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Widowhood and asset inheritance in sub-Saharan Africa: empirical evidence from 15 countries

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What is Chronic Poverty?

The distinguishing feature of chronic poverty is extended duration in absolute poverty.

Therefore, chronically poor people always, or usually, live below a poverty line, which is normally defined in terms of a money indicator (e.g. consumption, income, etc.), but could also be defined in terms of wider or subjective aspects of deprivation.

This is different from the transitorily poor, who move in and out of poverty, or only occasionally fall below the poverty line.

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Abstract

Widows in sub-Saharan Africa (SSA) are perceived to face widespread discrimination in asset and property inheritance following the death of a spouse, leading to poverty for themselves and their children. However, large-sample empirical research directly supporting this claim is scarce. This paper explores levels, determinants and effects of asset inheritance among widows using data from two sources: 1) cross-country, nationally representative demographic and health survey (DHS) data from 15 SSA countries to assess levels and correlates of asset inheritance among ever widowed women aged 15-49; and 2) a 13-year longitudinal panel from the Kagera region in northwest Tanzania to examine the relationship between inheritance and levels of household per capita consumption and value of asset stocks. Results indicate that, across the 15 DHS countries, less than half of widows report inheriting any assets (average inheritance of any assets is 47 percent, ranging from 22 percent in Sierra Leone to 66 percent in Rwanda); the proportion reporting inheriting the majority of assets is lower (average of 32 percent, ranging from 13 percent in Sierra Leone to 60 percent in Rwanda). Across countries, inheritance is generally correlated with higher age, education and wealth, indicating that women with higher socioeconomic status may be more likely to negotiate favourable asset inheritance outcomes. Findings from Kagera indicate that the value of inheritances, especially for widows (and specifically land inheritance), is significant in determining changes in long-term household welfare when accounting for sources of unobservable community- and individual-level bias. Taken together, findings indicate a major role for creative and culturally sensitive programme design to protect widow asset inheritance through property and family law, coupled with rigorous impact evaluation to document effectiveness of these programmes.

Keywords: widowhood, inheritance, sub-Saharan Africa, assets, intergenerational transmission of poverty.

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Executive summary

Widows in sub-Saharan Africa (SSA) are perceived to face widespread discrimination in asset and property inheritance following the death of a spouse, leading to poverty for themselves and their children. However, large-sample empirical research directly supporting this claim is scarce. The objectives of this paper are several: first, to provide empirical evidence surrounding the magnitude of inheritance issues for widows in SSA; and second to provide evidence, within a specific region in northwest Tanzania, on dynamics and welfare effects of these inheritances.

This paper explores levels, determinants and effects of asset inheritance among widows using data from two sources: 1) cross-country, nationally representative demographic and health survey (DHS) data from 15 SSA countries to assess levels and correlates of asset inheritance among ever widowed women aged 15-49; and 2) a 13-year longitudinal panel, the Kagera Health and Development Survey (KHDS), collected from 1991 to 2004 in northwest Tanzania, to examine the relationship between inheritance and levels of household per capita consumption and value of asset stocks. The DHSs collected questions on inheritance by widows in selected countries: Benin (2006), Congo/Brazzaville (2005), Democratic Republic of Congo (DRC) (2007), Guinea (2005), Mali (2006), Namibia (2006/07), Niger (2006), Nigeria (2008), Rwanda (2005), Senegal (2005), Sierra Leone (2008), Tanzania (2004), Uganda (2006), Zambia (2007) and Zimbabwe (2005/06).

Cross-country profiles of widows from the DHSs reporting inheriting ‘any assets’ and ‘the majority of assets’ are analysed using descriptive and linear probability model (LPM) regression models. The sample is made of all current or ever widowed women aged 15-49 across all 15 countries, resulting in a sample of 8,691 women. The KHDS is analysed using ordinary least squares (OLS) regression models (cross-sectional, panel with community-level fixed effects, panel with individual-level fixed effects) to map changes in inheritance to changes in household-level per capita consumption and household value of asset stocks.

Results indicate that. across the 15 DHS countries, less than half of widows report inheriting any assets (average inheritance of any assets is 47 percent, ranging from 22 percent in Sierra Leone to 66 percent in Rwanda); the proportion reporting inheriting the majority of assets is lower (average of 32 percent, ranging from 13 percent in Sierra Leone to 60 percent in Rwanda). Across countries, inheritance is generally correlated with higher age, education and wealth, indicating that women with higher socioeconomic status may be more able to negotiate favourable asset inheritance outcomes – or that these women are more likely to have large asset stores to begin with. Findings from Kagera indicate that the value of inheritances, especially for widows (and specifically land inheritance), is significant in determining changes in household consumption and asset stocks.

Property grabbing is a continued problem for widows across SSA. Further, inheritances have a significant role in determining household welfare as measured by current consumption and asset stocks. Because of limited data availability, future data collection efforts of the DHS and other household surveys should expand efforts to collect analysable data on these dynamics. Findings indicate a major role for creative and culturally sensitive programme design to protect widow asset inheritance, such as land titling, will writing and provision of legal services, with rigorous impact evaluation to document effectiveness.

1 Introduction

Popular perceptions of widowhood in sub-Saharan Africa (SSA) are of discrimination, deprivation and suffering endured by women who are often stripped of property and assets following the death of a spouse. The majority of evidence surrounding wealth dynamics at widowhood is based on qualitative research, case studies, anecdotes or the popular press, often framed in a human rights or legal perspective.[1] For example, a Human Rights Watch brief on property rights discriminations in Kenya recounts stories of dozens of widows who were stripped of assets (including land and livestock) and in many cases forced to undergo ritual cleansing (HRW, 2003).[2] Izumi (2007) defines asset disinheritance as a form of gender-based violence and documents stories of widows who are humiliated and robbed of self-esteem and others who literally die defending their property.

Concerns over widows' human rights violations have been exacerbated in the wake of the HIV epidemic, especially in SSA and other endemic regions. An increase in the absolute number of widows is partially attributed to HIV/AIDS. It is also cited as impoverishing a household prior to the husband's death, leaving a widow few resources with which to resist outside pressures exerted by the clan or extended family regarding inheritances (Drimie, 2002).[3] Strickland (2004) argues that, when women have weak property rights, they are unable to secure resources that would allow them to improve their chances of preventing infection, even before the dissolution of a marriage or death of a spouse.[4] As such, then, there is extensive documentation of inheritance discrimination and human rights violations against widows across diverse geographic and cultural settings.

However, as with many claims that appeal to a human rights perspective, critics may argue that this 'property grabbing' relates to worst case scenarios and that, although unfortunate, these events are not relevant to or significant for women as a group. Availability of data to analyse the dynamics of widowhood in developing countries is extremely limited, although a United Nations (UN) brief on widowhood estimates that 44 percent of women over 60 years

[1] Cooper (2010b); ICRW (2005; 2007); Izumi (2007); LaFraniere (2005); Sossou (2002); Walsh (2005); Young (2006).

[2] Widow inheritance, or 'levirate marriage', is the practice whereby a male relative of the dead husband takes the widow as a wife, traditionally in part to provide economic security for the woman. Variants of the practice exist by tribe, but it has historically included cleansing involving sex with a social outcast or a male relative to rid the woman of her dead husband's evil spirits and misfortune (Malungo, 2001). Sex is often forced and protection is rarely used, as the cleansing is not thought to be valid unless semen enters the woman (Walsh, 2005).

[3] For example, AIDS-related losses can reduce African household incomes by up to 80 percent, food consumption by 15 to 30 percent and primary school enrolment by 20 to 40 percent (Whiteside, 2002).

[4] Despite national poverty levels being viewed as a risk factor for HIV/AIDS, there is considerable debate as to the relationship between wealth and HIV within a given resource-poor country (Bingenheimer, 2007; Mishra *et al.*, 2007; Piot *et al*., 2007).

old and 16 of women aged 45-59 in SSA are widows (UN, 2001).[5] In addition, there is evidence that proportions of widows and divorcees or female-headed households are increasing, especially in SSA and other regions with high HIV rates (Chapoto *et al*., 2010; Mfono *et al*., 2008). As an example, in the Zimbabwe demographic and health survey (DHS) (of which this paper analyses data from 2005/06), the percentage of current widows in the population among women aged 15-49 increases from 3.5 to 4.2 to 7.5 percent in cross-sections 1994, 1999 and 2005/06, respectively.[6]

This paper seeks to provide preliminary empirical evidence exploring levels, correlates and effects of widow's property inheritance on household welfare using a variety of data sources. First, nationally representative DHS data collected among women aged 15-49 from 15 SSA countries are presented to assess levels and correlates of asset inheritance among ever widowed women. Second, longitudinal data from the Kagera Health and Development Survey (KHDS), a 13-year panel in northwest Tanzania, is used to examine welfare effects of asset inheritance.

The objectives of this paper are several: 1) to provide empirical evidence on the magnitude and correlates of asset inheritance for widows in SSA; 2) to provide evidence, within a specific region in northwest Tanzania, on changes in household-level per capita consumption and asset stocks as a result of inheritances; and 3) to explore research directions and suggest promising policies and programmes to ameliorate inheritance inequities among women and widows in particular.

Results from the 15 DHS countries indicate that, of women aged 15-49 interviewed, approximately 5.03 percent (N=8,725) have been widowed. Of these, approximately 46.95 percent reported inheriting assets following their spouse's death (ranging from 21.88 percent in Sierra Leone to 65.61 percent in Rwanda) and approximately 31.94 percent reported inheriting the majority of assets (ranging from 12.65 percent in Sierra Leone to 59.96 percent in Rwanda). Although the situation varies by country, bivariate analysis of these outcomes with background characteristics confirms that older, better-educated and wealthier women are better situated to negotiate favourable inheritance as compared with their counterparts.

