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**What Role Does Marriage Play in Urban Africa?
Evidence from a High HIV Area in Kenya**

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What Role Does Marriage Play in Urban Africa? Evidence from a High HIV Area in Kenya *

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Abstract

The marriage institution, which plays an important role in regulating sexual activity in most societies, traditionally placed few restrictions on male extra-marital relationships in sub-Saharan Africa. If this traditional pattern continues to remain in place today, then it may help explain the relatively high levels of HIV/AIDS in that region of the world. We test the link between marriage and sexual activity on a sample of migrants in the town of Kisumu, Western Kenya, which reported HIV prevalence of 26 percent in 1997. A preliminary regression shows that married men have significantly fewer non-marital partners than single men, but this regression does not account for selective entry into marriage. Indeed, the marriage effect disappears completely when we instrument for marriage. In contrast, marriage has a strong influence on employment, income, and remittances among the migrants (after instrumenting), consistent with the view that marriage improves labor market outcomes and facilitates reciprocal exchange in this network-based economy. Sexual activity appears to lie outside the range of influence of the marriage institution due to historical circumstance, not because the institution *per se* is ineffective.

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1 Introduction

The HIV/AIDS epidemic has confronted the world with a public health challenge of unprecedented magnitude. As of 1999, a total of 50 million people had either died of AIDS, or were HIV positive and would ultimately most likely die of the disease (UNAIDS and WHO 1999). While this has been a global disaster, the focus of the epidemic has been sub-Saharan Africa; almost 70% of persons with HIV/AIDS, and over 80% of those who have died of the disease, belong to a region that accounts for less than 10% of the world's population.

Why has sub-Saharan Africa borne the brunt of this deadly epidemic? 80% of HIV transmission in sub-Saharan Africa is attributable to heterosexual activity (Ulin 1992), and while certain health conditions, such as the high prevalence of STDs, have increased the transmission rate, it is evident that social organization has played an important role in the rapid spread of the disease. Caldwell et al. (1994), for instance, cite numerous studies from countries throughout the region that describe a sexual culture characterized by substantial permissiveness and the absence of punishment for extra-marital relations.

This paper focuses on a single component of the local culture - the marriage institution - which serves to regulate sexual activity in most societies. We will argue that historical circumstances shaped the marriage institution very differently in much of sub-Saharan Africa and Eurasia (a region covering Europe and most of Asia). This may have had an important effect on the pattern of sexual activity in the two regions today, and by extension the spread of HIV/AIDS.¹ We will see in Section 2 that marriage in sub-Saharan Africa traditionally placed few restrictions on male extra-marital relationships. While the advent of Christianity and exposure to Western ideas may have changed the structure of the marriage institution over time, it is still an open question as to whether entry into the marriage institution has any effect on male sexual activity today.

The first objective of this paper will consequently be to estimate the effect of marriage on sexual activity. There have been a number of previous studies from various parts of Africa that compare the behavior of married and unmarried men (Caraël 1994 provides a summary of these studies). The general pattern seems to be that married men are less likely to engage in risky behavior and tend to display lower rates of HIV infection. These studies do not account for selection into marriage, however.

¹While we discuss broad regional differences in this paper, it is important to recognize that there is important cultural variation, with accompanying differences in HIV prevalence, *within* sub-Saharan Africa as well. An exploration of these within-region differences is beyond the scope of this paper.

In this paper we will think of ability as a collection of unobserved traits that determines a wide range of individual outcomes. In general we would expect high ability individuals to have superior labor market outcomes, as well as greater success in attracting (non-marital) sexual partners. Marriage is associated with entry into the wife's family network in a traditional society, which brings both benefits and new obligations. High ability individuals will tend to subsidize the other members of their network, particularly in the city, providing accommodation, credit, and job assistance, while requiring and receiving little support in return. Such individuals might then have a lower propensity to marry, in which case a spurious negative correlation between marriage and sexual activity could be obtained.

Our strategy to avoid this selection bias exploits traditional marriage rules among the Luo, an ethnic group residing in Western Kenya, to construct an instrument for marital status. The fundamental marriage rule followed throughout much of sub-Saharan Africa, and among the Luo, is very simple; no individual is allowed to marry someone from a related clan. While this rule of exogamous marriage is the same for the entire ethnic group, its effect on the actual matching process varies widely across traditional Luoland (modern Nyanza Province). The Luo are a tribe of Nilotic origin who migrated south into Kenya between three and five hundred years ago. Areas lying directly in the path of the incoming migrants were settled by large numbers of unrelated clans, while more remote areas were settled later, often by related clans in a single wave. These patterns of historical migration generated wide variation in the local level of relatedness across Nyanza Province, which we will exploit in the empirical analysis. Relatedness determines the efficiency of the matching process, and we would expect areas with a lower proportion of related clans to be characterized by higher marriage prevalence (at each age) since there are more eligible partners to choose from.

