**The Long-term Impacts of Orphanhood on Education Attainment and Land
Inheritance among Adults in Rural Kenya**

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1. Introduction

Responding to concerns about long-term impacts of the AIDS epidemic, there have been a growing number of studies on the schooling of orphans (Case, Paxson, and Ableidinger, 2004; Evans and Miguel, 2004; Ainsworth, Beegle, and Koda, 2005). In addition to education, passing land to children is another important way for parents to assure their children's future welfare in rural areas (Quisumbing, Estudillo, and Otsuka, 2004). Because land is increasingly becoming a scarce resource in many African countries that are suffering from the AIDS epidemic (Jayne et al., 2004), studying the land inheritance of orphans is equally as important as studying the schooling of orphans.

No studies, however, have yet quantified the impacts of orphan status on land inheritance. The lack of studies on the land inheritance of orphans is partly due to the lack of former orphan status information of adults. Indeed, the welfare status of orphans in their adulthood is virtually unknown because orphan status is only measured among children.[1] Thus, there is a gap in the literature about the long-term impacts of orphanhood on the welfare of orphans in their adulthood.

The purpose of this paper, therefore, is to estimate the education attainment and land inheritance of former orphans, who have lost at least one parent before reaching age

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[1] One exception is Beegle, De Weerdt, and Decron (2005). They use panel data that cover surveys in 1991-94 and 2004 in the Kagera region of Tanzania. They follow sampled children aged 0 to 15 in the 1990-94 surveys into the 2004 survey. Among the 681 sampled children who had reached adulthood by the 2004 survey, they find significantly lower education attainment between orphans, especially maternal orphans, and non-orphans. However, their study only follows orphans into early adulthood and does not cover the land inheritance of orphans.

15, in rural Kenya. We use a household survey of 889 rural households interviewed in 2004. In the survey, we have asked about the timing of losing the mother and father of household members, if they have experienced such a loss. If a member had already lost one or both parents, we have asked the age of the member when the parent(s) died. By using such information, we have identified current orphans if aged 15 or younger and former orphans if aged 16 or older. To the best of our knowledge, no studies have identified the former orphan status of adults systematically in a household survey.

2. Schooling and the Land Inheritance of Orphans

Previous studies provide a theoretical framework on the impacts of parental deaths on child schooling (Case, Paxson, and Aleidinger, 2004). There are several pathways through which parental deaths have negative impacts on child schooling. First, financial losses caused by medical and funeral payments after parental deaths may reduce schooling. Previous studies find financial losses among households who experience working-age adult deaths (e.g, Yamano and Jayne, 2004). The size of the negative impact on schooling could be large especially when schooling fees are high.[2] Second, opportunity costs of children's time may increase because of the time required to take care of sick parents and to replace the labor of the sick parents. Both Yamano and Jayne (2005) and Evans and

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2 Yamano, Shimamura, and Sserunkuuma (2005), for instance, found a lower enrollment rate for orphans than non-orphans among young adolescents aged 15 to 18 but not among children aged 6 to 14 in Uganda. This could be because of the elimination of school fees in public primary schools, which children aged 6 to 14 are likely to attend, and high school fees in secondary schools, which adolescents aged 15 to 18 are likely to attend

Miguel (2004) find a decline in enrollment rates among children, especially girls, in periods before they experience working-age adult deaths in their households. The authors of both papers speculate that this is because of the increased demand for children's labor. Third, changes in parental preference after the loss of one parent may affect the schooling of orphans. There is evidence that mothers tend to invest more of the income they control in children than do fathers (Thomas, 1997). Thus, the loss of a mother may have a larger negative impact on schooling than the loss of a father. Fourth, the living arrangements of orphans may change after parental deaths. Although some orphans remain in their households after the death of one or both parents, caretakers adopt many of them.[3] Thus, caretakers may have control over the schooling of orphans.

Recent studies that use panel data have identified the causal effects of orphanhood on schooling (e.g., Beegle, De Weerdt, and Decron, 2005). The results from these studies, therefore, imply a loss in the final educational attainment among orphans, which will result in poorer ability to generate income in their adulthood. However, few previous studies have actually measured the educational attainment of former orphans in their adulthood. Therefore, in the following sections of this paper, we identify former orphans among all adults and estimate the associations between the final educational attainment and former orphan status.

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3 In Uganda, for instance, Yamano, Shimamura, and Sserunkuuma (2006) show that the education of the female members, the number of female elders, and the value of assets increase the household's probability of living with orphans who are not the biological children of any of the current household members.