Results from the KHDS longitudinal analysis highlight modest increases in real household per capita consumption over the 13-year period, and large increases in the real value of asset stocks. In comparison, the average value of household inheritances is small, although, among households inheriting any value, the contribution is quite large (over four times per

[5] The data presented in this brief are from 1985 to 1997 and are taken from the World's Women 2000: Trends and Statistics.

[6] According to recent DHS estimates, Zimbabwe has an 18 percent HIV rate (Zimbabwe CSO and Macro International, 2005).

capita consumption and just under half of household endline value of asset stocks). Regression analysis shows that the total value of inheritance, especially for households in which widows reside (and specifically land inheritance), is significant in determining both long-term household per capita consumption and asset stocks while accounting for sources of unobservable community- and individual-level bias.

The remaining sections of the paper are organised as follows: Section 2 provides a framework for conceptualising asset inheritance among widows and reviews relevant empirical literature. Section 3 introduces the data and model used in the analysis. Section 4 presents results. The paper concludes with a discussion of the findings and their generalisability, limitations and implications for policy and further research.

2 Framework and evidence: widows' property inheritance in sub-Saharan Africa

The framework developed by Deere and Doss (2006) to examine the gender asset gap can be applied to the specific case of widows and property inheritance. The authors ask the central question: 'What affects women's ability to accumulate wealth?' and identify factors conditioned at different levels: the state, the family, the community and the market. State-level factors include civil codes as well as property and family law affecting the accumulation, control and transmission of property. These broadly encompass marriage and divorce laws, legal provisions such as prenuptial agreements and will writing, pension, taxation and social security systems. Family and community characteristics or norms interact with these legal frameworks, and can often be as influential as formal written law. Family and community factors include a range of marital regimes often found in SSA, including polygamous marriages, patrilineal and matrilineal inheritance and extended household units. They also include customs such as brideprice or dowry, which may influence asset accumulation, and socioeconomic or demographic characteristics such as education levels and fertility levels. Finally, markets generally and labour and financial markets in particular determine women's income-earning ability, options for savings and availability of credit choices. A global review of evidence and a further discussion of the typologies included within these categories can be found in Deere and Doss (2006).

This paper examines a specific type of marital outcome (widowhood) and a specific type of asset accumulation (or inheritance) after the death of a spouse. Definitions as to who is considered a 'widow' as well as what is considered 'inheritance' depend largely on the constructs used in survey data collection, as defined in subsequent sections. However, broadly, a woman is defined as having experienced widowhood if she has lost a spouse to mortality. This includes women in common law marriages. Women may or may not have subsequently re-partnered or remarried. Inheritance of assets is defined to generally cover land and in-kind asset and cash transfers at the time of death, and largely excludes broader sources of intergenerational transfers such as those at birth, marriage or retirement (for a review of these typologies of *inter vivos* transfers see Cooper, 2010a).

This paper also focuses on individual- and household-level factors that vary across women that are easily measured in household surveys and can be used as policy or programme targeting mechanisms.[7] These factors include marital regime, religious context, age and

[7] Although the qualitative and anthropological literature identifies a variety of other social factors, including fear of punishment and violence, mistrust of traditional institutions and discrimination in legal processes, these are not easily captured, measured or identifiable in quantitative analysis (Welch *et al*., 2007).

education and existence of children or heirs and their linkages to inheritance of assets; these are explored further in Section 3.3.

The remainder of this section reviews studies on quantitative impacts of widows' property inheritance, focusing on levels, determinants and impacts of inheritance on wealth and asset accumulation. The review includes strictly *de facto* micro-level evidence of inheritance, rather than documentation of institutional changes in laws or legal status, since these latter typically rely on macro-level modelling, cluster analysis or legal analysis (see UN-HABITAT, 2006, for review of constitutional provisions on women's inheritance rights in SSA).

Empirical research on property inheritance among widows comes from a variety of mostly unpublished reports, often linked to studies on HIV and prime-age adult mortality. Perhaps the most rigorous documentation of inheritance loss comes from an evaluation in Zambia using population-level panel data from 2001 to 2004 (Chapoto *et al.*, 2010). Findings indicate that the number of widow-headed households rose from 9.4 to 12.3 percent of the sample over the panel period and that on average these households controlled 35 percent less land than before their husband's death. Although the authors are able to control for other factors related to land loss through household fixed-effects and have a sample size of over 5,000 rural farm households, they are not able to examine other assets or to directly attribute land loss to disinheritance rather than to selling for consumption gains or consumption smoothing.

A study with similar motivation in Kenya using a two-year panel from 1997 to 2000 of approximately 1,400 rural households finds that the death of a prime-age adult male results in the reduction of farm assets and small livestock, while the death of a prime-age adult female results in the reduction of small livestock only (Yamano and Jayne, 2004). Mather and Donovan (2008) use a panel of 4,058 Mozambican households surveyed in 2002 and 2005 to analyse, among other outcomes, the effect of prime-age adult mortality on crop and non-farm income, total household income and asset levels. Results indicate significant reductions in total landholding for deaths of both adult females and males (19 percent and 20, respectively), although reductions vary by region, which may owe to the locations of matrilineal lineage societies in northern and central Mozambique. However, large differences by gender are found for changes in livestock holdings in households experiencing male deaths (a 34 percent reduction), whereas none was found for households experiencing female deaths. Despite using panel methods and regression analysis to assess dynamics, authors in the Zambia, Kenya and Mozambique studies are not able to distinguish between dynamics of selling, property grabbing or other sources of asset loss. The Zambia and Kenya studies are the only known studies to date that are population-representative.[8]

[8] A related study by Fafchamps and Quisumbing (2002) also utilises large-scale panel data to analyse hypothetical inheritance in scenarios of divorce or separation and death of spouse. Findings indicate

Other quantitative evidence documenting property and asset inheritance among widows comes mainly from technical or policy reports. Although less rigorous, partially because of smaller sample sizes, these studies provide useful snapshots of mean levels across subsamples of widows and asset types. A survey collected to study HIV and its effects on agriculture in Namibia finds that, among 282 households that had experienced the death of a household member between 1996 and 2001, 52 percent reported losing cattle, 38 percent farm equipment and 31 percent small stock (Africa Institutional Management Services, 2003). A parallel survey in Uganda finds that 39 percent of households (N=100) that had experienced the death of a head reported a reduction in productive land, although no distinction was made between selling and dispossession of land (NAADS, 2003). In an evaluation of support services for children affected by AIDS in Uganda, the Population Council and collaborators find approximately 29 percent of 204 widows surveyed had had property taken away from them when their husband died (Gilborn *et al*., 2001). A survey of 115 widows in Mukono district of Uganda carried out between 2005 and 2007 revealed that 41 percent (47 widows) had experienced property grabbing; this percentage increased to 51 percent (59 widows) when attempts/threats of property grabbing were included (IJM, 2008).

While related bodies of evidence touching on women's property and inheritance rights more generally, as well as intergenerational transfers to children or young adults, are informative in terms of framing the literature focused on widows, they do not speak directly to the substantial gaps in the empirical literature among a widow-specific sample (for an annotated review of literature addressing these general issues, see Cooper, 2008). The literature on the welfare effects of inheritance is especially thin, especially given that property dispossession is influenced greatly by regional variations in cultural norms and ethnic groups.

approximately half of surveyed households expect the land and house to go to the husband on a no-fault divorce, whereas 40 percent expect them to be divided equally between husband and wife. Property inheritance expectations for women following the death of a spouse are higher: upward of 85 percent of the sample report land and house would be inherited by their spouse or their spouse and children. However, in the Ethiopian context, it is unclear if the solicited expectations will be reflected in actual division of property.

3 Data and methods

3.1 Demographic and health surveys

The data utilised are recent DHSs from 15 SSA countries: Benin (2006), Congo/Brazzaville (2005), Democratic Republic of Congo (DRC) (2007), Guinea (2005), Mali (2006), Namibia (2006/07), Niger (2006), Nigeria (2008), Rwanda (2005), Senegal (2005), Sierra Leone (2008), Tanzania (2004), Uganda (2006), Zambia (2007) and Zimbabwe (2005/06). These are cross-sectional nationally representative surveys collected by host country governments with funding and technical assistance from Macro International and the United States Agency for International Development (USAID).[9] The similarity of the survey instrument means it is possible for this analysis to perform a cross-country comparison of selected variables and outcomes.

Questions on inheritance after widowhood have been included in a number of countries since 2003.[10] The DHS asks all women aged 15-49 who are currently widowed or who have ever experienced the death of a spouse, 'To whom did most of your late husband's property go?' Response categories are: 1) widow or widow's children; 2) other wife (i.e. co-wife in polygamous union); 3) spouse's children or family (specifically children who are non-joint with the woman being interviewed); 4) other relative or person; and 5) spouse had no property.[11] If the woman indicates someone other than herself, she is then asked, 'Did you receive any of your late husband's assets or valuables?'[12]

We use these questions to construct the two main outcome variables for use in this analysis. The first is an indicator of inheriting 'any assets' and equals one if the woman (or her children) answers that she received *any* of her late husband's assets or valuables. The second is an indicator of inheriting the 'majority of assets' and equals one if the woman (or her children) answers that she herself received *most* of her late husband's property. DHSs collect a rich set of individual- and household-level demographic and socioeconomic indicators which will be used to conduct a descriptive and bivariate analysis, described in Section 3.3. Further information on country contexts and background indicators by country

[9] Funding is provided through USAID-sponsored MEASURE DHS in addition to other international development agencies. Data are publicly available and downloadable from www.measuredhs.com.