Most of the data used in the empirical analysis described in this paper comes from a survey of male Luo migrants aged 21-45 that we conducted in Kisumu, the capital of Nyanza Province. One advantage of this urban setting is that migrants in Kisumu are drawn from all over the Province, leaving sufficient variation in the relatedness variable to test the relationship between marriage and individual outcomes. But relatedness will only have bite if the migrants continue to find their partners at home. Reassuringly, we find a strong negative correlation between relatedness in the origin location and marital status among the migrants in the sample. Our instrumental variable strategy also takes advantage of the fact that social rules often persist long after they have ceased to serve their originally intended purpose. Thus relatedness continues to determine marital status among the migrants, even

though any economic motivation for the local relatedness pattern at home when it was first put into place is unlikely to be relevant in the city today. Consistent with this view, we will later provide evidence that relatedness only affects outcomes in the city through its effect on marriage. A preliminary OLS regression provides the usual result that being married significantly lowers the number of sexual partners (after controlling for the individual's age). However, this marriage effect disappears when we instrument for marriage with relatedness, which is indicative of negative selection into marriage. The marriage *institution* itself appears to have no effect on sexual activity, providing us with the first empirical result of the paper.

A comparison of sexual activity among the Kisumu migrants and a representative sample of U.S. men between 20-39, drawn from the 1991 National Survey of Men (Billy et al. 1993), would appear to support the conclusion that we reached above. The sexual activity of single men in both societies is similar, with around 90% sexually active, and 20% having four or more partners in the past year.² The most striking difference is in the proportion of married men who report extra-marital partners in the past year: 45% in Kisumu versus 5% in the U.S. It is entirely possible that underreporting of sexual activity is more severe in the U.S., given the negative connotations associated with extra-marital relationships in this country. These comparative statistics also do not take account of selective entry into marriage, which may vary across countries. Nevertheless, the differences in extra-marital activity are striking, and are probably too large to be explained as an artifact of the data.

While the evidence that we present suggests that marriage has no effect on sexual activity, we will show that marriage does have a strong influence on employment, income, and remittances (after instrumenting with relatedness), consistent with the view that marriage improves labor market outcomes and facilitates reciprocal exchange in a network-based economy. Our most conservative estimates suggest that marriage increases the employment duration from eight months in the year to 11 months, and annual income from 54 thousand Kenyan shillings to 78 thousand Kenyan shillings.³ These benefits come with increased social responsibility; marriage increases remittances to family members from 18 percent to 25 percent of the migrant's annual income. These supplementary results are very useful, establishing that the marriage institution in sub-Saharan Africa does play an important role in regulating individual behavior and influencing outcomes, even among urban migrants. Sexual activity

²The term *single* in much of this paper refers to men who are currently unmarried. This includes divorced/separated and widowed men who have not remarried. The U.S. statistics for single men reported above, however, refer to never married men.

³\$1 was equal to approximately 70 Kenyan shillings in the year of the survey (2001).

lies outside the range of influence of this institution due to historical circumstance, not because the institution *per se* is ineffective.

The HIV/AIDS epidemic has threatened the Luo for two decades now, and HIV prevalence in Kisumu was estimated to be as high as 26 percent by 1997 (Glynn et al. 2001). There is very possibly a negative externality associated with sexual activity involving multiple partners in this environment, and marriage appears as a natural institution around which to situate social norms restricting such activity.⁴ But the HIV/AIDS crisis, despite its severity, appears to have done little to change the historical structure of the marriage institution.

The paper is organized in five sections. Section 2 describes the institutional setting. Section 3 presents a simple model of marriage in a network-based economy, which describes the selection into marriage and discusses solutions to this identification problem. Section 4 reports the empirical results, and Section 5 concludes.

2 The Institutional Setting

We begin this section by describing the historical circumstances that led to distinct marriage structures in sub-Saharan Africa and Eurasia (a region covering Europe and most of Asia), with a special emphasis on extra-marital sexual activity. Subsequently we discuss the impact of marriage on individual labor market outcomes. Finally, we describe the marriage institution among the Luo in some detail, with a particular emphasis on the relationship between marriage and relatedness. The discussion in this section prepares us for the theoretical model of marriage that follows in Section 3 and the empirical analysis in Section 4.

2.1 Marriage and Sexual Activity

Explanations for differences between African and Eurasian marriage systems typically begin with the historically low population density in sub-Saharan Africa (Goody 1971, Goode 1970). Since labor was in short supply, women were valued for both their productive and reproductive capabilities. Women were net contributors to the households that they married into, giving rise to the institution of bride wealth (payment from the husband's family to the bride's family) in the marriage market.

⁴While we would expect a decline in sexual activity by married men to be associated with a decline in HIV prevalence, Kremer (1996) shows that this need not be the case. The married men in our sample apparently have lower ability, and hence fewer partners. Kremer shows that inducing such individuals to *increase* their sexual activity could actually lower HIV prevalence in the population under certain conditions.

In contrast, land rather than labor was in short supply in Eurasia, and women were valued primarily for their reproductive ability. Women apparently contributed less than they received from the family they married into, giving rise to the system of dowry in equilibrium, where transfers flowed from the bride's family to the groom's family at the time of marriage.

