) by the International Food Policy Research Institute (IFPRI) in collaboration with the Ethiopian Development Research Institute (EDRI) (IFPRI 2010; 2014). Round 2 collected detailed information on not only household members (on the roster) but also inheritance, employment, and migration data for all direct descendants between the ages of 15 and 34 at baseline (98 percent of them children) of the household head or spouse.

The round 1 (baseline) survey covered 1,810 households and was completed in July 2010. The sample was drawn from a list of woredas (districts) in the Blue Nile Basin in Amhara and Oromia.[11] The final sample consisted of 27 kebeles located in 9 woredas, with approximately 200 households surveyed per woreda. The locations of these woredas are shown in Figure 4.1[12] In round 2, 1,748 of the households interviewed in round 1 were located and interviewed again, representing a household attrition rate of 3.4 percent over four years.

Figure 4.1 Spatial distribution of survey sites



Source: Authors' calculations based on IFPRI's Watershed Survey of 2010.

We use a cross-sectional dataset that includes all direct descendants of the household head[13] or the head's spouse who lived in the household in round 1 and were at that time between the ages of 15 and 34. Our data capture whether or not they left the household (permanently migrated) by round 2, and their sector of employment in round 2. We focus on both male and female descendants as nearly two-thirds of women in the sample are either employed in agriculture, the nonagricultural sector, or are students, and although less likely than men to migrate out of their woredas, they are even more likely to migrate to an urban area (see Appendix Table A.1). Our controls are from round 1 to reduce concerns of reverse causality.

[11] To be eligible for selection, a woreda had to contain at least one kebele (village, or sub-district) in these regions' Sustainable Land Management Program. Three kebeles were then randomly selected in each woreda.

[12] For more information on sample selection and site location, see Schmidt and Tadesse (2014).

[13] We use the round 2 head because this is the round in which we collected data on all descendants of the head.

Variable Measurement

We measure youths' expected land inheritance by asking household heads about each of their direct descendants: how much land the person has already received[14] and how much land the head expects to provide to that person in the future. We consulted the head because heads are generally the prime decision makers over inheritances. Summing the two quantities gives the total expected inheritance; 78 percent of the "inheritance" variable used in our main estimation sample is composed of expected inheritance, while 22 percent is composed of land already inherited.

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. For this definition of permanent migration, individuals may have migrated anywhere in Ethiopia or elsewhere. However, they 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 on 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, which takes a value of 1 provided that the individual has permanently migrated since 2010 and, by 2014, lives in an urban area. We focus on permanent migration rather than temporary due to the relative importance of the former in the study context; although 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.

We are predominantly interested in whether individuals work in the agricultural or in the nonagricultural sector. We accordingly consider two employment outcomes: the individual's primary occupation is in the agricultural sector and the individual's primary occupation is in the nonagricultural sector. We further examine whether or not the individual's current primary occupation is attending school—indicating the choice to acquire human capital.[15]

Descriptive Statistics

Table 4.1 summarizes the outcomes, land access measures, and individual and household characteristics for the full sample as well as for the subsample of those youth who expect to inherit land (71 percent of the full sample). We focus most of the analysis on those who expect to inherit land; this group encompasses the vast majority of all individuals and is also the estimation sample driving the slope coefficients when we consider the logged value of land inheritance as the key explanatory variable. We apply a natural logarithmic transformation to reduce the tendency for extreme outliers to drive inferences in the regression analysis.

Table 4.1 Panel A summarizes the outcomes. Nearly half of the youth (45 percent) had permanently migrated between survey rounds. Of these, nearly half had moved to locations outside the woreda in which they lived in 2010, and 62 percent had moved to an urban area.[16][17] The primary occupation was most often agriculture (37 percent) or in school (29 percent), but 16 percent worked in the nonagricultural sector and 13 percent did domestic work. Only 4 percent of the sample was unemployed. The average individual expected to inherit 0.48 hectare of land (Panel B).

Panel C shows that the sample is tilted toward males (67 percent). This is an artifact of its demographic composition. The average age of the household head at baseline is 53, well beyond the peak reproductive years of couples. Because women in Ethiopia tend to marry younger than do men—half by age 18 (Hervish 2011)—many of the head's daughters would no longer be household members at the time

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

[15] There are two other primary occupations, domestic employee and unemployed, as summarized in Table 4.1.

[16] These numbers come from the following calculations: $\frac{0.21}{0.45} = 0.47$ and $\frac{0.28}{0.45} = 0.62$. Note that moving out of woreda and moving to an urban area are not mutually exclusive.

[17] Our sample implies an annual out-of-woreda (district) migration rate of 5.0 percent. This is slightly larger than the rate computed using 2007 census data, 1.1 percent (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.

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. The descendants' average age in round 1 was 20 years, most (98 percent) were children of the head, 68 percent had finished the first educational cycle (grades 1–4), and few (5 percent) were married. A quarter of descendants had more than one male younger sibling directly following them in birth order. On average, descendants had 1.4 older male descendants and 1.2 older female descendants; 17 percent were at least 18 years old at the time of the last land redistribution. Panel D summarizes household characteristics. Although about two-thirds of households had a metal roof, only 3 percent had an improved floor. The household head, on average was, 53 years old, predominantly male (83 percent), and had no education (58 percent). Orthodox Christians made up 71 percent and Protestants 25 percent.

Table 4.1 Descriptive statistics

	Full sample			Sample with nonzero expected land inheritance		
Variable	**Mean**	**SD**	**N**	**Mean**	**SD**	**N**
Panel A: Outcomes						
Dummy—permanent migrant	0.53	0.5	1717	0.45	0.50	1170
Dummy—permanent migrant out of woreda	0.27	0.44	1709	0.21	0.41	1167
Dummy—permanent migrant to urban area	0.34	0.47	1709	0.28	0.45	1167
Primary occupation is...						
In agriculture	0.32	0.47	1,713	0.37	0.48	1,167
In nonagriculture	0.19	0.4	1,713	0.16	0.36	1,167
As a student	0.30	0.46	1,713	0.29	0.45	1,167
Domestic	0.13	0.34	1,713	0.13	0.34	1,167
Unemployed	0.04	0.19	1,713	0.04	0.19	1,167
Panel B: Land access						
Dummy—inherited or expects to inherit land	0.71	0.45	1,717	1.00	0.00	1,170
Land inheritance (hectares)	0.34	2.14	1,671	0.48	2.54	1,170
Log land inheritance	-1.36	0.92	1,170	-1.36	0.92	1,170
Panel C: Individual controls						
Dummy—male	0.64	0.48	1,717	0.67	0.47	1,170
Age	19.9	4.05	1,717	19.9	4.09	1,170
Dummy—child of head	0.97	0.16	1,717	0.98	0.13	1,170
Dummy—married	0.05	0.21	1,717	0.05	0.23	1,170
Dummy—> 1 male descendant immediately follows in birth order	0.25	0.44	1,717	0.25	0.43	1,170
Number of older male direct descendants	1.38	1.49	1,717	1.37	1.48	1,170
Number of older female direct descendants	1.18	1.38	1,717	1.17	1.38	1,170
Dummy—age 18+ at time of land redistribution	0.18	0.38	1,717	0.17	0.38	1,170
Dummy—completed cycle 1 of primary school (grade 4)	0.70	0.46	1,717	0.68	0.47	1,170
Panel D: Household characteristics						
Household size	7.13	2.24	834	7.16	2.28	625
Number of men 18+ in household	1.96	1.08	834	2.00	1.09	625
Number of women 18+ in household	1.65	0.87	834	1.68	0.89	625
Number of direct descendants of household head	7.09	2.62	834	7.11	2.74	625
Dummy—metal roof	0.67	0.47	834	0.67	0.47	625
Dummy—improved floor	0.03	0.17	834	0.03	0.17	625
Dummy—head of household is male	0.84	0.37	834	0.83	0.37	625
Head of household age	52.2	10.92	834	52.8	10.99	625
Dummy—head of household has no education	0.59	0.49	834	0.58	0.49	625
Dummy—Orthodox Christian	0.72	0.45	834	0.71	0.46	625
Dummy—Protestant	0.22	0.41	834	0.25	0.43	625
Dummy—Muslim	0.02	0.14	834	0.01	0.11	625
Share of males 18+ at time of land redistribution	0.17	0.29	834	0.17	0.3	625
Panel E: Instrument						
Excluded instrument*	0.03	0.11	1,717	0.02	0.1	1,170