[10] This analysis includes all publicly available DHSs last accessed on 25 May 2010. Surveys collected after 2003 in SSA countries which do not include inheritance questions and are thus not analysed are Cameroon (2004), Chad (2004), Ethiopia (2005), Lesotho (2005), Liberia (2007) and Malawi (2004).

[11] It should be noted the response categories for this question vary by country (for example, in some countries the widow and the widow's children are listed as separate categories, and several countries do not offer the response of 'spouse had no property'). However, these differences are not expected to influence results.

[12] Unfortunately, this or a similar question is not asked to women who report being divorced or separated.

can be found in the DHS Technical Reports accessible on the MEASURE DHS website (www.measuredhs.com).

3.2 Kagera Health and Development Survey

The KHDS is a longitudinal household survey of Kagera region in northwest Tanzania conducted by the World Bank and collaborating organisations. Kagera is primarily rural and borders Uganda to the north, Rwanda and Burundi to the west and Lake Victoria to the east. The area is a hub for overland transport going from East to Central Africa and has been affected a host of regional conflicts, including most recently the influx of refugees after the Rwanda and Burundi genocides in the early to mid-1990s. The region is largely agricultural: traditional crops include banana and coffee in the north and maize, sorghum and tobacco in the south, although there is increasing diversification into cash crops and off-farm income activities (de Weerdt, 2010).

Land and inheritance law in Kagera is traditionally governed by the clan, including the patrilineal Haya, as well as the Nyambo tribes in the north and the Subi, Sukuma, Zinza and Hangaza in the south (de Weerdt, 2010). Although customary law typically discriminates against women, some advances have been made in inheritance and property rights for women, specifically linked to the passage of the Land Acts of 1999 (Peterman, 2011). Using community-level data from the KHDS, Peterman finds significant improvements in women's property inheritance norms over the time period from the early 1990s to 2004. For example, in 1991 approximately half of all 51 sample villages reported that it was customary for the wife to inherit land and the house after a husband's death; these percentages had increased to 86 and 90 percent, respectively, in 2004.[13] This evidence, in conjunction with qualitative and institutional analysis, confirms that general improvements in women's property rights have been realised in the past two decades.

The KHDS collected five waves of household-level data. Waves 1 through 4 were collected at six- to seven-month intervals starting in 1991, and Wave 5 was fielded approximately 13 years later in 2004 (Beegle *et al*., 2006).[14] The survey was originally designed to measure the impact of prime-age adult deaths and illness owing to HIV/AIDS on the welfare outcomes of remaining individuals and households, including child schooling, nutrition, adult labour force participation and poverty status. To accomplish this objective, the household sample was stratified on community adult mortality rates (from the 1988 census) and household-level

[13] These figures are collected at the community level and are thus an approximation of dynamics at the household level. For further discussion and analysis of the associations between changes in customary inheritance patterns on land, housing, other assets and widow inheritance and changes in individual-level women's economic outcomes, see Peterman (2011).

[14] A sixth wave was fielded in summer 2010, but data are not yet publicly available.

indicators predictive of adult mortality, such as incidence of chronic illness. This sampling meant a high rate of prime-age adult mortality over the 13-year panel, which makes the survey particularly relevant for analysing dynamics surrounding widowhood and inheritance. Questionnaires also included detailed information on household consumption, expenditure, individual economic activities, education and health status, as well as community-level information on health and education systems. The final sample included approximately 900 households in 51 communities (for a map of Kagera and survey cluster locations see Appendix 3).[15] Because of differences in questionnaire design in Waves 1 through 4 in the early 1990s, this analysis utilises only Wave 1 fielded in 1991 and Wave 5 fielded in 2004.[16]

The KHDS collected information on household inheritance in 2004 through two different series of questions. Recall that the KHDS was designed to capture dynamics around prime-age adult mortality and thus solicited information on each death of original or new household members over the panel period. For each death reported in the household, the respondent was asked, 'Was [NAME]'s death associated with any inheritances?', followed by the question, 'What was the total value of the inheritance received by you or any other member of your household?', in the categories of cash, in-kind assets and land. Subsequently, the respondent was asked, 'In the past 10 years were there any inheritances received by anyone in the household?,' and the enumerator was prompted to exclude those connected to the deaths listed previously. For these additional sources of inheritances, the respondent was asked to value the categories of cash, in-kind assets and land *as if* they were sold in 2004. From these series of questions, a total inheritance value in Tanzanian shillings (Tsh) can be constructed, as well as the relative contribution of inheritances in cash, land and in-kind transfers. All shilling values are deflated to baseline values.[17] Unfortunately, it is not possible

[15] Further information regarding sampling, attrition rate and questionnaire content is provided in survey technical documents and on the World Bank Living Standards Measurement Survey website (see Beegle *et al*., 2006).

[16] Specifically, there are differences in recall periods between Waves 1 and 5 (purchased and home-produced foods are recalled on 12 months) and between Waves 2, 3 and 4 (purchased and home-produced foods are recalled on six months). Because of seasonality in both these components, the differentiation is expected to be quite large in computing consumption aggregates across recall periods.

[17] The differences in question wording here have implications in terms of deflating the inheritance transfer amounts. In the first series of questions, the amount of transfer can be deflated using the Tanzanian Consumer Price Index (CPI) for the given year of the household member's death (obtained from the National Bureau of Statistics (NBS) on 18 July 2007). There may be some error in this method, as the inheritance may have actually occurred the year after the death or there may be a recall bias in the year of death and/or the transfer amount. In the second series of questions, where the respondent is asked to value the inheritance as if the items were sold today, the transfer value can be deflated using the same factors as used in constructing consumption aggregates (discussed in Section 3.3). The exception is for the cash component, in which we cannot assign a year of inheritance and therefore deflate using the midpoint (1998) between the two survey rounds. Although this results in the inheritance transfer amounts being deflated by different methods, the constructed Laspeyres and Fishers indices which are used to deflate consumption aggregates and the Tanzanian CPI are shown to track each other closely (EDI, 2004a; the KHDS-constructed data show an inflation of 4.05 over the panel, whereas the NBS reports inflation of 4.2 over the same period. However, there are reasons why the Kagera-specific and national CPI would be expected to differ.)

to attribute these inheritances to a single individual or woman within the household, and thus the analysis that follows represents outcomes in households where adult women reside.

3.3 Methodological approaches

In the first section of the paper, cross-country profiles of widows using the DHSs are presented both descriptively and using linear probability model (LPM) regression methods. The sample is made of all current or ever widowed women aged 15-49 across all 15 countries, resulting in a sample of 8,691 women. Three sets of background factors, all of which have hypothesised relationships with the probability of inheriting assets, are utilised as control variables in regression analysis: 1) demographic factors (age, Muslim religion and polygamous union);[18] 2) economic factors (education level and wealth quintile); and 3) locational factors (region of residence and urbanicity). Measures of wealth are pre-computed quintiles using factor analysis, including background indicators of socioeconomic status such as dwelling characteristics, asset ownership and access to basic infrastructure (Rutstein and Johnson, 2004). All descriptive presentations of the DHSs are weighted according to population-level weights provided in the data.

Despite being a powerful policy tool in understanding patterns and distribution of asset inheritance, analysis using cross-sectional data which includes *current* socioeconomic measures will be biased. Specifically, we will not know if an uncovered relationship is a result of factors pre- or post-asset inheritance (cause or effect of inheritance). To account for timing issues, including sources of time-variant bias, in the second section of the paper, the KHDS is analysed using regression models to examine the effect of the household receipt of inheritance on changes in household-level per capita consumption and household value of asset stocks. The sample is made up of 946 women aged 15 or above in the 1991 baseline and re-interviewed in the endline survey in 2004. In general, this relationship can be modelled as follows:

(1) HH Welfare $Y_{j,2004} = \beta_0 + \beta_1 * \text{HH Inheritance}_{j1991\text{-}2004} + \beta_2 * \text{Widowhood}_{i,2004} + \beta_3 * X_{i,2004} + \beta_4 * X_{j,2004} + \varepsilon_i$

Here, the welfare outcome of household *j* is a function of household receipt of inheritance from 1991 to 2004, the marital status of index woman *i*, a vector of individual- and household-level characteristics in 2004 (X_i and X_j). The coefficient β_1 is expected to be significant (positive) under the hypothesis that household inheritance acts as a buffer against poor welfare outcomes; coefficient β_2 is also expected to be significant (negative) if a

[18] A variety of religious categories were collected by country. While synchronisation of all categories was not feasible, the indicator of Muslim religion was a consistent category and expected to be associated with gender norms. Unfortunately, ethnic coding was not available in most countries examined; where it is available, it is not included in the analysis owing to the immense variation in ethnic groups.

widowhood outcome compromises household welfare. To distinguish whether the relationship between inheritance and welfare differs by marital regime, equation (1) is replicated in the subsample of ever widowed women and compared with results from the subsample of women who have never been widowed (in union, never married and separated or divorced women).[19]

The KHDS collected detailed consumption measures which allow for the construction of per annum, per capita values of consumption expenditure and value of household asset stocks. The indicator of consumption expenditure is pre-computed in the KHDS using 12 expenditure categories: 1) rainy/dry season purchased food; 2) non-seasonal purchased food; 3) rainy/dry season home-produced food; 4) non-seasonal home-produced food; 5) education; 6) other non-food; 7) health of household members; 8) health of deceased; 9) funeral; 10) utilities; 11) wage in kind; and 12) remittances. The asset stock indicator is also pre-computed and contains the following asset groupings: 1) physical assets; 2) business assets; 3) durables; 4) farm equipment; 5) farm buildings; 6) land; 7) livestock; 8) occupied dwelling; and 9) unoccupied dwelling. All values are deflated to baseline values using price questionnaires implemented in cluster communities, complemented by spatial information on households no longer residing in baseline communities.[20] Other individual-level control variables included in the model are age, education and marital status of the index woman, as well as religion and ethnicity of the household head. Other household-level control variables included in the model are household size and season of interview. Both outcomes are logged to account for skewedness of distributions and modelled using ordinary least squares (OLS) regression.