The dowry system essentially involved a lump sum transfer from the bride's family, in return for which the groom's family committed to support the bride over her lifetime. In a competitive marriage equilibrium, the amount of the dowry was based on the level of resources that the bride was expected to consume (net of the value of the children she produced). Since assets held by the groom's family (mainly land) that would support this consumption were essentially fixed, it was necessary to ensure that the groom would not make subsequent opportunistic marriages and renege on his previous commitment. Thus monogamy has historically been closely associated with the dowry system (Goody 1969). In contrast, there were no restrictions to prevent a man from acquiring additional wives in Africa, as long as he was able to pay the bride wealth. Polygyny emerged as an institutional response to labor scarcity in this economic environment.

Polygyny instilled a sexual culture in which men were permitted to acquire many partners, even after marriage (Adepoju and Mbugua 1997, Obbo 1995).⁵ As Orubuloye et al. (1997:1196) explain, "[Polygyny's] central position in society inevitably means widespread social and ethical acceptance of the proposition that many men need more than one wife, and by implication and extension, that many - perhaps most - men need sexual relations with more than one woman. This remains the situation [even] in Southern Africa, for, although a century or more has been long enough to dismantle polygyny, its behavioral implications, built up over aeons, will not disappear so easily." Such values were internalized by women in polygynous societies as well. For example, a Luo elder with whom we spoke in Kisumu noted that a Luo wife may actually encourage her husband to see other women and even ask him to bring his girlfriends home so that she could assess their potential as future co-wives. The threat of divorce by the woman, to deter extra-marital sexual activity, is in any case unlikely to be credible in many African societies. Divorce or separation typically leaves the woman with nothing in a polygynous society - the husband keeps the children and the bride wealth must be returned by the wife's family (Goody 1969, Potash 1978, Caldwell et al. 1994).

In contrast, the Eurasian system prescribes extremely severe social, religious, and legal sanctions

⁵In contrast, female sexuality was more tightly controlled than male sexuality in many parts of Africa (Caldwell et al. 1992, Oppong 1992). A detailed exploration of these gender differences is beyond the scope of this paper.

against extra-marital relationships. The traditional system of African sexuality thus clashed with Western values when the European colonialists arrived in the nineteenth century. European schools set forth models of family conduct to their students, while missionaries attempted to inculcate Christian values both in their schools as well as among those they converted. The colonial administrations in turn legislated or adjudicated against many traditional African practices, among them bride wealth and polygyny (Goode 1970).

African social institutions proved to be remarkably resilient to these attacks. Social rules surrounding marriage, sexual behavior, and fertility tend to change very slowly, and we will later see that while almost all the migrants in our sample are Christian, most still follow the traditional rules and rites of Luo marriage. The traditional patterns of polygyny and divorce settlement have also been retained in many modern African legal systems - marriage to more than one wife is legally permissible, the husband's family retains custody of the children, and alimony is rarely paid (Parkin 1978). In sum, it is not at all surprising that "the [African] male has greater freedom to participate in sexual unions outside legal monogamous marriage ... to a degree not tolerated in European society" (Goode 1970:188).

2.2 Marriage and Labor Market Outcomes

To understand the role that marriage plays in determining labor market outcomes in urban Africa, it is useful to begin with the classical anthropological theory of "marriage as exchange" (Lévi-Strauss 1969). In this theory, exchange in traditional societies is dominated by reciprocal gifts between individuals, families, and clans (or castes). The marriage institution serves to facilitate this exchange.

For simplicity, imagine that the individual is born into a network, drawn from his father's family, and then subsequently enters into a new network, drawn from his wife's family, when he marries. Marriage is thus associated with the acquisition of a new network. Marriage is also associated with the strengthening of the individual's birth-network. Marriages were, and continue to be, arranged by relatives and friends in almost every African society (Goode 1970). For example, arranged marriages have traditionally been organized among the Luo by an intermediary, or *jagam*, who is usually one of the man's sisters, sisters-in-law, or another extended relative (Ocholla-Ayayo 1976, Ndisi 1974). Marriage arrangement continues to be prevalent in Nyanza Province today. Potash (1978) found that 79 percent of the marriages in a rural Luo community that she studied were arranged. High levels of marriage arrangement are observed in urban areas as well, with 44 percent of the married migrants in

our Kisumu survey reporting that their marriages involved a *jagam*.

Marriage arrangement is a service that is usually matched by a reciprocal transfer from the individual to the *jagam*, who is typically connected to the individual's birth network. For instance, more than 72 percent of our married respondents who utilized the services of a *jagam* reported that they had subsequently provided some sort of service to them. Marriage in a traditional economy should not be seen as simply a match between two individuals, however. Marriage also strengthens and widens existing network ties, expanding the services and support that the individual receives from the community, while at the same time increasing his social obligations (Shipton 1989).