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

Notes: *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. *Land redistribution* always refers to the most recent redistribution. *With land* refers to those who either have already inherited land or expect to inherit and. *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. Religion is that of the household head.

5. EMPIRICAL STRATEGY

We investigate the effect of land inheritance on youths' decisions concerning migration and sector of primary employment. If all variation in youths' expected land inheritance were exogenous to employment and migration decisions, we could recover causal estimates of the impact of expected inheritance by estimating the following linear probability model:

$$E_i = \beta_0 + \beta_1 L_i + \gamma \mathbf{X}_i + \alpha_j + \varepsilon_i, \tag{1}$$

where i indexes individuals.[18] E_i denotes migration and employment outcomes, by L_i the logged expected land inheritance, $\mathbf{X}_i$ a vector of control variables, described below, and by α_j household fixed effects. Standard errors are clustered at the kebele level, the relevant administrative unit in which land redistribution policies are executed.

Identification

A potential concern of this analysis is that the size of land inheritance is likely to be 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 β_1. First, in a model without household fixed effects, one would worry that a household's land endowment, wealth, and income levels would influence both migration and employment decisions and expected inheritance. Migration is costly and requires payment of up-front costs to finance it (Carrington, Detraigiache, and Vishnawath 1996). Further, employment in agriculture is more likely in a family with ample experience in this sector due to its own larger land endowments (Bezu and Barrett 2012). These sources of omitted-variable bias motivate including household fixed effects; through their inclusion, we rely on within-household variation in expected land inheritances to explain within-household variation in migration and employment outcomes.

Second, within a household, parents may select descendants with particular characteristics—such as physical aptitude for or interest in agriculture—for larger inheritances. This would be problematic for identification if such physical and mental 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 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 greater willingness to stay behind and serve parents. These potential omitted variables may bias OLS estimates in different directions.

We address such threats to identification in two main ways. First, we control for a number of factors that may influence both the land allocations that youth receive and their migration, employment, and educational opportunities and decisions. Second, we implement an instrumental variables (IV) strategy, constructing an instrument for individual expected land inheritance. We elaborate on each of these below.

All specifications include household fixed effects to capture all characteristics of a kebele and a household that may influence youths' decisions. These include the availability of land (kebele-wide as well as within the household), laws and regulations, customs and traditions, the full local history of land redistribution, and access to agricultural and nonagricultural employment opportunities and educational institutions. Note that in the main estimation sample, 24.5 percent of individuals come from households

[18] We opt for a linear probability model given concerns with including fixed effects in a nonlinear model such as a logit or probit model. These fixed effects are central to the ability to interpret the estimates as causal.

with a single descendant and thus do not influence slope coefficients, given the use of household fixed effects.

We also 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 could capture the fact that, for example, different local governments may preferentially treat males, youth at critical stages such as those of marriageable age, or the married when redistributing land.

Household fixed effects control for the total amount of land available to the household. However, 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 both the youth's decision making and his or her access to land because older descendants are 1) likely to inherit land and other assets ahead of the individual in question and 2) may provide information or support in identifying and obtaining employment or educational opportunities. Following Vogl (2013), we include fixed effects for the permutation of older descendants that are ahead of the youth in birth order (for example, no older descendants, Boy (B)-Girl (G)-Boy (B), GB, BG, BBBB, G, and so on).[19] We also control for having more than one male younger sibling immediately behind oneself in birth order. Males in Ethiopia generally receive larger land inheritances than do females, and the land inheritance tends to be smaller when they are immediately followed by multiple males.

Our IV strategy leverages a unique feature of Ethiopia: given its authoritarian regime, land access is influenced by large-scale government efforts to redistribute land. Since the installation of Ethiopia's current government in 1991 following the collapse of the Communist Derg dictatorship, 20 of our 27 sample kebeles have experienced a large-scale land redistribution affecting the majority of households in the village. Our in-depth interviews with kebele officials suggest that males older than 18 receive priority in redistributions. This suggests that households with a greater share of their male descendants older than age 18 at the time of the redistribution should have relatively more land allocated to these descendants. Of individuals in our sample who inherited land, the median age of inheritance was 21—bolstering the idea that those younger than 18 are not yet being considered for inheritance.

Although household fixed effects capture the average impacts of redistributions (and our kebele fixed-effect interactions further control for their gender-, age-, and marital status–specific impacts), their impacts may vary within a household. Specifically, we would expect "marginal" individuals—those at high risk of receiving a small 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 younger sibling immediately behind them in birth order, whose household head will very soon after them have two or more boys reaching the age of inheritance. In our dataset, the median male land inheritance (in terms of land area) is 60 percent greater than that of the median female.[20] Thus, brothers pose a larger threat to inheriting land than sisters.

[19] As in Vogl (2013), with this control set, we anticipate that the gender of the next sibling after a descendant, conditional on having such a sibling, can be taken as if random.

[20] This is despite legal provisions in our study regions stating that women have equal rights as men to access, use, and manage land (ANRS 2006; ANRS 2007; ONRS 2007).

We use a single interaction term as an instrumental variable 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 younger sibling immediately following the person in question in birth order.[21] Because we have one excluded instrument (an interaction term), our model is exactly identified. The instrumental variable is summarized in Table 4.1; its mean is 0.03.

The first-stage equation states that an individual's expected land inheritance, measured as L_i, is a function of the product of the share of male descendants in the household who were older than 18 at the time of the most recent land redistribution, r_i, and a dummy for having more than one male younger sibling immediately following the descendant in question, m_i:

$$L_i = \delta_0 + \delta_1 r_i \times m_i + \delta_2 m_i + \theta \mathbf{X}_i + \pi_j + \eta_i \tag{2}$$

where π_j represents household fixed effects.[22]

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 who were older than 18 at the time of land redistribution on those with, versus without, more than one male younger sibling immediately behind them in birth order affects these youth's migration and employment decisions only through its effect on their expected land inheritance. Importantly, the individual components of the excluded instrument, m_i and r_i, are included in the main specification of Equation 1 (the latter through the use of household fixed effects). That is, we explicitly allow both of these components to directly impact the migration and employment outcomes. We do *not* claim that either of them affects such outcomes only through its effect on the size of an individual's inheritance. Thus, we need only believe that their *interaction* is a valid instrument—not that either of the two variables in level form is a valid instrument.