A simple cross-sectional model such as (1) does not take into account unobserved heterogeneous characteristics that could influence individual-level inheritance, marital status and household welfare. These could include initial wealth or socio-demographic characteristics of the household, which may in turn influence a woman's propensity of becoming a widowed or the likelihood of receiving an inheritance transfer. If it is believed that these factors are important in also determining welfare, the error term ε_i in equation (1) would take the following form:

$$(2)\quad \varepsilon_i = \lambda_i + u_{it}$$

[19] Alternatively, an interaction term between inheritance and widowhood could be included in the full sample regression to ascertain whether the association between inheritance and poverty status differed by widowhood. However, because of the small shares of households in both categories, there is little variation in the interaction term and thus it is unlikely to yield credible results.

[20] For more information on the construction of consumption aggregates, including subcomponents and detailed information on the price index, see de Weerdt (2010) and EDI (2004a; 2004b).

where λ_i is constant across individuals and u_{it} is assumed to be ~N(0, σ^2_u). To address this potential bias, from time-invariant sources, an individual-level panel fixed effects model is estimated following specification:

(3) Δ HH Welfare $Y_{j,1994\text{-}2004} = \beta_0 + \beta_1 * \Delta$ HH Inheritance$_{j1991\text{-}2004} + \beta_2 * \Delta$ Widow$_{i\ ,1991\text{-}2004} + \beta_3 * \Delta X_{i\ ,1991\text{-}2004} + \beta_4 * \Delta X_{j,\ 1991\text{-}2004} + \Delta \varepsilon_{i\ 1991\text{-}2004}$

Equation (3) maps the change in household welfare over the panel period as a function of the change in inheritance indicators, the change in woman's marital status and the change in individual- and household-level characteristics (ΔX_i and ΔX_j). In this specification, the constant term (λ_i) is eliminated through differencing and equation (3) is left with a random error component, thus accounting for individual and fixed sources of bias. This approach relies on the assumption that the main source of endogeneity is from time-invariant factors influencing inheritance and marital status. However, note that there exist potential sources of time-varying endogenous factors, for example changes in legal and family laws, which the fixed effect does not account for. In the results that follow, three versions of the main model are presented: a cross-sectional OLS model using the endline data (equation 1), a cross-sectional OLS model using the endline data accounting for community-level unobservables (equation 1 with community-level fixed effects) and a panel OLS model accounting for individual-level unobservables (equation 3 with individual-level fixed effects).

4 Results

4.1 Cross country profiles of widows and asset inheritance

Table 1 is a summary of weighted descriptive statistics of sample sizes and inheritance indicators for the pooled sample, by country. Results indicate that the proportion of women aged 15-49 who have ever experienced widowhood is approximately 5.03 percent, ranging from 3.22 percent in Namibia to 9.06 percent in Zimbabwe. These percentages increase if the sample is limited to women who have ever been married (ranging from 4.72 percent in Congo to 12.41 percent in Zimbabwe).[21] Among the pooled sample, approximately 47 percent of widows or their children report receiving any assets after their spouse's death. Widows and their children in Rwanda report the highest mean receipt of any assets (65.61 percent), whereas widows in Sierra Leone report the lowest mean receipt of any assets (21.88 percent). Among the pooled sample, and in all countries except Rwanda and Senegal, the majority of assets are reported to be inherited by the spouse's children and natal family. For example, in DRC the woman or woman's children report inheriting the majority of assets for 24 percent of the sample, whereas the spouse's family inherited the majority of assets in 63 percent of the sample. Co-wives in polygamous unions are reported to inherit the majority of assets in very low percentages across countries (3.52 percent in the pooled sample, ranging from 0.75 percent in Congo to 6.49 percent in Uganda). Other people or relatives are reported to inherit the majority of assets in comparably higher percentages (8.19 percent in the pooled sample, ranging from 2.09 percent in Namibia to 28.71 percent in Senegal).

Tables 2 and 3 report results from the LPM regressions predicting inheritance of any assets (Table 2) and inheritance of the majority of assets (Table 3) for the full sample and by country. Descriptive statistics for all control characteristics are reported for the full sample and by country in Appendix 1. In the analysis of the full sample (first column) in Table 2, older women with secondary or higher education in higher wealth quintiles and who self-report as Muslim have significantly increased chances of inheriting any assets. Only women in polygamous marriages are less likely to report inheriting any assets, although relationship with background characteristics varies in significance levels across countries. It should also be noted that regional indicators (coefficients not presented) are jointly significant in nearly all countries, which indicates the importance of regional factors in determining inheritance. The same general findings are mirrored in Table 3. Although these initial correlations confirm hypotheses regarding background factors influencing inheritance patterns, they should not be taken as indicative of causation because of previously discussed problems inherent in determining timing of spouse's death.

[21] Note these percentages are slightly larger compared with the DHS final country reports, which report percentages of *current* widows instead of women who have ever been widowed.

Table 1: Sample sizes and percentages of widows inheriting assets in sub-Saharan Africa by country

	Pooled sample	Benin (2006)	Congo (2005)	DRC (2007)	Guinea (2005)	Mali (2006)	Namibia (2006/7)	Niger (2006)	Nigeria (2008)	Rwanda (2005)	Tanzania (2004)	Senegal (2005)	Sierra Leone (2008)	Uganda (2006)	Zambia (2007)	Zimbabwe (2005/6)
Ever widowed (% full sample)	5.03	4.31	3.33	3.98	7.29	4.73	3.22	4.12	3.88	7.19	4.30	4.13	7.91	6.36	7.12	9.06
Ever widowed (% ever married sample)	6.71	5.38	4.72	5.25	8.73	5.37	7.65	4.57	5.18	11.53	5.59	5.65	9.77	8.34	9.62	12.41
Sample size ever widowed	8725	727	226	412	555	637	343	370	1283	779	426	611	563	546	484	763
Inherited any assets (%)	46.95	27.29	24.49	30.63	36.66	40.01	59.91	48.53	56.73	65.61	52.92	57.10	21.88	51.06	48.73	56.22
Who inherited majority of assets?																
Widow/widow's children (%)	31.94	21.90	15.81	23.80	25.40	28.86	29.40	23.75	27.87	59.96	38.06	46.24	12.65	36.41	31.77	37.31
Other wife (%)	3.52	2.26	0.75	2.90	5.93	2.83	2.11	3.24	4.44	4.74	2.06	3.56	5.44	6.49	0.98	1.60
Spouse's children/family (%)	48.41	56.05	64.61	62.73	52.02	50.52	60.69	52.07	57.16	6.58	47.11	28.67	55.35	48.90	57.82	50.92
Other relative/person (%)	8.19	2.48	5.11	10.57	16.64	4.40	2.09	20.94	4.99	28.71	3.20	7.59	6.96	2.27	1.55	3.47
Husband had no property (%)	7.93	17.31	13.72	0.00	0.00	13.40	5.72	0.00	5.54	0.00	9.57	13.94	19.59	5.92	7.89	6.70

Note: Sample is among women ages 15 to 49 and mean values are weighted according to population-level weights provided in the DHS.

Table 2: LPM regressions predicting inheritance of the any assets among widows in sub-Saharan Africa and by country among widows in sub-Saharan Africa and by country