While urbanization in Africa is a relatively recent phenomenon, the marriage institution has evolved so that it improves the individual's opportunities, while at the same time increasing his obligations, even in the city. Parkin's (1978:88) ethnography of Luo migrants in Nairobi describes how "A household head is subject to a barrage of requests for accommodation, many of them by job-seekers. All Luo who have 'spare' room in their houses are under some obligations to provide accommodation to a wide range of kin and affines [individuals related by marriage]." Consistent with this observation, over 60 percent of urban migrants interviewed in Kenya in the early 1990s reported that they were staying with kin or affines (Ocholla-Ayayo 2000). Over 90 percent of the respondents had also assisted kin or affines at some point, where assistance was specified to include paying school fees, providing housing, and job placement. While we do not attempt to formally identify network effects in this paper, one simple explanation for the positive effect of marriage on labor market outcomes that we will later observe is therefore that marriage strengthens existing network ties and builds new ones.⁶ The link between marriage and the network will also allow us to explain the negative selection into marriage that we observe with our sample of urban migrants.

2.3 Marriage Among the Luo

The Luo are one of the largest ethnic groups in Kenya today, numbering approximately three million, and they reside primarily in Luoland (modern Nyanza Province) in Western Kenya. Turning to Figure 1, we see that Luoland can be divided into two broad regions; Central Nyanza which consists of districts to the north and the east of Lake Victoria, and South Nyanza, composed of several districts south of

⁶Other explanations for the marriage effect are also available. For example, entry into marriage, and the arrival of children, could increase the individual's responsibilities and so induce additional effort in the labor market. Alternatively, increased specialization in household tasks after marriage could make the man more productive in the workplace. But only the network story can easily explain why we later see increased remittances, as a fraction of total income, by married men.

the Lake.

Insert Figure 1 here.

The Luo migrated southward into Kenya, from Egypt and Sudan, via Uganda, in three waves between 1490 and 1790 (much of the history that follows is based on Ogot 1996, 1967 and Ocholla-Ayayo 1976). Luo settlement in Kenya was initially restricted to Central Nyanza, which lies directly in the path of the incoming migrants. Pressure on the land, after the third wave of migrants, generated a movement to South Nyanza around 1790-1820. South Nyanza was settled for the most part by splinter groups from the clans in Central Nyanza, and the relatively uninhabited territory allowed groups to settle in a more dispersed manner, with individual families frequently claiming large territories for themselves and their descendants. This internal migration into South Nyanza was completed around 1850.

Over time, Luo clans were united politically under tribal chiefs into areas known as *pinje* (territories). Property rights were historically poorly defined, and over the course of the centuries there came to be substantial spatial overlap among the clans within a *pinje*. With the arrival of the British in the late 1800s, these settlement patterns were frozen and the *pinje* were formally incorporated into administrative areas known as *locations*. The 30 “traditional locations” roughly correspond to administrative divisions today and the shading in Figure 1 represents the degree of clan relatedness in each location, which varies quite substantially across Nyanza Province.⁷

The idea for the relatedness instrument came up during the course of a conversation with a Luo professor at the University of Nairobi in 1999. He noted that the Luo continue to adhere to many traditional practices and, as an example, he described the rule of marital exogamy, in which members of clans that were designated as “related” had not married each other for up to 15 generations.⁸ He also mentioned that individuals in certain locations with many related clans apparently found eligible partners with great difficulty. Following up on this conversation, we collected relatedness patterns for the entire Province from Luo elders in Kibera, a predominantly Luo neighborhood in Nairobi.

⁷Figure 1 shows the 30 traditional locations in present-day Nyanza Province. Districts in Nyanza Province comprised of other ethnic groups, primarily Kisii, are not included on the map. The two areas with no shading are recent settlement schemes that have an artificial arrangement of clans. These areas are excluded from the empirical analysis.

⁸Breaking rules of relatedness has connotations of incest, which would explain why the Luo continue to follow these rules even today. But why would a society choose to put rules that are so rigid in place? The rules governing marriage presumably emerged to take account of the externality associated with the individual marriage decision, which affects the performance of multiple networks in a traditional economy. These rules had to be strong, and hence rigid, to ensure that individuals did not deviate from the social norm. Such rigidity may not have been particularly costly in an economic environment that was essentially static for centuries.

Subsequently a Luo historian independently verified the relatedness patterns in 2001. Although many Luo have a general knowledge of relatedness patterns throughout Nyanza Province, and more specific knowledge about their own traditional location, we believe that this is the first time that these patterns have been systematically documented for the entire area, facilitating the construction of a region-wide instrument for marital status.

We will effectively treat each traditional location as a distinct marriage market in this paper. Typically, each location consists of a number of *clusters* of related clans, as well as a number of independent clans. Clans belonging to a cluster cannot marry within that cluster but can marry any other clan in the location. Individuals belonging to independent clans can marry anyone outside their own clan.

Let the number of *groups* in a location be the number of clusters plus the number of independent clans. Our measure of relatedness will be the ratio of the number of clans to the number of groups. Intuitively, the level of relatedness must grow as a greater fraction of clans are incorporated into clusters, which reduces the number of groups. When all the clans are independent, the number of clans is equal to the number of groups, and the degree of relatedness is one. When all the clans are incorporated in clusters, the degree of relatedness is the average number of clans per cluster. The relatedness statistic takes on values from one to 10 in our data, as described in Figure 1.