Table 5.1 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.[23] The F statistic on the excluded instrument is 26.6, suggesting no problems of weak instruments.[24] We argue that the exclusion restriction holds because the precise timing of land redistributions in a kebele—and specifically, the difference between its effect on those with versus without multiple male younger siblings immediately behind them in birth order—should be exogenous to the within-household selection mechanism determining the size of individual land inheritances.

[21] In the seven kebeles in which no redistribution occurred, we code that the share of descendants older than 18 at the time of the most recent land redistribution was 0, to reflect that none of the descendants in the household helped the household obtain more land by virtue of their age.

[22] r_i does not appear in the regression in its level form because it is collinear with the household fixed effects.

[23] This comes from taking $\exp(2.478 \times 0.11) = 1.3$.

[24] If we instead compute the excluded instrument using the share of total descendants that was over age 18 at the time of the last land redistribution, rather than the share of male descendants, we obtain a slightly smaller F statistic of 26.2. Second-stage results are robust to this alternative construction of the instrument.

Table 5.1 IV first-stage results

	Outcome: Log land inheritance	
Variable	**(1)**	**(2)**
Excluded instrument: Share of male descendants 18+ at time of land redistribution × Dummy for 1 male descendant immediately following in birth order	2.501***	2.478***
	(0.460)	(0.480)
Dummy for 1 male descendant immediately following in birth order	-0.082	-0.079
	(0.061)	(0.065)
Observations	1,170	1,170
R-squared	0.902	0.902
Number of households	625	625
First-stage F stat	29.59	26.63
Full set of individual-level controls?	No	Yes

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

Notes: 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 statistics is the t-statistic on the excluded instrument squared. Also included are household fixed effects and 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.

6. RESULTS

In this section, we first estimate an OLS specification to examine the impacts of the expected size of land inheritance on migration and employment outcomes. We next present IV estimates that help us interpret these estimates as causal; IV results largely support the OLS results. Exploratory OLS analysis using subsets of the sample (for which we are unable to carry out IV analysis given problems of weak instruments) helps us ascertain how land inheritance as a predictor of migration and employment decisions varies with gender, age, and two mediating factors: the quality of land rental markets and proximity to a major urban center.

OLS Estimates

Table 6.1, Panel A, provides OLS results from regressions of permanent migration (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 amount of expected land inheritance, in hectares. We present specifications with (even-numbered columns) and without (odd-numbered columns) the full control set; all specifications include household fixed effects.

In our preferred specification with the full set of controls, a 10 percent increase in a youth's land inheritance is associated with a 1.6 percentage point decrease in his or her probability of permanent migration.[25] This represents a 3.0 percent decrease relative to the mean rate of permanent migration. Inheriting land is also associated with a lower incidence of long-distance permanent migration and with less permanent migration to urban areas in particular. These findings are present regardless of whether the full control set is included. A 10 percent increase in land inheritance is associated with a 2.4 percentage point decrease in the incidence of long-distance permanent migration and a 2.7 percentage point decrease in the incidence of permanent migration to urban areas. Relative to the means of each of these outcome variables, these results indicate an 8.9 percent and a 7.9 percent reduction in long-distance permanent and rural-to-urban permanent migration, respectively. This suggests that receiving a land inheritance is associated with less migration, but that the magnitude of its impacts are particularly large for long-distance and rural-to-urban migration.

Table 6.1, Panel B, presents OLS results from regressions of primary employment in agriculture (columns 1–2), primary employment in nonagriculture (columns 3–4), and primary status as a student (columns 5–6) on the logged amount of expected land inheritance, in hectares. The likelihood of being primarily employed in agriculture is significantly larger for those who have inherited or expect to inherit land, regardless of whether the full control set is included. In our preferred specification with the full set of controls, increasing a youth's land inheritance by 10 percent is associated with a 2.5 percentage point increase in the incidence of primary employment in agriculture, which is a 7.8 percent increase relative to the mean incidence of employment in agriculture. The amount of land inheritance is also correlated with a lower incidence of employment in the nonagricultural sector, although this effect is not statistically significant at conventional levels (p-value = 0.16). Although land inheritance is negatively correlated with whether or not an individual's primary occupation is being a student, the correlation is not robust to the inclusion of the full control set.[26]

[25] Given the level-log model, here and elsewhere, the effect of a 10 percent increase in land inheritance is obtained by taking the coefficient on expected land inheritance $\times$ $ln(1.1)$.

[26] For both the migration and employment outcomes, we obtain similar results (available on request) when we instead measure land access with a dummy for whether or not an individual is expected to inherit land.

Table 6.1 OLS results showing how the amount of land inheritance predicts migration and employment decisions

Variable	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Migration						
	Dummy - migrated ...					
	Anywhere		Out of woreda		To urban area	
Log land inheritance	0.025	-0.165**	-0.085**	-0.252**	-0.128***	-0.283***
	(0.051)	(0.076)	(0.037)	(0.094)	(0.043)	(0.081)
Additional controls	No	Yes	No	Yes	No	Yes
Observations	1,170	1,170	1,167	1,167	1,167	1,167
R-squared	0.001	0.783	0.011	0.788	0.024	0.800
Number of households	625	625	624	624	624	624
Panel B: Occupation						
	Dummy - primarily employed in ...					
	Agriculture		Non-agriculture		Student	
Log land inheritance	0.309***	0.262**	-0.059	-0.180	-0.142***	-0.050
	(0.044)	(0.109)	(0.042)	(0.126)	(0.042)	(0.201)
Additional controls	No	Yes	No	Yes	No	Yes
Observations	1,167	1,167	1,167	1,167	1,167	1,167
R-squared	0.095	0.815	0.006	0.753	0.021	0.778
Number of households	625	625	625	625	625	625

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

Notes: OLS = ordinary least square. *Migrated* is defined as living in the household during round 1, and living elsewhere in round 2. Additional controls 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 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. Standard errors are in parentheses and clustered at the kebele level.

IV Estimates

OLS estimates may fail to account for important within-household variation in factors that influence land inheritance as well as migration and employment decisions. To address this endogeneity problem, we next turn to IV estimates. Section 5 outlined the IV identification strategy and described the excluded instrument: the share of male descendants in the household who were older than 18 at the time of the most recent land redistribution, interacted with a dummy for having more than one male younger sibling immediately following the youth in question.

Table 6.2, Panel A, compares the earlier OLS estimates of the impacts of the size of land inheritance on migration outcomes (columns 1–3) with IV estimates that account for the endogeneity of land inheritance with migration (columns 4–6). Compared with the OLS estimates, the IV estimates are larger—though for the case of permanent migration to any area, the effect is no longer statistically significant. However, we still find strong impacts on long-distance permanent migration and rural-to-urban permanent migration. A 10 percent increase in a youths' 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. Relative to the means of each of these outcome variables, these figures indicate a 30.0 percent and a 14.1 percent reduction in long-distance permanent migration and rural-to-urban migration, respectively.