	Pooled	Benin	Congo	DRC	Guinea	Mali	Namibia	Niger	Nigeria	Rwanda	Tanzania	Senegal	Sierra Leone	Uganda	Zambia	Zimbabwe
Control indicators	**sample**	(2006)	(2005)	(2007)	(2005)	(2006)	(2006/7)	(2006)	(2008)	(2005)	(2004)	(2005)	(2008)	(2006)	(2007)	(2005/6)
Age (years)	0.007	0.008	0.008	0.005	0.001	0.009	-0.002	0.007	0.006	0.023	0.006	0.003	0.007	0.006	-0.002	0.012
	(0.001)***	(0.002)***	(0.004)*	(0.003)	(0.003)	(0.002)***	(0.004)	(0.003)**	(0.002)***	(0.003)***	(0.003)**	(0.003)	(0.004)**	(0.003)**	(0.003)	(0.002)***
Polygamous union (=1)	-0.066	-0.119	-0.007	0.011	-0.043	-0.036	-0.400	0.243	-0.131	-0.102	0.030	-0.080	-0.062	0.015	-0.150	-0.080
	(0.013)***	(0.032)***	(0.076)	(0.048)	(0.044)	(0.041)	(0.101)***	(0.056)***	(0.035)***	(0.059)*	(0.041)	(0.038)**	(0.065)	(0.057)	(0.070)**	(0.084)
Muslim religion (=1)	0.089	-0.041	-0.370	-0.341	0.149	0.152	0.000	0.063	0.197	-0.019	0.120	-0.058	0.009	-0.097	-0.400	-0.257
Education (omitted = no schooling)	(0.019)***	(0.066)	(0.106)***	(0.119)***	(0.065)**	(0.064)**	(0.000)	(0.182)	(0.043)***	(0.113)	(0.081)	(0.047)	(0.085)	(0.102)	(0.087)***	(0.154)*
Primary (=1)	-0.012	-0.003	-0.049	-0.064	0.051	0.019	0.176	-0.026	0.008	0.004	-0.011	-0.068	0.026	0.111	-0.069	0.095
	(0.014)	(0.050)	(0.099)	(0.056)	(0.070)	(0.071)	(0.077)**	(0.084)	(0.035)	(0.035)	(0.057)	(0.059)	(0.055)	(0.048)**	(0.071)	(0.065)
Secondary and above (=1)	0.050	0.147	-0.052	0.015	0.030	0.103	0.153	0.365	0.036	0.120	0.097	-0.038	0.281	0.088	0.026	0.120
Wealth quintiles (omitted = lowest)	(0.019)***	(0.082)*	(0.089)	(0.073)	(0.119)	(0.094)	(0.084)*	(0.127)***	(0.049)	(0.057)**	(0.122)	(0.073)	(0.101)***	(0.087)	(0.085)	(0.072)*
Second quintile (=1)	0.011	0.022	0.023	-0.128	-0.048	0.160	0.155	-0.041	0.035	-0.056	0.008	0.018	0.016	0.038	-0.123	0.029
	(0.016)	(0.050)	(0.090)	(0.059)**	(0.063)	(0.062)***	(0.076)**	(0.084)	(0.040)	(0.048)	(0.062)	(0.060)	(0.077)	(0.060)	(0.071)*	(0.058)
Third quintile (=1)	0.005	-0.028	0.119	-0.086	-0.053	0.139	0.093	0.043	-0.027	-0.056	0.034	-0.054	0.068	-0.070	-0.008	0.066
	(0.016)	(0.047)	(0.098)	(0.073)	(0.062)	(0.064)**	(0.081)	(0.101)	(0.044)	(0.053)	(0.065)	(0.059)	(0.084)	(0.078)	(0.074)	(0.058)
Fourth quintile (=1)	0.043	-0.055	0.125	-0.047	-0.003	0.215	0.296	0.043	0.008	-0.093	0.034	-0.000	0.137	-0.079	0.145	0.140
	(0.018)**	(0.051)	(0.120)	(0.096)	(0.072)	(0.061)***	(0.104)***	(0.088)	(0.050)	(0.051)*	(0.092)	(0.063)	(0.083)*	(0.084)	(0.092)	(0.076)*
Highest quintile (=1)	0.092	-0.070	0.165	-0.068	-0.001	0.251	0.421	0.082	0.159	-0.040	-0.053	0.081	0.040	0.122	0.170	0.278
Locational (omitted = rural)	(0.022)***	(0.059)	(0.139)	(0.122)	(0.126)	(0.088)***	(0.147)***	(0.115)	(0.070)**	(0.053)	(0.105)	(0.086)	(0.123)	(0.112)	(0.111)	(0.089)***
Urbanicity (=1)	-0.004	-0.062	0.064	0.073	0.036	-0.088	0.028	-0.162	-0.010	-0.004	0.040	-0.035	-0.041	-0.022	-0.042	0.077
	(0.015)	(0.039)	(0.083)	(0.079)	(0.085)	(0.059)	(0.081)	(0.101)	(0.039)	(0.058)	(0.055)	(0.059)	(0.080)	(0.096)	(0.066)	(0.088)
Tests and fit statistics																
Wald-test (education, prob>F)	0.002	0.177	0.180	0.284	0.753	0.547	0.076	0.014	0.748	0.089	0.682	0.499	0.023	0.072	0.206	0.245
Wald-test (wealth, prob>F)	0.000	0.503	0.737	0.290	0.895	0.005	0.014	0.866	0.035	0.462	0.852	0.399	0.485	0.134	0.025	0.026
Wald-test (country/region, prob>F)	0.000	0.041	0.420	0.000	0.002	0.033	0.043	0.162	0.000	0.004	0.002	0.144	0.000	0.000	0.003	0.000
Sample size (N)	8691	725	225	404	554	635	339	370	1282	779	611	559	425	541	483	759
R-squared	0.084	0.088	0.043	0.152	0.082	0.097	0.166	0.099	0.107	0.143	0.069	0.034	0.092	0.147	0.091	0.138

*Note: LPM regressions, coefficients reported with robust standard errors in ( )'s clustered at the primary sampling unit level. *** p<0.01, ** p<0.05, * p<0.1; pooled model includes country indicators, county-specific models include regional indicators (included but not reported).*

Table 3: LPM regressions predicting inheritance of the majority of assets among widows in SSA and by country

	Pooled	Benin	Congo	DRC	Guinea	Mali	Namibia	Niger	Nigeria	Rwanda	Tanzania	Senegal	Sierra Leone	Uganda	Zambia	Zimbabwe
Control indicators	sample	(2006)	(2005)	(2007)	(2005)	(2006)	(2006/7)	(2006)	(2008)	(2005)	(2004)	(2005)	(2008)	(2006)	(2007)	(2005/6)
Age (years)	0.005	0.006	0.003	0.004	0.001	0.003	-0.007	0.003	-0.000	0.024	0.010	0.002	0.005	0.007	-0.002	0.010
	(0.001)***	(0.002)***	(0.003)	(0.003)*	(0.003)	(0.002)	(0.004)*	(0.003)	(0.002)	(0.003)***	(0.003)***	(0.002)	(0.003)	(0.003)***	(0.003)	(0.002)***
Polygamous union (=1)	-0.080	-0.127	-0.073	-0.018	-0.055	-0.030	-0.123	0.119	-0.149	-0.094	-0.004	-0.036	-0.041	0.011	-0.166	-0.128
	(0.011)***	(0.030)***	(0.059)	(0.040)	(0.044)	(0.036)	(0.091)	(0.053)**	(0.026)***	(0.057)*	(0.042)	(0.032)	(0.060)	(0.053)	(0.058)***	(0.072)*
Muslim religion (=1)	-0.027	-0.005	-0.273	-0.168	0.048	0.088	0.000	0.243	0.035	-0.003	0.055	-0.040	-0.066	-0.153	-0.338	-0.091
Education (omitted = no schooling)	(0.017)	(0.063)	(0.081)***	(0.091)*	(0.058)	(0.057)	(0.000)	(0.065)***	(0.037)	(0.113)	(0.088)	(0.038)	(0.073)	(0.090)*	(0.081)***	(0.170)
Primary (=1)	0.003	-0.066	-0.012	0.003	0.041	-0.001	0.047	-0.067	-0.002	0.044	0.029	-0.059	-0.040	0.093	-0.013	0.127
	(0.013)	(0.044)	(0.078)	(0.051)	(0.073)	(0.068)	(0.075)	(0.063)	(0.030)	(0.034)	(0.056)	(0.043)	(0.053)	(0.046)**	(0.065)	(0.055)**
Secondary and above (=1)	0.057	0.010	-0.034	0.074	0.112	0.071	0.046	0.233	0.079	0.172	0.069	0.016	0.049	0.025	0.013	0.180
Wealth quintiles (omitted = lowest)	(0.018)***	(0.068)	(0.076)	(0.070)	(0.115)	(0.097)	(0.082)	(0.152)	(0.043)*	(0.061)***	(0.117)	(0.069)	(0.094)	(0.082)	(0.078)	(0.063)***
Second quintile (=1)	-0.002	0.062	0.097	-0.126	-0.035	0.141	0.086	-0.100	-0.048	-0.033	0.050	0.037	0.078	-0.003	-0.094	-0.044
	(0.014)	(0.047)	(0.070)	(0.050)**	(0.055)	(0.053)***	(0.075)	(0.072)	(0.033)	(0.049)	(0.054)	(0.045)	(0.072)	(0.058)	(0.065)	(0.052)
Third quintile (=1)	0.018	-0.023	0.171	-0.111	-0.018	0.110	0.045	-0.112	-0.021	-0.044	0.018	0.039	0.123	-0.012	-0.052	0.037
	(0.015)	(0.043)	(0.080)**	(0.064)*	(0.053)	(0.051)**	(0.075)	(0.081)	(0.041)	(0.053)	(0.065)	(0.052)	(0.072)*	(0.080)	(0.075)	(0.051)
Fourth quintile (=1)	0.016	-0.035	0.109	-0.155	-0.065	0.198	0.193	0.019	-0.070	-0.066	0.019	-0.018	0.184	-0.075	0.015	0.091
	(0.016)	(0.047)	(0.103)	(0.081)*	(0.056)	(0.055)***	(0.087)**	(0.080)	(0.047)	(0.053)	(0.085)	(0.052)	(0.077)**	(0.082)	(0.088)	(0.070)
Highest quintile (=1)	0.066	0.005	0.063	-0.067	-0.063	0.268	0.381	-0.045	0.050	-0.030	-0.016	0.007	0.142	0.086	0.089	0.214
Locational (omitted = rural)	(0.020)***	(0.056)	(0.106)	(0.117)	(0.124)	(0.087)***	(0.135)***	(0.107)	(0.067)	(0.054)	(0.102)	(0.070)	(0.109)	(0.109)	(0.100)	(0.086)**
Urbanicity (=1)	0.010	-0.037	-0.057	0.101	0.083	-0.112	0.068	-0.099	-0.001	0.000	0.100	0.025	-0.072	-0.083	0.017	-0.042
	(0.014)	(0.036)	(0.067)	(0.076)	(0.076)	(0.061)*	(0.070)	(0.099)	(0.035)	(0.056)	(0.055)*	(0.047)	(0.073)	(0.084)	(0.065)	(0.086)
Tests and fit statistics																
Wald-test (education, prob>F)	0.003	0.286	0.875	0.445	0.543	0.758	0.810	0.144	0.113	0.018	0.781	0.327	0.542	0.097	0.879	0.018
Wald-test (wealth, prob>F)	0.010	0.300	0.206	0.080	0.360	0.002	0.030	0.245	0.145	0.799	0.880	0.745	0.162	0.537	0.245	0.036
Wald-test (country/region, prob>F)	0.000	0.031	0.225	0.000	0.048	0.000	0.001	0.004	0.000	0.000	0.001	0.089	0.000	0.000	0.007	0.000
Sample size (N)	8691	725	225	404	554	635	339	370	1282	779	611	559	425	541	483	759
R-squared	0.079	0.091	0.047	0.151	0.05	0.082	0.148	0.094	0.089	0.146	0.081	0.027	0.126	0.115	0.075	0.138

*Note: LPM regressions, coefficients reported with robust standard errors in ( )'s clustered at the primary sampling unit level. *** p<0.01, ** p<0.05, * p<0.1; pooled model includes country indicators, county-specific models include regional indicators (included but not reported).*

4.2 Widows and asset inheritance in Kagera, Tanzania

Tables 4, 5 and 6 present results from the regression analysis using the KHDS to explore the relationship between inheritance and 1) per capita annual household consumption expenditure and 2) value of household asset stocks with particular attention to widows. Table 4 shows descriptive statistics of outcomes, inheritance and marital status indicators for the full baseline (1991) and endline (2004) samples (columns A and B), as well as for the endline sample split by ever widowed and never widowed status (columns C and D). There are 946 women in the sample, of whom 295 have ever been widowed and the remaining 651 have never experienced the death of a spouse. Per capita consumption expenditure in the full sample is approximately Tsh 165,000, and this increases in real terms to Tsh 211,000 in the endline. The value of household asset stocks has increased 3.3 fold at approximately Tsh 694,000 (baseline) and Tsh 2,289,000 (endline), respectively, indicating a large increase in wealth over the panel period.