The pathways through which parental deaths affect land inheritance may differ from the above. Although there have been some previous studies on the gender differences of schooling and land inheritance (Quisumbing, Estudillo, and Otsuka, 2004), no studies have discussed a theoretical framework of orphans' land inheritance. To start a discussion, let us consider the simplest case where the parents simply divide their land, Z, equally among N children. In patrilineal societies, such as in Kenya, the number of children that matter is the number of sons. A simple question about the land inheritance of orphans is whether the parental deaths affect Z or N.

The prevailing practice after the death of a father (or husband) in Kenya is for the wife of the deceased husband to hold land in trust for her male children (Drimie, 2002). In this case, the amount of land left by the deceased father, Z, is intact. Thus, male paternal orphans would inherit as much land as they would even if their fathers had survived. In fact, the transfer process of inheritance to them could be faster than usual because they do not need to share the land with their father any longer. Thus, as soon as male paternal orphans become old enough to inherit land, they inherit as much land as they would in their life. In their early adulthood, therefore, male parental orphan may own more land than former non-orphans who need to wait to inherit land as long as their fathers are alive. For maternal orphans, the situation is similar to non-orphans, since their fathers maintain the land even after the death of their wives.[4]

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[4] Exceptions occur when widows are dispossessed of their land by their husbands' relatives after the deaths of their husbands (Wanyeki, 2003). However, we do not know if such conflicts actually lead to the dispossession of land. Another case is when a household decides to sell its land to

Next, let us consider how parental deaths affect the number of siblings, N, who share the inheritance. If one partner dies in an early stage of marriage and the remaining partner remains unmarried, the number of siblings who share the inheritance could be fewer than expected. As a result, former orphans would inherit more land than they would if both of their parents had survived and produced more children. The situation has similarities to a situation studied in Young (2005). In his study, he simulates the impact of the AIDS epidemic on future living standards in South Africa. He finds a positive impact of lowered fertility, because of widespread community infections, on per capita income, and that the positive impact is larger than the negative impact of the AIDS epidemic on human capital.

3. Data

The data used in this paper come from 899 households interviewed in a survey conducted in 2004. This survey was conducted as part of the Research on Poverty and Environment and Agricultural Technology (REPEAT) Project[5] and was financed by the 21st Century Center of Excellence Grant, which was provided by National Graduate Institute for Policy Studies. The survey randomly took samples from three previous surveys conducted by the International Livestock Research Institute (ILRI) in 1996, 1998,

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compensate for financial losses due to medical and funeral fees. An earlier study in Kenya, however, does not find any significant declines in total cultivated land after working-age adult mortality (Yamano and Jayne, 2004).

[5] The REPEAT Project is a collaborative research project of National Graduate Research Institute for Policy Studies, the World Agro-forest Center, and Tegemeo Institute in Kenya.

and 2000. The three ILRI surveys used a similar sampling method and covered about 3,300 households who resided in central and western regions of Kenya. From the sub-locations that the ILRI samples located, we randomly selected 100 sub-locations and 10 households from each of the 100 chosen sub-locations.

Because the AIDS epidemic has emerged in the last two decades, we expect that the proportion of orphans has increased in recent years. To see the changes in the proportion of orphans across generations, we stratify the samples by age cohorts in Table 1. Among the youngest cohort, which includes children aged 0 to 5, we find that about seven percent of them are orphans who had lost at least one parent by the survey period. Among the second youngest cohort, it is 14.3 percent. Note that the percentages of orphans in these youngest two cohorts are likely to increase as some of them may still suffer from parental losses by the time they reach age 15.

Among the next age cohort, we find that about 14 percent of them are former orphans who had lost at least one parent before reaching 15. This group and the younger age cohorts are likely to have suffered from AIDS-related parental deaths because the number of AIDS patients has increased in the past 20 years. The proportion of orphans is lower in the next three older age cohorts, aged 26 to 55, but it increases again in the second and third oldest age cohorts, aged 56 to 65. This could indicate that the proportion of orphans was decreasing as the living conditions in Kenya improved in the older age cohorts. As the AIDS epidemic spread in the last two decades, however, the proportion of orphans increased in the youngest three age cohorts.

4. Results on Former Orphans Schooling

To estimate the educational attainment of former orphans and non-orphans, we first identify the Kenyan education systems: Pre and Post Independence in 1950 to 1973, Free Primary Education in 1974 to 1987, and Cost-Sharing System in 1988 to 2003. Even in the pre-independence period, the enrollment rate in Kenya was high. Furthermore, after independence, the Kenyan government devoted a significant portion of its budget and increased the number of schools and teachers. As a result, the gross enrollment rate (GER) reached 62 percent in 1970. After the introduction of the Free Primary Education system in 1974, the GER reached 100 percent and remained over 100 percent until 1987. In 1988, however, a cost-sharing scheme was introduced to reduce the government budget on education as part of the structural adjustment programs, and the GER started declining to below 90 percent in the late 1990s until the newly elected President Kibaki re-introduced Free Primary Education in 2003. Accordingly, therefore, we stratify adults who completed their schooling in these three educational systems: ages 38 to 60, 24 to 37, and 18 to 23.