In Panel B of Table 6.2, we compare OLS estimates (columns 1–3) with IV estimates (columns 4–6) of the impacts of the size of land inheritance on employment outcomes. The significant, positive impact of inheriting more land on employment in agriculture is now even larger in magnitude and more statistically significant; the IV results show that a 10 percent increase in expected land inheritance increases the incidence of employment in agriculture by 6.2 percentage points, which is a 19.4 percent 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 nonagricultural sector is also larger in the IV results, and also significant at the 0.01 level; a 10 percent increase in land inheritance leads to a 4.1 percentage point increase in employment in the nonagricultural sector, or a 21.6 percent increase relative to the variable's mean. As in the OLS results, however, we find 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.

Table 6.2 Comparison of OLS and IV results showing how the amount of land inheritance predicts migration and employment decisions

	OLS			IV		
Variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Panel A: Migration						
	Dummy - migrated ...					
	Anywhere	Out of woreda	To urban area	Anywhere	Out of woreda	To urban area
Log land inheritance	-0.165**	-0.252**	-0.283***	-0.198	-0.855***	-0.508***
	(0.076)	(0.094)	(0.081)	(0.199)	(0.173)	(0.173)
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
Panel B: Employment						
	Dummy - primarily employed in ...					
	Agriculture	Non-agriculture	Student	Agriculture	Non-agriculture	Student
Log land inheritance	0.262**	-0.180	-0.050	0.655***	-0.427***	-0.171
	(0.109)	(0.126)	(0.201)	(0.168)	(0.095)	(0.140)
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

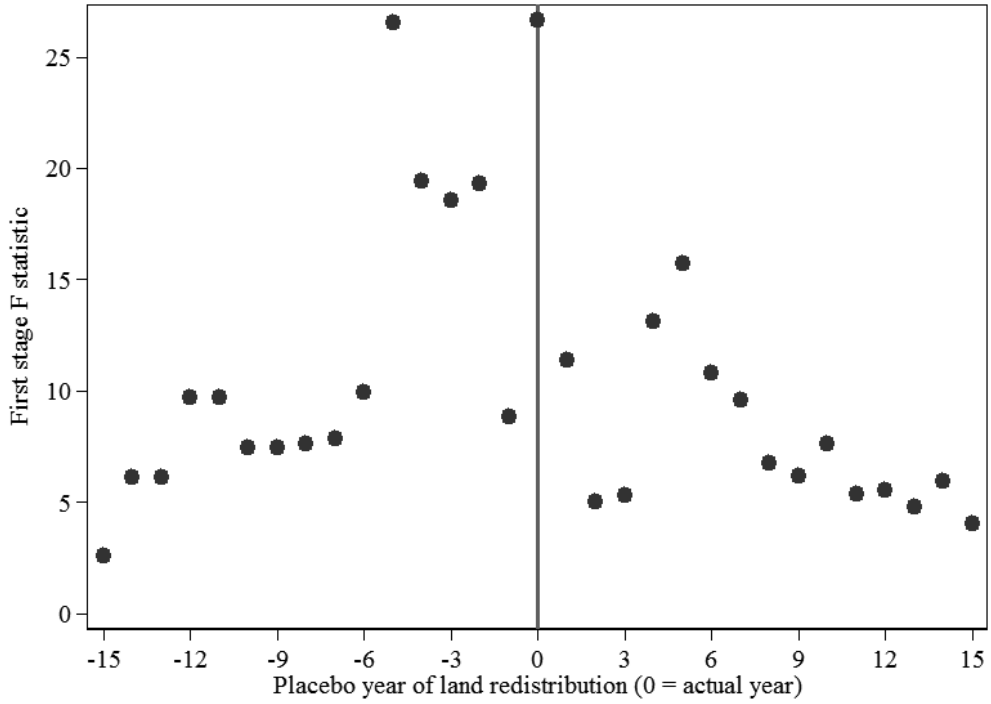
Source: Authors' calculations based on IFPRI's Watershed Surveys of 2010 and 2014.

Notes: IV = independent variable; OLS = ordinary least squares. 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 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. Standard errors are in parentheses and clustered at the kebele level.

IV Placebo Test

A potential concern with the IV strategy is that kebeles with relatively early (or late) land redistributions may simply be on different time trends with respect to how having younger brothers influences within-household allocations of land. If this were the case, then it might not be the land redistribution itself that explains the strength of the first stage, but rather just the order in which kebeles experienced such a redistribution (with that order potentially being endogenous to factors influencing youth employment and migration decisions).[27] The first stage would be just as strong if we were to instead pretend that each kebele's land redistribution occurred in year $t+k$ rather than year t, for $k \in (-\infty, \infty)$. We carry out this placebo analysis in Figure 6.1, for integer values of $k \in (-15, 15)$, plotting k on the x-axis and the F statistic of the excluded instrument in the main specification (column 2 of Table 5.1) on the y-axis. We see that the F statistic is maximized when $k = 0$ (that is, when we use for each kebele the actual year, t, in which land redistribution occurred). Further, it quickly deteriorates as we move away from $k = 0$. Indeed, among the 30 years to which we try perturbing the actual year of redistribution, for 26 we obtain an F statistic indicating problems of weak instruments.[28][29] Overall, these findings are encouraging; they suggest that it is the extra land being made available by redistributions, and not different trends across kebeles with early versus late redistributions, that is driving the strong first-stage results.

Figure 6.1 Placebo analysis: First-stage F statistics if land redistribution is assumed to occur before or after the actual year



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

Notes: The x-axis indicates the number of years after the actual year of land redistribution that we assume land redistribution occurred; positive numbers indicate that we pretend it occurred in later years than the actual, while negative numbers indicate that we pretend it occurred in earlier years. The y-axis displays the first-stage F statistic on the excluded instrument (from estimating column 3 of Table 5.1). The vertical line at x = 0 highlights the value of the F statistic when the calculation uses the actual year of land redistribution.

[27] Table 3.1 shows this order, with Tulugura kebele experiencing the first redistribution, followed by Fundisa and Arjo a year later, and Shemagile Giyorigis experiencing the latest land redistribution.

[28] In our main specification, the Stock-Yogo critical value for 10 percent maximal IV size for a Cragg-Donald F statistic is 16.38.

[29] Further, the four other "sufficiently high" F statistics occur at $t-5, t-4, t-3$, and $t-2$; this may be because redistribution policies in some kebeles favor not those older than 18, but rather those older than age 23 (or 22, or 21, or 20)—that is, youths slightly older than 18.

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 are most driving the results. Of special importance are the differential impacts on men versus women, and on youth at different ages—specifically, above versus below median for our sample, which involves separately considering 15- to 19-year olds and 20- to 34-year olds. Given cultural and social norms that 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 decision making.

Table 6.3, Panel A, estimates a model that interacts the full set of individual-level controls with gender; this allows us to compare how well land inheritance predicts migration and employment outcomes for men versus women and to test for any statistically significant differences. Given problems of weak instruments for this interacted model, we estimate by OLS.[30] The potential issue with Weak instruments is less of a concern given the consistent story—in terms of sign and statistical significance—told by the OLS and IV results for the key outcomes so far. Also, 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 versus for women is informative.