One of the important steps in the empirical analysis will be to show that high relatedness reduces the probability of finding an eligible partner, which leads to lower marriage prevalence. We now proceed to verify that the relatedness statistic that we have chosen does indeed satisfy the first part of this condition. Assume that the individual matches randomly with a partner from his own location in each period. Let N be the number of clans in the location, K the number of clusters, and n the number of clans within a cluster. For simplicity, we take it that all clans are of equal size.⁹ Under these conditions, the probability of matching with an eligible (unrelated) partner in any period, for an individual drawn at random from the location, is obtained as

$$\frac{K}{N} \cdot n \left(1 - \frac{n}{N}\right) + \left(1 - \frac{K}{N} \cdot n\right) \left(1 - \frac{1}{N}\right).$$

The relatedness statistic can in turn be expressed as

$$\frac{1}{1 - \frac{K}{N} (n - 1)}.$$

⁹In practice, the relatedness statistic is computed using large clans only.

Relatedness is evidently increasing in K/N , while the probability of an eligible match is decreasing in K/N , since $n > 1$. Thus relatedness and this probability must be *negatively* correlated. Later in Section 3 we will complete the connection between relatedness and marital status by showing that an increase in the probability of an eligible match does in fact lead to a rise in marriage prevalence in equilibrium under reasonable conditions.

3 A Simple Model of Marriage

We now proceed to lay out a simple model of marriage. In the previous section we saw that our measure of relatedness was negatively correlated with the probability of matching with an eligible partner. But individuals in high relatedness locations could compensate for this disadvantage by adopting less stringent matching strategies or by entering the marriage market earlier. In the discussion that follows we will derive conditions under which relatedness is negatively correlated with marital status in equilibrium.

The model is solved (backwards) in two stages. In the first stage each individual (man) decides whether or not to enter the marriage market. In the second stage, individuals in the marriage market match with (wives') family networks. The individual's ability is shown to determine both the age at which he enters the marriage market as well as the (expected) delay before he matches with a suitable partner once he is on the market. Marital status is thus a function of the individual's ability, at each age, and we will show that negative selection into marriage is obtained under reasonable conditions. Since unobserved ability determines both marital status and individual outcomes such as sexual activity, employment, and income, a spurious correlation between marriage and these outcomes could be obtained. This section concludes with a discussion on this identification problem, in which relatedness is proposed as an instrument for marital status.

3.1 Population, Preferences, and the Matching Technology

Consider a marriage market in which individuals (men) match with (wives') family networks. Men are characterized by an index of ability u , while family networks are characterized by an index w , which denotes the average ability of their members. Both u and w are continuous distributions on $[0, 1]$.

The value of a network is measured by the assistance that it can provide in the labor market, which depends on the ability of its members. Thus the payoff to an individual from matching with a network whose average member has ability w will be $g(w)$, where g is an increasing function of w .

Networks similarly benefit more from individuals with high ability.¹⁰

All participants in the marriage market are risk neutral utility maximizers who discount the future with a common and constant discount factor $\delta \in [0, 1)$. Individuals and networks meet randomly, once every period, and a successful match only occurs if both parties find their partners acceptable. Participants in the marriage market adopt a reservation strategy in which partners above a threshold ability (or average ability) level are accepted. Search costs are represented in this model by the discount factor δ , which reflects the participants' impatience to be matched. Lowering the ability threshold reduces these search costs by increasing the probability of a successful match, which avoids having to return to the market in the future. But the expected ability of the match will also be lower as the threshold declines. In practice, participants in the marriage market trade off these opposing pressures when choosing the ability threshold that is optimal for them. In general both individuals and networks will be more stringent in their choice (specify a higher ability threshold) as the discount factor grows.

Finally, individuals and networks who match in any period are replaced by individuals and networks of the same ability, preserving the stationarity of the ability and average ability distributions in the marriage market.

3.2 The Second Stage: Matching in the Marriage Market

Under the conditions described above, the properties of the two-sided search equilibrium are well known and have been described elsewhere (Burdett and Coles 1997, Eeckhout 1999, Bloch and Ryder 2000). In general, there will be (imperfect) positive assortative matching, with individuals of high ability matching with networks of high average ability. Moreover, the set of individuals and networks is partitioned into blocks, such that all individuals (networks) in the same block follow the same reservation strategy.

The intuition for this result is straightforward, and is well described in Bloch and Ryder. Begin with the highest ability individual ($u = 1$). Taking into account the fact that any network $w \in [0, 1]$ accepts him, and the cost (delay) associated with a mismatch, he will choose a threshold W_1 above which he accepts any network that he is paired with. All networks in the interval $[W_1, 1]$ are accepted by the highest quality individual, and therefore by all individuals. They make a similar calculation,

¹⁰The discussion in this section focusses on the individual's behavior since the empirical work that follows is restricted to male activity. Thus, it is not necessary to explicitly specify the benefit that the network derives from the individual, here or in the Appendix. All that we require is that this benefit be increasing in the individual's ability u .

to choose any individual in $[U_1, 1]$. This generates the first set of blocks.