Although women experiencing widowhood live in households with lower outcomes, they are not significantly different from those of never widowed women. Average total value of inheritance over the panel period is approximately 59,000 Tsh and is received mostly in land (Tsh 34,000), followed by other in-kind assets (Tsh 21,000) and cash (Tsh 4,000). However, this average value masks comparatively large values for those households that do receive inheritance. For example, among households that report any inheritance, total value is approximately Tsh 919,000, or over four times average per capita consumption in 2004 and just under half of household average value of asset stocks in 2004. Similar to welfare measures, although households with widows report receiving nearly twice the total value in inheritances, there are no significant differences in comparison with households where never widowed women reside. Here it is important to note that the comparison between households with ever and never widowed women is not clean. Because households with never widowed women may also receive transfers from other deceased family members, the comparison is between households where women reside with inheritance from the death of a spouse, inheritance from other family members and no inheritance among households reporting none.

Table 4: Descriptive statistics on outcome measures, inheritance and marital status in Kagera (sample women age>=15 in 1991 survey)

	(A) Full sample	(B) Full sample	(C) Ever widowed women	(D) Never widowed women	(E) p-value (C) = (D)
Outcome measures	(1991)	(2004)	(2004)	(2004)	
Per capita consumption	164.52	210.69	202.50	214.40	*0.3554*
	[115.86]	[183.33]	[151.17]	[196.17]	
Value of household asset stocks	693.62	2289.16	3039.89	1948.96	*0.3146*
	[3758.29]	[15447.88]	[25825.46]	[6700.81]	
Inheritance measures					
Any inheritance (=1)	--	0.065	0.061	0.066	*0.7705*
Total value of inheritance	--	59.32	88.02	46.31	*0.4807*
	--	[842.11]	[993.36]	[764.28]	
Value of cash inheritance	--	4.08	2.79	4.66	*0.7923*
	--	[101.08]	[47.69]	[117.58]	
Value of in-kind inheritance	--	21.09	32.58	15.88	*0.5329*
	--	[381.20]	[481.76]	[325.89]	
Value of land inheritance	--	34.16	52.65	25.77	*0.3472*
	--	[407.24]	[537.86]	[331.72]	
Marital status					
Widow (=1)	0.151	0.290	0.929	0.000	--
Never married (=1)	0.279	0.043	0.000	0.390	--
Separated/divorced (=1)	0.088	0.109	0.020	0.149	--
Union (=1)	0.481	0.558	0.051	0.538	--
Sample size (N)	946	946	295	651	

Note: Mean values reported with standard deviations where appropriate below in [ ]'s. All values are logged in analysis to account for skewed distributions and are reported as unlogged for presentation only.

All outcome and inheritance measures calculated at the household level, reported in Tsh 000s and deflated to baseline (1991) real values using the methodology described in Section 3.3 and footnote 17.

Table 5 reports the main results for OLS regressions predicting welfare outcomes for cross-sectional models among the 2004 endline (A1 and B1), cross-sectional models among the endline with community-level fixed effects (A2 and B2) and panel first difference models with individual-level fixed effects (A3 and B3). Descriptive statistics of all control variables are reported in Appendix 2; R-squared measures and sample sizes are reported at the bottom of the table. Across all models and both outcome measures the value of inheritance is significantly associated with higher welfare outcomes. While the magnitude and significance of this relationship decreases when accounting for sources of community-level and individual-level unobservables for household asset stocks, it increases in magnitude and significance in relationship to per capita consumption expenditure. For example, in the preferred model, a one percentage point increase in the value of inheritance over the panel period corresponds to a 0.046 percentage increase in annual per capita consumption

expenditure holding other factors constant (column A3). Likewise, a one percentage point increase in the value of inheritance over the panel period corresponds to a 0.955 percent increase in value of household asset stocks holding other factors constant (column B3). The indicator of widow is also significant and negatively associated with all welfare outcomes across all models (with the exception of column A3 in the individual-level panel fixed effects model for per capita consumption). These results indicate a positive and robust relationship between inheritance and welfare outcomes as well as a negative and robust relationship between widowhood and welfare outcomes in the Kagera sample.

Table 5: Regression results for the effect of inheritance on household consumption and asset stocks in Kagera (sample women age>=15 in 1991 survey)

	Log per capita consumption (ln tsh)			Log value of household asset stocks (ln tsh)		
	(A1) Cross-section	(A2) Cross-section with community-level FE	(A3) Panel with individual-level FE	(B1) Cross-section	(B2) Cross-section with community-level FE	(B3) Panel with individual-level FE
	(2004)	(2004)	(1991-2004)	(2004)	(2004)	(1991-2004)
Log of inheritance value (ln tsh)	0.0266	0.0253	0.0461	0.140	0.137	0.0955
	(0.0130)**	(0.0113)**	(0.0179)***	(0.0369)***	(0.0402)***	(0.0544)*
Widow (=1)	-0.154	-0.186	-0.0674	-0.744	-0.688	-0.835
	(0.0453)***	(0.0445)***	-0.0642	(0.142)***	(0.126)***	(0.174)***
Never married (=1)	0.160	0.0511	-0.189	0.0814	-0.0851	0.278
	(0.0887)*	-0.0984	(0.0604)***	-0.217	-0.298	(0.151)*
Separated/divorced (=1)	-0.147	-0.179	-0.0783	-0.977	-0.942	-0.685
	(0.0553)***	(0.0511)***	-0.0729	(0.210)***	(0.208)***	(0.225)***
Age (in years)	0.00415	0.00448	0.00588	0.0314	0.03	0.0822
	(0.00149)***	(0.00142)***	(0.00260)**	(0.00457)***	(0.00447)***	(0.00681)***
Incomplete primary schooling (=1)	0.231	0.192	0.100	0.413	0.336	0.411
	(0.0457)***	(0.0475)***	-0.0621	(0.143)***	(0.172)*	(0.184)**
Complete primary schooling (=1)	0.305	0.268	0.198	0.42	0.436	0.373
	(0.0496)***	(0.0523)***	(0.0798)**	(0.142)***	(0.157)***	(0.217)*
Secondary or above schooling (=1)	0.948	0.775	0.508	1.400	1.341	0.649
	(0.0974)***	(0.0974)***	(0.151)***	(0.222)***	(0.216)***	(0.347)*
Muslim (=1)	0.114	0.0689	--	-0.438	-0.381	--
	(0.0526)**	-0.0651	--	(0.178)**	(0.150)**	--
Christian or other religion (=1)	-0.0966	-0.102	--	-0.062	-0.0514	--
	(0.0374)***	(0.0397)**	--	-0.121	-0.146	--
Nyambo tribe (=1)	0.159	-0.0394	--	0.32	-0.194	--
	(0.0530)***	-0.121	--	(0.165)*	-0.387	--
Hangaza tribe (=1)	-0.371	-0.324	--	-0.328	-0.586	--
	(0.0544)***	(0.159)**	--	(0.165)**	-0.539	--
Other tribe (=1)	-0.208	7.68E-06	--	-0.759	-0.447	--
	(0.0555)***	-0.0658	--	(0.147)***	(0.256)*	--
Log household size (ln members)	-0.743	-0.744	0.871	1.531	1.542	1.205
	(0.0432)***	(0.0402)***	(0.366)**	(0.133)***	(0.163)***	-0.864
Sample size (N)	946	946	1859	946	946	1859
R-squared	0.424	0.397	0.112	0.315	0.285	0.213

*Note: OLS regressions, coefficients reported with robust standard errors in ( )'s. *** p<0.01, ** p<0.05, * p<0.1. Also included but not reported are seasonal indicators found in Appendix 2.*

All values in Tsh are in TSh 000s and deflated to baseline (1991) real values using the methodology described in Section 3.3 and footnote 17.