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 than it is for women. 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 nonagricultural sector for both genders, this finding is statistically significant only for men. A small land inheritance may drive men to the nonagricultural sector, but women do not take up these nonfarm 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 6.3, 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, allowing us to compare how well land inheritance predicts migration and employment outcomes for each group. Once again, we estimate using OLS in response to problems of weak instruments. We see that the migration results are mostly driven by those aged 20–34 (older youth), as are reductions in employment in the nonagricultural sector. This is consistent with older youth's 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. However, land inheritance predicts similar increases in employment in agriculture for both groups. As for men and women individually, neither younger-than-median nor older-than-median aged youth are more likely to be students as a result of inheriting more land. Overall, it seems that land

[30] Due to degrees-of-freedom considerations in these 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 $\times$ gender, kebele $\times$ marital status, and kebele $\times$ age fixed effects.

inheritance does not matter much for whether or not one 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).

Table 6.3 Analysis of impacts of size of land inheritance on migration and employment outcomes by gender and by age (OLS)

	Dummy - migrated ...			Dummy - primarily employed in ...		
Variable	Anywhere (1)	Out of woreda (2)	To urban area (3)	Agriculture (4)	Non-agriculture (5)	Student (6)
Panel A: By gender						
Log land inheritance (women)	0.097	0.024	-0.022	0.154***	-0.078	-0.082
	(0.073)	(0.044)	(0.053)	(0.047)	(0.047)	(0.065)
Log land inheritance (men)	-0.003	-0.155***	-0.188***	0.226***	-0.163***	-0.058
	(0.062)	(0.047)	(0.051)	(0.047)	(0.042)	(0.061)
Observations	1,170	1,167	1,167	1,167	1,167	1,167
R-squared	0.418	0.449	0.415	0.563	0.436	0.525
Number of households	625	624	624	625	625	625
P-value of difference	0.11	0.002	0.004	0.093	0.022	0.614
Panel B: By age						
Log land inheritance (20–34)	-0.010	-0.104*	-0.149**	0.220***	-0.139***	-0.011
	(0.068)	(0.055)	(0.058)	(0.053)	(0.040)	(0.058)
Log land inheritance (15–19)	-0.024	-0.028	-0.107	0.221***	-0.061	-0.082
	(0.09)	(0.056)	(0.066)	(0.046)	(0.048)	(0.077)
Observations	1,170	1,167	1,167	1,167	1,167	1,167
R-squared	0.407	0.425	0.393	0.542	0.424	0.501
Number of households	625	624	624	625	625	625
P-value of difference	0.799	0.096	0.317	0.984	0.069	0.181

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

Notes: OLS = ordinary least square. 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 versus 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. 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.

Estimates by Rental Markets and Proximity to Urban Center

It is instructive to examine the role of mediating factors that may heavily influence youths' costs of migration, opportunity costs, and barriers to entry into nonagricultural labor. We consider two such mediating factors: the quality of land rental markets and the travel time to a major urban center. 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 its share of households renting out land. We distinguish kebeles that are relatively close to and far from a major urban center by dividing the sample 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 (CSA 2014). The 26 cities range in size from 20,824 to 3,156,057 and have a median population of 110,086; they are listed in Appendix Table A.2. Again, we estimate a model by OLS that interacts the full set of individual-level

controls with one of these two dummies—either a dummy for below-median land rental market activity or a dummy for above-median travel time to a major urban center.[31]

As shown in Table 6.4, the size of land inheritance is a more powerful predictor of spatial and sectoral location decisions in areas with more vibrant land rental markets and those close to major urban centers. 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 nonagricultural sector than that seen in areas with richer rental markets. Rental may be a viable alternative to inheritance, but where such markets are weak, youth not inheriting land will tend to migrate and enter the non-agricultural sector in higher numbers. This result provides evidence of the partial substitutability of land access via inheritance versus land rental markets. Similarly, travel time to a major urban center matters as well; for those far away (with greater than the 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 nonagricultural sector, than it is for those nearby. When an urban center is nearby, youth employment in the nonagricultural 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.

Table 6.4 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)

	Dummy–migrated ...			Dummy–primarily employed...		
Variable	Anywhere (1)	Out of woreda (2)	To urban area (3)	In agriculture (4)	In nonagri-culture (5)	As a student (6)
Panel A: By land rental market activity						
Log land inheritance (low activity)	-0.337***	-0.181*	-0.514***	0.410***	-0.661***	0.418**
	(0.108)	(0.094)	(0.080)	(0.099)	(0.120)	(0.196)
Log land inheritance (high activity)	-0.179	-0.378**	-0.267***	0.443***	0.006	-0.361**
	(0.119)	(0.151)	(0.077)	(0.143)	(0.143)	(0.155)
Observations	1,170	1,167	1,167	1,167	1,167	1,167
R-squared	0.830	0.848	0.850	0.869	0.826	0.850
Number of households	625	624	624	625	625	625
P-value of difference	0.335	0.280	0.035	0.853	0.001	0.004
Panel B: By distance to major urban center						
Log land inheritance (close)	0.430***	0.173	-0.071	0.473**	0.090	-0.610***
	(0.079)	(0.131)	(0.064)	(0.204)	(0.121)	(0.104)
Log land inheritance (far)	-0.126	-0.330**	-0.317***	0.234*	-0.319**	0.116
	(0.100)	(0.158)	(0.073)	(0.125)	(0.148)	(0.289)
Observations	1,170	1,167	1,167	1,167	1,167	1,167
R-squared	0.841	0.849	0.871	0.892	0.828	0.849
Number of households	625	624	624	625	625	625
P-value of difference	0.000	0.021	0.018	0.327	0.042	0.026

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

Notes: *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). Estimates are from completely interacted models in which rental market activity and distance 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. 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.

[31] 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).

7. 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 nonagricultural-sector employment in rural Ethiopia. Our empirical model—which exploits exogenous variation in the timing of land redistributions to overcome the endogeneity of the size of land inheritance—predicts that a 10 percent increase in inheritance size reduces rural-to-urban migration and employment in the nonagricultural sector by 4.8 and 4.1 percentage points, respectively. These findings are largely driven by the male and 20-to 34-year-old subpopulations. 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 land inheritance evokes a common trend, the African concept of *waithood* (Honwana 2012), whereby older youth postpone major employment decisions until they attain financial independence.

We examine two prominent features of land and labor markets to measure the extent to which youth employment decisions are constrained by land inheritance. First, we consider the role of access to land rental markets, which 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 nonagricultural 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 nonagricultural employment as a last resort after exhausting all means of access to land (such as temporary arrangements via land rental markets). It also supports the notion that rural inhabitants tend to diversify sectorally (Schmidt and Bekele 2016), particularly in areas constrained by land availability, rather than exit agriculture altogether.

Second, we assess whether a reduction in either moving costs or search costs, captured by being closer to an urban area, mediates the effect expected inheritance has on employment and relocation. There is no apparent relationship between land inheritance and either migration or nonagricultural-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 nonagricultural sector employment or migration when subject to liquidity constraints, such as under periods of income variability (Gray and Mueller 2012) or land scarcity (Bezu and Holden 2014; Deininger, Ayalew, and Alemu 2007). We show that when land constraints on youth in remote areas are relaxed, their proclivity to engage in long-distance migration or rural nonfarm employment is greatly reduced.

Our findings have broader implications for the development strategies available to Ethiopia. Absent government intervention, the decline in arable land over time may increase youth unemployment and urbanization. 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 the fraction of youth with limited opportunities for landownership. 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 widespread adoption of agricultural technologies. Agricultural growth will increase rural household welfare, generating the demand for auxiliary services and goods, which landless rural youth can provide.