Next, individuals in $[0, U_1]$ and networks in $[0, W_1]$ go through the same exercise to generate the second set of blocks; $[U_2, U_1]$, $[W_2, W_1]$. This process continues until the entire distribution has been partitioned into blocks, leaving us with the unique search equilibrium.

As noted, our first objective in this section is to derive conditions under which lower relatedness translates into an increased probability of being married. To derive these conditions, we will see that we must first study how block-size varies as we move down the ability distribution. Under the search equilibrium just described, an individual with ability u , belonging to the n^{th} block, takes the highest quality network that accepts him W_{n-1} as given when he chooses the threshold average ability $w(u)$ that maximizes his utility. All individuals in a block face the same choice problem and so $w(u)$ can be replaced by W_n . Denote the block size as $\Delta_n \equiv W_{n-1} - W_n$. Under the assumption that w is uniformly distributed, we show that

Proposition 1 *The block size Δ_n is increasing (decreasing) in n if $g'(w)/g(w)$ is increasing (decreasing) in w .*

While the proof is derived more formally in the Appendix, the intuition for this result is straightforward. If network quality $g(w)$ is a convex function of the average ability of its members w , then high ability individuals who end up matching with high quality networks in equilibrium tend to be more picky, since they have more to lose by choosing a slightly lower w network. While convexity is clearly necessary for the block size to be increasing as we move down the ability distribution, we require the stronger condition that the change in the slope of the g function should not only be positive, but also more rapid than the change in its level.¹¹

This is not the sort of economy in which a Luo man with ability, or connections, can do exceptionally well. While Kisumu was a major port until the 1970s, moving goods between Kenya, Uganda, and Tanzania, the subsequent decline of East African trade and the poor performance of the Kenyan economy in recent years have seen a marked decline in its fortunes. The major trading houses and businesses are in any case owned and controlled by the expatriate Indian community, and so opportunities are relatively limited for the Luo. In these circumstances, we do not expect the strong convexity condition derived above to hold in practice. It seems reasonable to assume that $g'(w)/g(w)$ will be

¹¹For example, it is easy to verify that $g(w) = e^w + a$, $w \in [0, 1]$, satisfies this condition for $a > 0$. Intuitively, the increase in the intercept of the g function due to the $a > 0$ term slows down the rate of change in its level, leaving the change in the slope unchanged.

decreasing in w , which implies in turn that Δ_n will be decreasing in n . Under the assumption that w is uniform, block size maps directly into the probability of marriage. This tells us that the probability of being married will be declining in ability; high ability individuals find a partner more quickly once they enter the marriage market.

Up to this point in the discussion we have assumed that all participants in the marriage market are free to match with each other. In practice, different marriage markets are characterized by different levels of relatedness. A mismatch occurs in any period if the individual's partner belongs to a related clan or lies outside the block that he belongs to. Earlier in Section 2.3 we derived the negative relationship between our measure of relatedness and the probability of meeting an unrelated partner, which we denote by λ . We now proceed to establish a positive relationship between λ and marriage prevalence in equilibrium, which completes the link between relatedness and marital status. Continuing with the assumption that $w \in [0, 1]$ is uniformly distributed, the probability that an individual belonging to the n^{th} block will match successfully in any period is given by $\lambda(W_{n-1} - W_n)$, the joint probability that his randomly assigned partner is both unrelated, and is endowed with an ability level that results in both parties accepting the match. We can then show that

Proposition 2 *The probability of a successful match is unambiguously increasing in λ as long as Δ_n is decreasing in n .*

While the proof is relegated to the Appendix, the intuition for this result is once more straightforward. Differentiating the probability expression above with respect to λ we obtain

$$\Delta_n + \lambda \left(\frac{dW_{n-1}}{d\lambda} - \frac{dW_n}{d\lambda} \right).$$

Fixing the block size, an increase in λ reduces frictions in the marriage market and increases the probability of a successful match; this is the first term Δ_n in the expression above. But an increase in λ will also induce a change in participants' reservation strategies. Individuals become more picky when accepting a match since frictions in the marriage market have been reduced, which shifts W_n, W_{n-1} up. How does this affect the equilibrium block size? Under our previous assumption that Δ_n is decreasing in n we show that $\frac{dW_{n-1}}{d\lambda} > \frac{dW_n}{d\lambda}$, and so the block size must expand when λ increases, reinforcing the direct (positive) effect of an increase in λ on marital status. Ultimately we will verify empirically that relatedness is negatively correlated with marital status. What the preceding discussion tells us is that

we should expect to obtain this relationship under reasonable conditions on the network technology; as long as $g(w)$ is not too convex.

3.3 The First Stage: Entry into the Marriage Market

Our next objective is to derive conditions under which negative selection into marriage is obtained. We noted above that high ability individuals match faster, under reasonable conditions, once they are on the marriage market. But this pattern of selection into marriage might be reversed when we allow individuals to choose when to enter the market.