To further explore the results in Table 5, parallel regressions were run splitting the sample into households with ever widowed and households with never widowed women. Summary results of this sensitivity analysis are reported in Table 6, where each coefficient represents a different regression and coefficients are reported only for the inheritance indicator predicting per capita consumption (Panel A) and value of household assets (Panel B). In determining household per capita consumption expenditure, the relationship with inheritance is clearly driven by the sample of ever widowed women and this relationship becomes stronger when accounting for unobservables at the community and individual level. This negative and increasing relationship among widows signifies that unobservables for widows particularly decrease the likelihood of high welfare measures, which is consistent with the descriptive findings that households with widows have no significant differences in terms of mean welfare measures. In contrast, there is no significant relationship found between inheritance and household per capita consumption among the sample of never married women. In determining the value of household asset stocks, a different pattern emerges: in the cross-sectional models, significant relationships are found with both samples (although magnitude of coefficients is higher among the group of households containing ever widowed women), although these relationships becomes insignificant in the panel model. This could be because of relatively small samples and few degrees of freedom, as magnitudes of coefficients are largely in the same range as in other models. This result indicates that, in households where widows reside, inheritances are important in determining asset stocks, perhaps owing to investments, whereas this dynamic is not observed in households where no widows reside. Although not reported, all models in Tables 4 and 5 were rerun using disaggregated categories of inheritance types (land, other in-kind assets and cash). As might be expected, findings are driven largely by land inheritance; however, since the magnitude of the in-kind and cash groups is small, these results are only suggestive.

Table 6: Summary of regression results for the effect of inheritance on household consumption and asset stocks in Kagera by widowhood status

Panel A: Log per capita consumption (ln tsh)

	Cross-section		Cross-section with community- level FE		Panel with individual-level FE	
	(A1)	(A2)	(B1)	(B2)	(C1)	(C2)
	Ever widowed	Never widowed	Ever widowed	Never widowed	Ever widowed	Never widowed
	(2004)	(2004)	(2004)	(2004)	(1991-2004)	(1991-2004)
Log of inheritance value (ln tsh)	0.0485	0.0148	0.0408	0.0167	0.0751	0.0301
	(0.0218)**	(0.015)	(0.0216)*	(0.016)	(0.0253)***	(0.023)
Sample size (N)	295	651	295	651	573	1286
R-squared	0.375	0.458	0.371	0.455	0.079	0.138

Panel B: Log value of household asset stocks (ln tsh)

Log of inheritance value (ln tsh)	0.174	0.114	0.173	0.119	0.132	0.0652
	(0.0689)**	(0.0406)***	(0.0671)***	(0.0509)**	(0.085)	(0.070)
Sample size (N)	295	651	295	651	573	1286
R-squared	0.308	0.332	0.307	0.331	0.177	0.252

*Note: OLS regressions, coefficients reported with robust standard errors in ( )'s. *** p<0.01, ** p<0.05, * p<0.1.*

Also included but not reported are all control variables as in Table 5 and seasonal indicators found in Appendix 2. All values in Tsh are in Tsh 000s and deflated to baseline (1991) real values using the methodology described in Section 3.3 and footnote 17.

5 Discussion, conclusion and policy implications

Women's property and inheritance rights are now on the development agenda and are being incorporated into research and programme implementation plans by donors and other international organisations. Linkages have been made not only to land tenure, food security and other agricultural subsectors, but also to HIV/AIDS, health and general poverty.[22] However, many of these linkages are theoretical, based on case studies and not necessarily quantified using empirical research methods. While literature on agricultural outcomes is more common, especially related to land rights and land security, the quantitative literature on linkages between women's inheritance and property rights and general welfare or poverty measures is thin and fraught with problems of endogeneity. Although results from both analyses presented here largely reflect hypotheses from qualitative and other existing literature, there are several interesting results that warrant further discussion.

The analysis of DHSs shows that, overall, more than half of widows in the 15 countries examined report *no* asset inheritance, and only in Rwanda and Senegal do widows and their children report inheriting the *majority* of assets. In all other countries, the majority of assets are reported as being inherited by the spouse's families or other children. Measures of majority inheritance are particularly low in Sierra Leone (12.65 percent), Congo (15.81 percent), Benin (21.90 percent) and DRC (23.80 percent), which may signify restrictive legal frameworks, as well as added insecurity owing to conflict (USAID, 2004). The correlate analysis generally supports the hypotheses that older, wealthier, more educated women have a better chance of protecting assets from dispossession. Chapoto *et al*. (2010) find similar patterns in Zambia where older women, in addition to those with greater kinship networks in the community, are able to protect against losing property. Furthermore, qualitative research in matrilineal villages in Mozambique finds that property dispossession is a problem even in traditionally women-centred inheritance regimes (Hendricks and Meagher, 2007). However, Fafchamps and Quisumbing (2002) find older women in Ethiopia anticipate inheriting fewer assets, which they speculate may owe to the expectation of being supported economically by children. Also, in contrast with findings presented in this paper, in the Ethiopian context results suggest educated women anticipate receiving fewer assets through inheritance, which the authors suggest may be indicative of access to non-farm or other income-generating opportunities. These findings highlight the need to conduct more in-depth country-specific analysis to understand dynamics and determinants of asset inheritance across SSA.

Although the analysis using DHS and Kagera data is focused on women who have ever experienced widowhood, there are a several reasons why the findings could pertain to asset

[22] Cooper (2008); ICRW (2007); USAID (2009).

and property inheritance for women in general. First, it is likely that women who are separated or divorced face similar (or in some cases more restrictive) asset inheritance discrimination as widows, contingent on the nature of the separation. Unfortunately, questions in the DHS were asked only to women whose spouse had died, and the sample of separated or divorced women in Kagera is too small for a subsample analysis. Second, research shows that individuals often make investments and other productivity-enhancing decisions in land or in small businesses based on their expectations of future asset security (Deininger and Jin, 2006; USAID, 2009). Therefore, if women expect or fear dispossession of assets or property grabbing, this expectation has the potential to affect their economic outcomes even before the death of their spouse. In addition, if the percentage of women who report being separated or divorced in the 2005/06 data were to be included, an additional 7.7 percent of women would be added to the sample.[23] The issue of security of asset ownership is one with the potential to affect the majority of women (both directly and indirectly). In addition, we do not know what the contribution of restrictive property rights or asset dispossession is to the burden or probability of contracting HIV/AIDS (Cooper, 2010a). This question remains extremely difficult to answer, not only because biomarkers must be collected, but also because, in many cases, if the husband's death is because of HIV/AIDS, a woman will already have a higher probability of being HIV positive herself. This is another topic that needs to be addressed in future research efforts.[24]

There are a number of important limitations in this analysis. The first is an inherent limitation of household-based data collection: widows who are the worst off may not be part of the sample because they may be living on the streets or in informal housing arrangements. As previously mentioned, given inability to analyse inheritance trends, there is little evidence on if or how asset inheritance dynamics are changing in the DHS countries. Throughout this document, assets and property are used interchangeably, whereas a more specific questionnaire design could have differentiated large assets (land, house), from household items (refrigerator, radio), small valuables (jewellery, watches) and productive assets (agricultural tools and machinery, irrigation pumps). In addition, the DHS collects information only for women aged 15-49; given the age range of widows, the sample is likely leaving out a very relevant segment of the population with perhaps differing experiences on asset dispossession. Finally, in the Kagera sample, there are attrition issues, owing to both mortality and migration of women, which are not explicitly addressed in the current analysis.

[23] As previously noted, these percentages are an underestimation, since they measure the percentage currently widowed and currently separated or divorced, which are lower as compared with the percentage ever experiencing these events.

[24] However, recent promising work has been conducted looking at the effects of HIV on agriculture and land losses (Chapoto *et al*., 2010; Donovan *et al*., 2003; Mather and Donovan, 2008). Cooper (2010a) devotes a section of her review of policy considerations to mainly qualitative evidence surrounding the HIV and inheritance linkage.

Based on these limitations, several suggestions are proposed for DHS data collection efforts. First, questions on assets in the DHS should be expanded to cover women who have experienced divorce and separation. Ideally, these questions would include prompts to understand dynamics of the separation, including fault and both knowledge and use of legal structures. Second, if information on timing of marriage or death were collected among widows and divorcees, a trend analysis would be possible to assess expectations or changes in probability of property grabbing over time. In addition, a more specific disaggregation of assets into types as previously proposed would improve information gathering and targeting of interventions. Finally, these questions should be included in questionnaires not only for SSA but also in Northern Africa, Asia and South America, as inheritance dynamics are expected to vary across countries and regions (UN, 2001).[25]

Although women's asset inheritance is clearly a gendered issue, it is not necessarily the case that property dispossession is strictly limited to men grabbing property from women. For example, clan or extended family members who take property from widows often include other women. Given the diversity of dynamics surrounding gender dimensions of asset inheritance, evidence-based research is needed to guide the growing portfolio of successful policy and programmes (Cooper, 2010a). Gendered impact evaluation of land certification and effectiveness of titling regimes is an integral part of this process, as schemes can be varied in their acceptability and functionality in different settings.[26] Research has shown that, contrary to popular perceptions, the introduction of privatised land ownership systems has in some cases hurt, not helped, women's land rights, by ascribing land rights solely to a male household head, thereby bypassing the many other household members who use communal or family land.[27]

Innovative programme evaluation will also add to our knowledge of other methods through which property dispossession can be decreased. For example, Mendenhall *et al.* (2007) evaluate a randomised intervention of a will-writing programme in Lusaka, Zambia, among individuals within monogamous unions in which at least one partner was HIV positive. Findings suggest that individuals find even small items (clothing, kitchenware, furniture) to be important components of assets detailed in wills, and that often men specifically included instructions to their families not to take property from their wives and children. Other programmes which have focused on integrating property rights into related programmes (such as HIV/AIDS programmes) have apparently been successful, although they have not been formally evaluated or documented (IRCW, 2007). In Ethiopia, a recent land titling

[25] Exploration of DHSs in Asia and the Middle East that collect this module finds only one country (Cambodia, 2005) for which the question was publicly available on 2 August 2009.

[26] Deininger *et al*. (2007); Holden and Tefera (2008); USAID (2006).