APPENDIX TABLES

Table A.1 Descriptive statistics for sample with nonzero expected land inheritance, by sex

	Men			Women		
Variable	Mean	SD	N	Mean	SD	N
Panel A: Outcomes						
Dummy—permanent migrant	0.42	0.49	779	0.51	0.50	391
Dummy—permanent migrant out of woreda	0.22	0.41	776	0.20	0.40	391
Dummy—permanent migrant to urban area	0.26	0.44	776	0.31	0.46	391
Primary occupation is...						
In agriculture	0.50	0.5	777	0.11	0.31	390
In nonagriculture	0.19	0.39	777	0.10	0.30	390
As a student	0.27	0.44	777	0.33	0.47	390
Domestic	0.00	0.00	777	0.4	0.49	390
Unemployed	0.03	0.18	777	0.05	0.21	390
Panel B: Land access						
Dummy—inherited or expects to inherit land	1.00	0.00	779	1.00	0.00	391
Land inheritance (hectares)	0.43	0.55	779	0.59	4.33	391
Log land inheritance	-1.28	0.92	779	-1.52	0.91	391
Panel C: Individual Controls						
Dummy—male	1.00	0.00	779	0.00	0.00	391
Age	20.1	4.11	779	19.6	4.04	391
Dummy—child of head	0.99	0.1	779	0.97	0.17	391
Dummy—married	0.06	0.24	779	0.04	0.19	391
Dummy—$>$ 1 male descendant immediately follows in birth order	0.24	0.43	779	0.28	0.45	391
Number of older male direct descendants	1.3	1.45	779	1.52	1.54	391
Number of older female direct descendants	1.15	1.37	779	1.23	1.41	391
Dummy—Age 18+ at time of land redistribution	0.18	0.39	779	0.16	0.36	391
Dummy—completed cycle 1 of primary school (grade 4)	0.72	0.45	779	0.62	0.49	391

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

Notes: *The share of male descendants who were older than age 18 at the time of the redistribution interacted with a dummy for having more than one male descendant immediately following oneself. *Land redistribution* always refers to the most recent redistribution. *With land* refers to those who either have already inherited land or expect to inherit land. *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. Religion is that of the household head.

Table A.2 Major urban center populations, Ethiopia, 2007

Major urban center	Total population
ASAYTA-TOWN	20,824
ASOSA-TOWN	35,752
GAMBELLA-TOWN	52,659
ADIGRAT-TOWN	72,375
KOMBOLCHA-TOWN	77,757
DILA-TOWN	77,856
ASELA-TOWN	83,591
DEBERE MARKOS-TOWN	86,225
DEBRE BREHAN-TOWN	87,204
NEKEMTE-TOWN	94,014
HOSAENA-TOWN	94,208
SODO-TOWN	98,930
ARBA MINCH-TOWN	101,819
HARAR-TOWN	118,353
BISHOFTU-TOWN	127,678
SHASHEMENE-TOWN	133,252
JIJIGA-TOWN	142,408
DESSIE-TOWN	152,568
JIMMA-TOWN	157,432
BAHIR DAR-TOWN	202,157
HAWASSA-TOWN	221,397
DIRE DAWA-TOWN	263,827
GONDER-TOWN	273,157
MEKELE-TOWN	284,652
ADAMA-TOWN	285,611
ADDIS ABABA	3,156,057

Source: CSA (2014).

REFERENCES

Ali, D. A. and K. Deininger. 2015. "Is There a Farm Size–Productivity Relationship in African Agriculture? Evidence from Rwanda." *Land Economics* 91 (2): 317–343.

ANRS (Amhara National Regional State). 2006. *The Revised Amhara National Regional State Rural Land Administration and Use Proclamation, Zikira- Hig of the Council of Amhara National Regional State.* The Council of Amhara National Regional State, Proclamation No. 133/2006. Bahir Dar, Ethiopia.

———. 2007. "The Amhara National Regional State Rural Land Administration and Use System Implementation Council of Regional Government Regulations." The Council of Amhara National Regional State, Regulation No. 51/2007, Bahir Dar, Ethiopia.

Barrett, C. B., M. F. Bellemare, and J. Y. Hou. 2010. "Reconsidering Conventional Explanations of the Inverse Productivity–Size Relationship." *World Development* 38 (1): 88–97.

Bellemare, M. F. 2013. "The Productivity Impacts of Formal and Informal Land Rights: Evidence from Madagascar." *Land Economics* 89 (2): 272–290.

Benin, S., and J. Pender. 2001. "Impacts of Land Redistribution on Land Management and Productivity in the Ethiopian Highlands." *Land Degradation & Development* 12 (6): 555–568.

Bernheim, B., A. Shleifer, and L. Summers. 1985. "The Strategic Bequest Motive." *Journal of Political Economy* 93 (6): 1045–1076.

Bezu, S., and C. Barrett. 2012. "Employment Dynamics in the Rural Nonfarm Sector in Ethiopia: Do the Poor Have Time on Their Side?" *Journal of Development Studies* 48 (9): 1223–1240.

Bezu, S., and S. Holden. 2014. "Are Rural Youth in Ethiopia Abandoning Agriculture?" *World Development* 64: 259–272.

Bustos, P., B. Caprettini, and J. Ponticelli. 2016. "Agricultural Productivity and Structural Transformation: Evidence from Brazil." *American Economic Review* 106 (6): 1320–1365.

Butcher, K. F., and A. Case. 1994. "The Effect of Sibling Sex Composition on Women's Education and Earnings." *The Quarterly Journal of Economics* 531–563.

Carletto, C., S. Savastano, and A. Zezza. 2013. "Fact or Artifact: The Impact of Measurement Errors on the Farm Size–Productivity Relationship." *Journal of Development Economics* 103: 254–261.

Carrington, W., E. Detraigiache, and T. Vishnawath. 1996. "Migration with Endogeneous Moving Costs." *American Economic Review* 86 (4): 909–930.

Congdon Fors, H., K. Houngbedji, and A. Lindskog. 2015. *Land Certification and Schooling in Rural Ethiopia*. PSE Working Papers 2015-30. Paris School of Economics.

Croppenstedt, A., M. Goldstein, and N. Rosas. 2013. "Gender and Agriculture: Inefficiencies, Segregation, and Low Productivity Traps." *World Bank Research Observer* 28 (1): 79–109.

CSA (Ethiopia Central Statistical Agency). 2012. Agricultural Sample Survey 2011/2012, Volume IV: Report On Land Utilization. http://www.csa.gov.et/images/documents/pdf files/ nationalstatisticsabstract/2006/ total.pdf.

———. 2014. Statistical Report on the 2013 National Labour Force Survey. Adidas Ababa.