For negative selection to be obtained, the payoff from marriage versus remaining single must be declining with ability. It is easy to see why this could be the case in a network-based economy. While high ability individuals do match with networks of higher average ability, we noted earlier that superior network quality might not translate into substantially higher benefits in this economy. A high ability migrant has easier access to jobs in the city, and so has less demand for the services that the network provides in any case. But perhaps more importantly, the high ability migrant might end up contributing disproportionately to the network, by way of housing assistance, transfers to kin and affines, and job support.¹²

Another feature of the marriage institution that we must account for when characterizing the entry decision is that ultimately all Luo men marry. We will see later that marriage prevalence starts to increase in the early twenties and continues to grow until age 40 in the city. A simple explanation for this observation is that marriage provides two benefits in an economy in which markets function imperfectly; access to a network, which has been the focus of the discussion this far, and access to children as old age support. While Luo men are permitted to have multiple extra-marital partners, the culture discourages children out of wedlock. The demand for old age support will increase as the individual grows older, and so the incentive to marry and produce the children that will provide this support in the future must also be increasing with age.

The payoff from marriage that we specified earlier can now be augmented, based on the preceding discussion, as $h(\tau, u) \equiv g(w(u)) \cdot G(\tau, u)$. The first term, $g(w(u))$, is the payoff from the network, with network average ability w mapping into individual ability u through the second-stage matching process described above. The second term, $G(\tau, u)$, represents both the ability tax, represented by the

¹²It is unlikely that networks will be perfectly partitioned by ability in this economy, as these are family networks. Thus, even though there is positive assortative matching in the marriage market, high ability individuals will still end up having higher than average ability *within* their networks.

transfers and services that flow from the high ability individual to his network, as well as the benefit from children, which grows with his age τ ; $G_u(\tau, u) < 0$, $G_\tau(\tau, u) > 0$. It is easy to verify that the new multiplicative term has no effect on the second-stage matching that we describe in the Appendix. Matching in the marriage market continues to be based on ability alone. And the delay in matching continues to be declining with ability and increasing with relatedness, under the conditions derived earlier. But we will see that this new term now opens up the possibility for negative selection into marriage.

Let the payoff from remaining single be $f(u)$.¹³ Then negative selection into marriage requires that the returns to ability must increase more steeply for single than for married men:

Condition 1: $h_u(\tau, u) < f_u(u) \quad \forall \tau, u$.

We account for the observation that marriage prevalence increases steadily over a wide age range, and that all Luo men ultimately marry, by imposing the additional restriction:

Condition 2: $h(\tau, 0) > f(0)$, $h(\tau, 1) \leq f(1) \quad \forall \tau$.

This condition specifies that the lowest ability individuals, who are subsidized most by the network, always prefer marriage to remaining single. In contrast, the highest ability individuals are at least as well off being single, at any age. Condition 1 and Condition 2 together ensure that a unique cutoff ability $u^*(\tau) \in (0, 1]$ is obtained, for any age τ , such that all individuals with $u < u^*(\tau)$ choose to marry. We thus have some amount of marriage at every age, with negative selection into marriage.

Whether we observe positive or negative selection into marriage is ultimately an empirical question. For instance, a large literature on the marriage premium in the U.S. labor market uses longitudinal data to control for selection into marriage (see Korenman and Neumark 1991, Gray 1997, Ginther and Zavodny 2001, and the references cited in those papers). While the uncorrected and corrected marriage effects are similar in a few studies, the usual result is that the marriage premium declines, but continues to be significant even after controlling for unobserved differences between married and single men. These results are indicative of positive selection into marriage, which requires from Condition 1 that the returns to ability should be steeper for married than for single men. This could well be the case in the U.S. economy if specialization in the household through marriage disproportionately increases productivity in the workplace among high ability men, particularly since there is no marriage-network tax in the modern economy. Among the Luo, men traditionally entered the marriage market as soon as

¹³We normalize so that $f(u)$ equals zero while the individual is searching in the marriage market.

they could pay the bridewealth, which also leads to positive selection into marriage. But high ability men could well have a lower propensity to marry in the city today. It is easy to see how high ability Luo men in the city might have a lower propensity to marry, to avoid being inundated by requests for assistance from kin and affines with little benefit in return. If the tax on ability in the network-based economy is sufficiently severe - $G_u(\tau, u)$ is sufficiently negative - then the returns to ability in marriage could well be shallower than then returns to ability from being single.¹⁴ Consistent with such negative selection, we will later see that more educated migrants, who we would expect have higher ability, are significantly less likely to be married after controlling for age.

While high ability men might have a lower propensity to marry at any age, we noted above that almost all Luo men ultimately marry. We account for this stylized fact by allowing the (future) value from children, and hence the value from marriage, to grow as the individual ages; $G_\tau(\tau, u) > 0$, which implies $h_\tau(u, \tau) > 0$. As the h function shifts up, it is easy to verify that the cutoff ability u^* shifts up with it; $u_\tau^*(\tau) > 0$. Thus the proportion of married men in the population is increasing with age. But at any age, married men continue to have lower ability than single men.¹⁵

The discussion up to this point has ignored the delay associated with matching in the marriage market. Individuals will anticipate this delay, which we suggested will be greater for low types, in order to marry at the age that is appropriate for them. If there are no costs to entering the marriage market, then the differential delays (by ability) that we derived in the second stage equilibrium will wash out completely. The same argument also tells us that relatedness could have no effect on marriage prevalence if individuals adjust their time of entry into the marriage market.