[27] Lastarria-Cornhiel (1997); Tripp (2001); Whitehead and Tsikata (2003).

scheme introduced pictures of both husband and spouse in passport-size booklets to ensure women were represented and identified as joint owners (Deininger *et al*., 2007). The International Center for Research on Women (ICRW) is piloting programmes which train grassroots paralegals to help women defend their property rights in Uganda, although results from this effort are still forthcoming.[28] Finally, property inheritance among orphans and child-headed households and among women in post-conflict situations is an area that requires more evidence and attention in the research agenda.[29] Although the problem of property grabbing and the 'plight' of widows in SSA is often framed using a human rights perspective and has legitimacy on this basis alone, quantitative research and evidenced-based programme evaluation should be pursued in parallel to identify if progress is being made and to highlight successful programme designs that protect women's inheritance rights and help prevent descents into poverty.

[28] http://icrw.org/where-we-work/training-grassroots-paralegals-help-women-exercise-their-property-rights

[29] ICRC (1999); Rose (2006); UN (2001); UNIFEM (2001).

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Appendix

Appendix 1: Descriptive statistics on demographic, economic and locational control variables among widows in SSA and by country

	Pooled	Benin	Congo	DRC	Guinea	Mali	Namibia	Niger	Nigeria	Rwanda	Tanzania	Senegal	Sierra Leone	Uganda	Zambia	Zimbabwe
A. Demographic	**sample**	(2006)	(2005)	(2007)	(2005)	(2006)	(2006/7)	(2006)	(2008)	(2005)	(2004)	(2005)	(2008)	(2006)	(2007)	(2005/6)
Age (years)	53.43	39.28	38.75	38.75	38.89	37.70	40.08	35.60	39.58	38.83	38.28	38.72	37.89	38.35	37.77	36.83
Polygamous union (=1)	0.27	0.38	0.13	0.20	0.51	0.51	0.03	0.38	0.26	0.11	0.20	0.52	0.34	0.17	0.10	0.04
Muslim religion (=1)	0.37	0.13	0.01	0.02	0.81	0.93	0.00	0.98	0.37	0.02	0.23	0.96	0.79	0.05	0.00	0.01
Education levels																
No schooling (=1)	0.51	0.79	0.17	0.31	0.88	0.86	0.14	0.86	0.47	0.36	0.34	0.80	0.81	0.38	0.13	0.11
Primary (=1)	0.32	0.15	0.28	0.42	0.08	0.08	0.46	0.12	0.34	0.54	0.63	0.16	0.10	0.53	0.62	0.44
Secondary and above (=1)	0.16	0.06	0.55	0.27	0.04	0.06	0.41	0.02	0.19	0.11	0.04	0.05	0.09	0.09	0.24	0.46
B. Economic																
Wealth quintiles																
Lowest quintile (=1)	0.23	0.25	0.20	0.32	0.24	0.19	0.32	0.21	0.22	0.24	0.26	0.52	0.23	0.26	0.15	0.19
Second quintile (=1)	0.21	0.22	0.27	0.23	0.20	0.18	0.22	0.14	0.23	0.22	0.20	0.19	0.20	0.23	0.17	0.16
Third quintile (=1)	0.21	0.20	0.22	0.14	0.22	0.21	0.21	0.21	0.25	0.20	0.22	0.21	0.19	0.21	0.17	0.19
Fourth quintile (=1)	0.20	0.20	0.17	0.13	0.19	0.25	0.15	0.21	0.20	0.16	0.21	0.26	0.24	0.17	0.28	0.24
Highest quintile (=1)	0.16	0.14	0.13	0.18	0.15	0.17	0.10	0.22	0.11	0.18	0.12	0.14	0.14	0.13	0.23	0.22
C. Locational																
Urbanicity (=1)	0.30	0.36	0.43	0.38	0.25	0.30	0.31	0.21	0.27	0.18	0.22	0.42	0.28	0.13	0.50	0.37

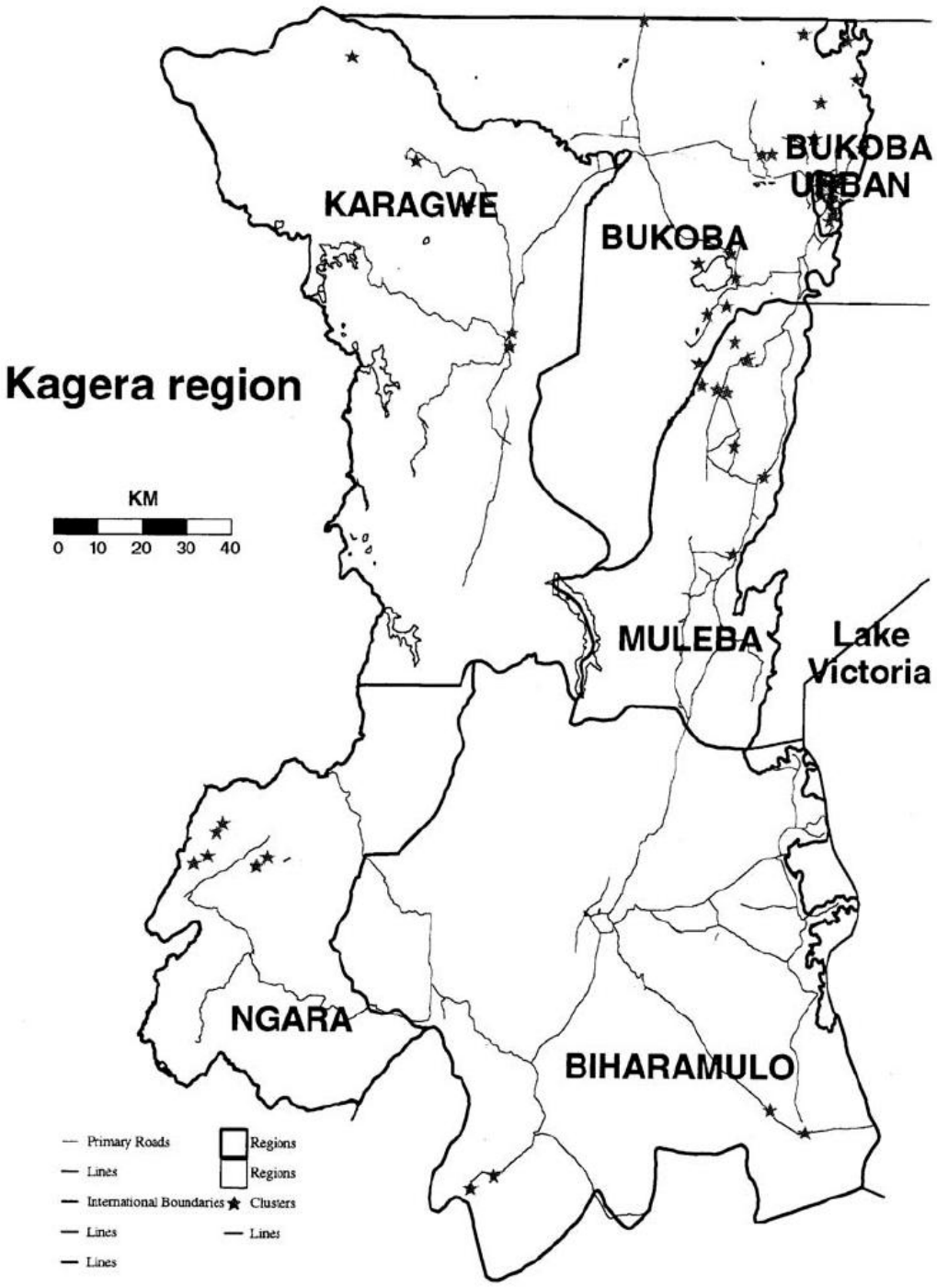
Note: Sample is among women aged 15-49. Mean values and adjusted wald tests use weights according to population-level weights provided in the DHS. Regional indicators are not displayed and vary by country.

Appendix 2: Descriptive statistics on control variables used in Kagera regression analysis (sample women age>=15 in 1991 survey)

	(A) Full sample	(B) Full sample	(C) Ever widowed women	(D) Never widowed women
Control variable	(1991)	(2004)	(2004)	(2004)
Age (in years)	33.76	46.30	60.58	39.83
	[16.43]	[16.89]	[16.31]	[12.66]
Education levels				
No schooling (omitted = 1)	0.29	0.32	0.51	0.23
Incomplete primary schooling (=1)	0.32	0.22	0.26	0.20
Complete primary schooling (=1)	0.36	0.41	0.19	0.51
Secondary or above schooling (=1)	0.04	0.05	0.04	0.06
Religious affiliation of household head				
Catholic religion (omitted =1)	0.57	0.58	0.56	0.58
Muslim (=1)	0.13	0.12	0.13	0.12
Christian or other religion (=1)	0.29	0.30	0.31	0.29
Tribe affiliation of household head				
Haya tribe (omitted =1)	0.60	0.61	0.70	0.57
Nyambo tribe (=1)	0.13	0.12	0.09	0.13
Hangaza tribe (=1)	0.11	0.12	0.08	0.13
Other tribe (=1)	0.16	0.15	0.12	0.17
Season of interview				
Interviewed Masikara rain season (omitted =1)	0.18	0.56	0.64	0.52
Interviewed Vulani rain season (=1)	0.67	0.29	0.27	0.30
Interviewed Kiangazi season (=1)	0.15	0.15	0.09	0.18
Household size (members)	5.50	5.63	4.82	6.00
	[2.93]	[2.98]	[2.53]	[3.10]
Sample size (N)	946	946	295	651

Note: Mean values reported with standard deviations where appropriate below in [ ]'s.

Appendix 3: Location of survey clusters in the KHDS



Source: Beegle et al. (2006).

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