In Table 2, we present the regression results from the community fixed effects models. The dependent variable is the highest grade attained. The results indicate that former maternal orphans have a lower attained grade, by about 0.75 years, than former non-orphans. However, when we stratify the sample into three periods, we only find such a negative and significant coefficient on former maternal orphans among adults aged 38 to 60 in column B but not in the other age cohorts. This indicates that, since the introduction

of Free Education, orphans have not been suffering from permanent losses in educational attainment.

5. Results on Former Orphans' Land Inheritance

Next, we examine the land inheritance of former orphans. In Table 3, we present the descriptive statistics of the inherited land sizes of former orphans and non-orphans. We find that former non-orphans have inherited about 2.72 acres of land on average, while former orphans inherited about 2.3 acres of land. Among orphans, we find that paternal orphans inherited more land, about 2.6 acres, than maternal orphans, who inherited 2.0 acres. This could be because paternal orphans do not need to share land with their fathers anymore and inherit land much earlier than others. Yet, paternal orphans do not inherit as much as non-orphans. Note, however, that the numbers in Table 3 are not statistically different from the others. In addition, even if there were significant differences in inherited land size between orphans and non-orphans, orphans may obtain land in land markets. Thus, in Table 3, we also present the purchased, rented-in, and total land sizes. We find that maternal orphans purchase more than others and, as a result, that the total land size of maternal orphans is 4.3 acres, which is very close to the land sizes of non-orphans and paternal orphans, whose land size is 4.4 and 4.3 acres, respectively.

To investigate further, we estimate the regression models on inherited land (Tobit) and total land access (Community Fixed Effects). Because men inherit land in most cases

in Kenya, we use the former orphan status of male heads in Table 4. When we do not have the information of the deceased male heads, we include a widow dummy in columns A and C or exclude such cases in columns B and D. In all models, the results indicate that there are no differences in inherited land sizes and total land access between orphans and non-orphans.

6. Conclusion

Concerned with the long-term implications of the AIDS epidemic, many researchers have examined the schooling of orphans. However, only a few studies have explored the impacts of orphan status on educational attainment into adulthood, and no studies have yet quantified the impacts of orphan status on land inheritance. Therefore, we estimate the educational attainment model and find that former maternal orphans have about a one year lower educational attainment than former non-orphans when we select individuals who started schooling before the Free Education Policy was introduced in 1974. We do not, however, find a similar difference in education attainment among younger cohorts, who started schooling after 1974. This suggests that the Free Education Program might have helped orphans to obtain education. Regarding inherited land, there is a possibility for paternal orphans to inherit land quicker than non-orphans because paternal orphans do not need to share the land with their fathers. The empirical evidence, however, suggests no significant differences in inherited land between former non-orphans and orphans.

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Table 1. Current and Former Orphan Status of Sample Individuals

Age Category	Number of sampled individuals	Current or Former Orphans of Any Type	Current and Former Orphans		
			Paternal Orphans	Maternal Orphans	Double Orphans
	(A)	(B)	(C)	(D)	(E)
	- Number-	- % -	- % -	- % -	- % -
0 – 5 years	624	6.9	4.3	1.4	1.1
6 – 15 years	1,629	14.3	6.9	5.0	2.5
16 – 25 years	1,641	14.0	10.2	2.6	1.2
26 – 35 years	692	10.1	7.7	1.9	0.6
36 – 45 years	484	9.7	6.8	2.9	0
46 – 55 years	460	13.7	9.6	3.5	0.7
56 – 65 years	328	17.4	8.8	5.5	3.0
66 and older	382	10.7	5.8	3.4	1.6
All	6,240	12.6	7.8	3.3	1.4
Household Heads	899	10.5	6.0	3.1	1.4