———. 2015. Ethiopia Central Statistical Authority - National Statistics. Addis Ababa. http://www.csa.gov.et/images/documents/pdf files/nationalstatisticsabstract/2006/total.pdf.

de Brauw, A. 2014. "Migration, Youth, and Agricultural Productivity in Ethiopia." Paper prepared for the AAEA session on Immigration, agricultural employment, and trade: International Perspectives, at the Annual Meeting of the Allied Social Science Association (ASSA), Boston, January 3–5.

de Brauw, A. and V. Mueller. 2012. "Do Limitations in land Rights Transferability Influence Mobility Rates in Ethiopia?" *Journal of African Economies* 21 (4): 548–579.

de Brauw, A., V. Mueller, and T. Woldehanna. 2013a. *Does Internal Migration Improve Overall Well-being in Ethiopia*. Ethiopia Strategy Support Program Working Paper 55. Washington, DC: International Food Policy Research Institute.

———. 2013b. "Motives to Remit: Evidence from Tracked Internal Migrants in Ethiopia." *World Development* 50: 13–23.

Deininger, K., S. Jin, M. Demeke, B. Adenew, and S. Gebre-Selassie. 2003. Market and Non-market Transfers of Land in Ethiopia: Implications for Efficiency, Equity, and Non-farm Development. Policy Research Working Paper 2992. Washington, DC: World Bank.

Deininger, K., D. Ayalew, and T. Alemu. 2007. "Land Rental in Ethiopia: Marshallian Inefficiency or Factor Market Imperfections and Tenure Insecurity as Binding Constraints?" Paper prepared for presentation at the American Agricultural Economics Association Annual Meeting, Portland, OR, US, July 29–August 1, 2007.

Deininger, K., D. A. Ali, and T. Alemu. 2011. Productivity Effects of Land Rental Markets in Ethiopia: Evidence from a Matched Tenant-Landlord Sample. Policy Research Working Paper 5727. Washington, DC: World Bank.

Deininger, K., F. Xia, and S. Savastano. 2015. *Smallholders' Land Ownership and Access in Sub-Saharan Africa: A New Landscape?* Policy Research Working Paper 7285. Washington, DC: World Bank.

Demeke, M. 1999. "Agricultural Technology, Economic Viability and Poverty Alleviation in Ethiopia." Paper presented to the Agricultural Transformation Policy Workshop, Nairobi, Kenya, June 27–30.

Dillon, B. and C. Barrett. 2014. *Agricultural Factor Market in Sub-Saharan Africa: An Updated View With Formal Tests for Market Failure*. Policy Research Working Paper 7117. Washington, DC: World Bank.

Dorosh, P., H. G. Wang, L. You, and E. Schmidt. 2012. "Road Connectivity, Population, and Crop Production in Sub-Saharan Africa." *Agricultural Economics* 43 (1): 89–103.

Fafchamps, M., and A. R. Quisumbing. 2002. "Control and Ownership of Assets within Rural Ethiopian Households." *Journal of Development Studies* 38 (6): 47–82.

———. 2005. "Marriage, Bequest, and Assortative Matching in Rural Ethiopia." *Economic Development and Cultural Change* 53 (2): 347–380.

Filmer, D., L. Fox, K. Brooks, A. Goyal, T. Mengistae, P. Premand, D. Ringold, S. Sharma, and S. Zorya. 2014. *Youth Employment in Sub-Saharan Africa*. Washington, DC: International Bank for Reconstruction and Development, World Bank.

Garg, A., and J. Morduch. 1998. "Sibling Rivalry and the Gender Gap: Evidence from Child Health Outcomes in Ghana." *Journal of Population Economics* 11 (4): 471–493.

Gibson, M. A. and E. Gurmu. 2011. "Land Inheritance Establishes Sibling Competition for Marriage and Reproduction in Rural Ethiopia." *Proceedings of the National Academy of Sciences* 108 (6): 2200–2204.

———. 2012. "Rural to Urban Migration is an Unforeseen Impact of Development Intervention in Ethiopia." *PLoS One* 7 (11): e48708.

Gibson, M. A. and R. Sear. 2010. "Does Wealth Increase Parental Investment Biases in Child Education?" *Current Anthropology* 51 (5): 693–701.

Grawe, N. D. 2010. "Bequest Receipt and family Size Effects." *Economic Inquiry* 48 (1): 156–162.

Gray, C. and V. Mueller. 2012. "Drought and Population Mobility in Rural Ethiopia." *World Development* 40 (1): 134–145.

Harris, J. and M. Todaro. 1970. "Migration, Unemployment and Development: A Two-Sector Analysis." *American Economic* Review 60 (1): 126–142.

Headey, D. and T. Jayne. 2014. "Adaptation to Land Constraints: Is Africa Different?" *Food Policy* 48: 18–33.

Headey, D., M. Dereje, and A. S. Taffesse. 2014. "Land Constraints and Agricultural Intensification in Ethiopia: A Village-Level Analysis of High-potential Areas." *Food Policy* 48: 129–141.

Hervish, A. 2011. *Despite Challenges Ending Early Marriage in Ethiopia is Possible.* Washington DC: Population Reference Bureau.

Holden, S. and M. Bezabih. 2008. "Gender and Land Productivity on Rural *Land in Ethiopia. In The Emergence of Land Markets in Africa: Impacts on Poverty and Efficiency,* edited by S. Holden, K. Otsuka, and F. Place, 179–196. Washington, DC: Resources for the Future Press.

Holden, S. T. and H. Ghebru. 2016. "Land Rental Market Legal Restrictions in Northern Ethiopia." *Land Use Policy* 55: 212–221.

Honwana, A. M. 2012. *The Time of Youth: Work, Social Change, and Politics in Africa*. London, UK: Kumarian Press.

IFPRI (International Food Policy Research Institute). 2010. Watershed Survey. First Round. Washington, DC.

———. 2014. Watershed Survey. Second Round. Washington, DC.

Jayne, T., D. Mather, and E. Mghenyi. 2010. "Principal Challenges Confronting Smallholder Agriculture in sub-Saharan Africa." *World Development* 38 (10): 1384–1398.

Keister, L. A. 2003. "Sharing the Wealth: The Effect of Siblings on Adults' Wealth Ownership." *Demography* 40 (3): 521–542.

Kumar, N. and A. Quisumbing. 2012. "Inheritance Practices and Gender Differences in Poverty and Well-Being in Rural Ethiopia." *Development Policy Review* 30 (5): 573–595.

Kushnick, G. 2010. "Resource Competition and Reproduction in Karo Batak Villages." *Human Nature* 21 (1): 62–81.

Larson, D. F., K. Otsuka, T. Matsumoto, and T. Kilic. 2014. "Should African Rural Development Strategies Depend on Smallholder Farms? An Exploration of the Inverse-Productivity Hypothesis." *Agricultural Economics* 45 (3): 355–367.

Lee, H., and V. Mueller. 2016. "Can Migration Be a Conduit for Transformative Youth Employment? Evidence from the LSMS-ISA Countries." International Food Policy Research Institute, Washington, DC.

Lloyd, C. B., C. Mete, and M. J. Grant. 2009. "The Implications of Changing Educational and Family Circumstances for Children's Grade Progression in Rural Pakistan: 1997–2004." *Economics of Education Review* 28 (1): 152–160.

Mekonnen, W., and A. Worku. 2011. "Determinants of Fertility in Rural Ethiopia: The Case of Butajira Demographic Surveillance System (DSS)." *BMC Public Health* 11 (1): 782.

Morduch, J. 2000. "Sibling Rivalry in Africa." *American Economic Review* 90 (2): 405–409.

Mueller, V., E. Schmidt, N. Lozano-Gracia, and S. Murray. 2015. "Household and Spatial Drivers of Migration Patterns in Africa: Evidence from Four Countries." Paper presented at the Structural Transformation in Agriculture and Rural Spaces Conference, Addis Ababa, December 4–5.

Muyanga, M., and T. S. Jayne. 2014. "Effects of Rising Rural Population Density on Smallholder Agriculture in Kenya." *Food Policy* 48: 98–113.

Nagler, P., and W. Naude. 2014. *Non-Farm Enterprises in Rural Africa: New Empirical Evidence*. Policy Research Working Paper 7066. Washington, DC: World Bank.

North, D. C. 1990. *Institutions, Institutional Change and Economic Performance*. Cambridge University Press.

ONRS (Oromia National Regional State). 2007. "Proclamation to Amend the Proclamation No. 56/2002, 70/2003, 103/2005 of Oromia Rural Land Use Administration. Rural land Use Administration." The Council of Oromia National Regional State, Proclamation No. 130/2007. Addis Ababa.

Schmidt, E., and F. Bekele. 2016. "Rural Youth and Employment in Ethiopia." International Food Policy Research Institute, Washington, DC.

Schmidt, E., and F. Tadesse. 2014. "Sustainable Agriculture in the Blue Nile Basin: Land and Watershed Management Practices in Ethiopia." *Environment and Development Economics* 19 (05): 648–667.

Sengupta, S. 2015. "The World Has a Problem: Too Many Young People." http://www.nytimes.com/2016/03/06/sunday-review/the-world-has-a-problem-too-many-young-people.html.

Sheahan, M., and C. B. Barrett. 2014. "Understanding the Agricultural Input Landscape in Sub-Saharan Africa: Recent Plot, Household, and Community-level Evidence." Policy Research Working Paper 7104. Washington, DC: World Bank.

Sjaastad, L. 1962. "The Costs and Returns of Human Migration." *Journal of Political Economy* 70 (4): 80–93.

Vogl, T. 2013. "Marriage Institutions and Sibling Competition: Evidence from South Asia." *Quarterly Journal of Economics* 128 (3): 1017–1072.

World Bank. 2010. *The Ethiopian Urban Migration Study 2008: The Characteristics, Motives and Outcomes of Migrants to Addis Ababa*. Technical Report No. 55731-ET. Poverty Reduction and Economic Management, Africa Region. Washington, DC.

———. 2016. *Ethiopia Public Expenditure Review 2015.* Washington DC.

Zeleke, G., W. Asfaw, D. Tolosa, B. Alemu, and P. Trutmann. 2008. *Seasonal Migration and Rural Livelihoods in Ethiopia: An Empirical Study*. Rural-Urban-Linkage Theme Working Paper 3. Lima: Global Mountain Program.

RECENT IFPRI DISCUSSION PAPERS

For earlier discussion papers, please go to www.ifpri.org/publications/discussion_papers.
All discussion papers can be downloaded free of charge.

1593. *How headquarters relocation is affected by rising wages and ownership: Evidence from China's Annual Survey of Industrial Enterprises, 1999–2008.* Qingtao Wang, Kevin Chen, Longwen Chiang, and Xuanli Xie, 2016.

1592. *External shocks, food security, and development: Exploring scenarios for Central America.* Eugenio Diaz-Bonilla, Valeria Piñeiro, and Pablo Elverdin, 2016.

1591. *The role of learning in technology adoption: Evidence on hybrid rice adoption in Bihar, India.* Jared Gars and Patrick S. Ward, 2016.

1590. *Building effective clusters and industrial parks.* Xiaobo Zhang, 2016.

1589. *Nepal's 2072 federal constitution: Implications for the governance of the agricultural sector.* Jordan Kyle and Danielle Resnick, 2016.

1588. *Entitlement fetching or snatching?: Effects of arbitrage on India's public distribution system.* Suman Chakrabarti, Avinash Kishore, and Devesh Roy, 2016.

1587. *Changing preferences through experimental games: Evidence from sanitation and hygiene in Tamil Nadu.* Yaniv Stopnitzky, 2016.

1586. *Climate change, agriculture, and adaptation in the Republic of Korea to 2050: An integrated assessment.* Nicola Cenacchi, Youngah Lim, Timothy Sulser, Shahnila Islam, Daniel Mason-D'Croz, Richard Robertson, Chang-Gil Kim, and Keith Wiebe, 2016.

1585. *The dark side of competition: Gender differences.* Simon Chang, Kamhon Kan, and Xiaobo Zhang, 2016.

1584. *Harnessing net primary productivity data for monitoring sustainable development of agriculture.* Nathaniel P. Robinson, Cindy M. Cox, and Jawoo Koo, 2016.

1583. *Effects of agricultural mechanization on smallholders and their self-selection into farming: An insight from the Nepal Terai.* Hiroyuki Takeshima, Rudra Bahadur Shrestha, Basu Dev Kaphle, Madhab Karkee, Suroj Pokhrel, and Anjani Kumar, 2016.

1582. *The agricultural sector as an alternative to illegal mining in Peru: A case study of Madre de Dios.* Valeria Piñeiro, Jenny Thomas, and Pablo Elverdin, 2016.

1581. *What drives diversification of national food supplies?: A cross-country analysis.* Samira Choudhury and Derek Headey, 2016.

1580. *Identity, household work, and subjective well-being among rural women in Bangladesh.* Greg Seymour and Maria S. Floro, 2016.

1579. *Youth employment, agricultural transformation, and rural labor dynamics in Nigeria.* Margaret Adesugba and George Mavrotas, 2016.

1578. *Farm size and effects of chemical fertilizer price on farm households: Insights from Nepal terai.* Hiroyuki Takeshima, Sabnam Shivakoti, Binod Bhattarai, Madhab Karkee, Suroj Pokhrel, and Anjani Kumar, 2016.

1577. *Energy use and rural poverty: Empirical evidence from potato farmers in northern China*. Zihan Li, Yazhen Gong, and Kevin Z. Chen, 2016.

1576. *Does a "blue revolution" help the poor?: Evidence from Bangladesh.* Shahidur Rashid, Nicholas Minot, and Solomon Lemma, 2016.

1575. *Do development projects crowd out private-sector activities?: A survival analysis of contract farming participation in northern Ghana.* Isabel Lambrecht and Catherine Ragasa, 2016.

1574. *Strong democracy, weak state: The political economy of Ghana's stalled structural transformation.* Danielle Resnick, 2016.

1573. *Storage and handling among smallholder potato farmers in southwestern Uganda.* Bjorn Van Campenhout, Senne Vandevelde, Wiberforce Walukano, and Piet Van Asten, 2016.

1572. *What drives input subsidy policy reform?: The case of Zambia, 2002–2016.* Danielle Resnick and Nicole M. Mason, 2016.

INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

www.ifpri.org

IFPRI HEADQUARTERS
2033 K Street, NW
Washington, DC 20006-1002 USA
Tel.: +1-202-862-5600
Fax: +1-202-467-4439
Email: ifpri@cgiar.org

IFPRI ADDIS ABABA
P. O. Box 5689
Addis Ababa, Ethiopia
Tel.: + 251 (0) 11-617-2500
Fax: + 251 (0) 11-646-2927
Email: ifpri-addisababa@cgiar.org