Table 2. Attained Grades of Adults Aged 18 to 60 by Former Orphan Status Community Fixed Effects Model

| | All Adults | Education Systems | | |
		Pre- and Post-Independence in 1950-1973 Adults 38-60	Free Primary Education in 1974-1987 Adults 24-37	Cost-sharing System in 1988-2004 Adults 18-23
	(A)	(B)	(C)	(D)
Former Orphan Status				
Maternal Orphan (=1)	-0.754	-1.173	-0.553	0.122
	(2.06)**	(1.88)*	(0.78)	(0.37)
Paternal Orphan (=1)	0.105	0.097	0.095	-0.009
	(0.46)	(0.21)	(0.26)	(0.04)
Fixed Individual Characteristics				
Age	0.180	-0.107	-0.463	2.936
	(4.91)**	(0.34)	(1.19)	(5.32)**
Age squared	-0.004	-0.001	0.006	-0.071
	(7.37)**	(0.28)	(0.97)	(4.76)**
Female (=1)	-1.316	-3.213	-0.807	0.226
	(10.05)**	(12.54)**	(3.88)**	(1.58)
Catholic (=1)	0.040	-0.037	0.160	0.152
	(0.24)	(0.12)	(0.59)	(0.83)
Other religion (=1)	0.337	0.214	0.707	0.272
	(1.19)	(0.38)	(1.60)	(0.90)
Constant	7.747	16.323	17.454	-21.117
	(12.68)**	(2.15)**	(3.10)**	(4.19)**
R-squared	0.13	0.19	0.03	0.09
Number of Sub-locations	97	97	97	97
Number of total obs.	3151	1073	1163	1455

Note: Sub-location fixed effects for 97 sub-locations are controlled for. ** indicates 5% significance level; * indicates 10% significance level.

Table 3. Inherited Land Size by Former Orphan Status of Male Household Head [a]

	Former non-orphans	Former orphans of any type	Former Orphan Status		
			Paternal Orphans	Maternal Orphans	Double Orphans
	(A)	(B)	(C)	(D)	(E)
	mean (sd)	mean (sd)	mean (sd)	mean (sd)	mean (sd)
Inherited Land	2.72	2.30	2.57	1.96	1.90
	(4.70)	(2.48)	(2.47)	(2.71)	(1.98)
Purchased Land	1.36	1.61	1.44	2.08	1.33
	(3.09)	(3.51)	(3.44)	(3.95)	(2.84)
Rented-in Land	0.26	0.18	0.26	0.10	0.02
	(0.75)	(0.71)	(0.92)	(0.28)	(0.07)
Total Land Access	4.40	4.30	4.32	4.34	4.08
	(5.17)	(3.96)	(4.30)	(3.72)	(3.14)
Number of Observations	637	90	51	27	12

Note: (*a*) The total number of male headed households is 727, and the number of widow headed households is 170. Female headed households in which their husbands are alive are included in the male headed households because we have their husbands' schooling information. Because men inherit land in most cases in Kenya and because we assume that men's former orphan status affects inherited land sizes, we have excluded 170 widow-headed households because we do not have information about the former orphan status of their deceased husbands.

* and ** indicate results of the t-test between former non-orphans (column A) and each type of former orphan. ** indicates 5% significance level; * indicates 10% significance level.

Table 4. Determinants of Inherited Land Size by Former Orphan Status of Household Head

	ln (Inherited Land in acres)		ln (Total Land Access in acres)	
	Full Sample	Female Headed Households Excluded	Full Sample	Female Headed Households Excluded
	Tobit	Tobit	Community FE	Community FE
	(A)	(B)	(C)	(D)
Head's Former Orphan Status				
Maternal Orphan (=1)	-0.184	-0.150	0.013	0.020
	(1.11)	(0.90)	(0.13)	(0.20)
Paternal Orphan (=1)	0.135	0.147	0.011	0.031
	(1.06)	(1.15)	(0.14)	(0.38)
Head is Widow (=1)	-0.064		-0.054	
	(0.68)		(0.93)	
Availability of Head's Parents				
Father alive (=1)	0.030	0.015	-0.002	-0.012
	(0.28)	(0.15)	(0.03)	(0.17)
Mother alive (=1)	0.116	0.091	-0.037	-0.063
	(1.34)	(1.04)	(0.68)	(1.10)
Head Characteristics				
Head's age	0.006	0.006	0.014	0.016
	(0.39)	(0.39)	(1.61)	(1.62)
Age squared	-0.000	-0.000	-0.000	-0.000
	(0.81)	(0.96)	(0.71)	(0.90)
Community Characteristics				
Altitude	0.137	0.257		
	(0.38)	(0.64)		
ln (Distance to town)	-0.111	-0.098		
	(1.72)*	(1.37)		
Six Ethnic Group Dummies	Included	Included		
14 District Dummies	Included	Included		
Constant	-0.610	0.210	0.826	0.834
	(0.22)	(0.07)	(3.22)**	(3.02)**
(Pseudo-) R-squared	0.105	0.097	0.018	0.011
Number of censored obs.	183	183	0	0
Number of total obs.	885	717	885	717

Note: Sub-location fixed effects models for 97 sub-locations are estimated in columns C and D.
  ** indicates 5% significance level; * indicates 10% significance level