There are two reasons why we expect relatedness to continue to determine marital status, even when entry into the marriage market is endogenous. First, many of the responsibilities and the obligations associated with marriage appear as soon as the individual enters the marriage market. As van de Walle and Meekers (1994:57) explain, “African marriage is often a process with a varying

¹⁴The network could in principle make a lump sum transfer to the high ability individual (effectively a dowry) to compensate him for the services and transfers that he will subsequently provide. But in a decentralized equilibrium it is not obvious who would coordinate these transfers, and liquidity constraints could prevent a lump sum payment in any case.

¹⁵Note that the stationarity of the ability distribution in the marriage market, which we require to derive the second-stage matching equilibrium, is unaffected by the fact that individuals of different ability enter the marriage market at different ages. All that we need is that the underlying population distribution be stationary. By the same reasoning, differential exit by ability will not affect the stationarity of the distribution at the beginning of each period. For example, suppose that we begin with 100 low types and 100 high types in the marriage market in period 0, and suppose that 25 low types and 50 high types enter the market at the beginning of each subsequent period. If the probability of exit is 0.25 for the low types and 0.50 for the high types, then it is easy to verify that a stationary (and uniform) ability distribution in this marriage market is obtained.

number of potential stages, from the beginning of courting to the customarily sanctioned wedding, through periods where sexual relations are allowed, and periods of full cohabitation. Payment of bridewealth may also occur in stages. If all goes right, subsequent stages confirm the legitimacy of earlier ones ... but if the couple drift apart, the marriage, retrospectively, has never taken place.” This tells us that the prospective groom must often incur substantial costs long before he marries. The prospective groom must also start to behave more responsibly, and his obligations to the community, particularly to the *jagams* that are searching on his behalf, will increase immediately. While there might be some adjustment in the time of entry, these costs to entering the marriage market imply that this adjustment will not be complete. Second, the very lowest ability individuals who enter the marriage market as soon as they reach adulthood cannot move their entry time forward. Later we will empirically verify that relatedness does indeed affect marriage prevalence, both in rural Nyanza Province as well as in urban Kisumu.

To summarize the discussion this far, the selection bias that creates problems for consistent estimation of the marriage effect is seen to arise at the first (entry) stage of the model. While higher ability individuals might match faster in the marriage market, we would expect the delayed entry by such individuals to dominate, particularly since the frictions in the marriage market can be adjusted for to some extent. In contrast, the instrument that we propose to correct the selection bias affects marital status in the second (matching) stage of the model.

3.4 Identifying Marriage Effects

Our basic objective in the empirical analysis will be to estimate the effect of marriage on sexual activity, labor market outcomes, and remittances. These outcomes will in general depend on observed and unobserved individual characteristics, as well as marital status, so we will estimate regressions of the form

$$y_i = \alpha M_i + X_i \beta + s(u_i) \tag{1}$$

where y_i is the outcome of interest for individual i , $M_i = 1$ if the individual is married and $M_i = 0$ otherwise. X_i is a vector of observed individual characteristics, which is restricted to the individual’s age and a region dummy in the regressions that we report. Age affects the individual’s sexual activity as well as his labor market outcomes. It is also important to control for regional differences, since South Nyanza is relatively isolated and has preserved many more aspects of traditional Luo culture.

Finally, $s(u_i)$ measures the effect of the individual's unobserved ability u_i ; $s'(u_i) > 0$. The idea here is that high ability individuals are endowed with traits such as confidence, entrepreneurship, initiative, and intelligence, that lead to superior labor market outcomes as well as to greater success in the market for non-marital sexual partners. We take it that individuals participate in both these markets at every age.

Following the discussion in the previous section, the probability of being married is decreasing in relatedness and unobserved ability u_i , at any given age. Individuals are more likely to enter the marriage market as they get older, and the probability that the individual will match successfully once he does enter the market does not vary from one period to the next, so the probability of being married must grow with age. Further, the regional differences noted above will affect marriage patterns as well. In the discussion that follows, we collect these observed determinants of marriage in a vector Z_i , that includes all the variables in X_i as well as relatedness. It will also be convenient to ignore the uncertainty associated with the search process and treat marriage as a deterministic outcome

$$\begin{aligned} M_i &= 1 && \text{if } Z_i\gamma - u_i \geq 0 \\ M_i &= 0 && \text{if } Z_i\gamma - u_i < 0. \end{aligned} \tag{2}$$

Notice that M_i is negatively correlated with u_i , which would be the case with negative selection into marriage. This tells us immediately that the OLS estimate of the marriage effect in equation (1) will be biased downward, since M_i and the unobserved $s(u_i)$ are negatively correlated.

A standard solution to such selectivity bias applies a two-step estimator, which essentially introduces a consistent estimate of $s(u_i)$ in equation (1). When u_i is normally distributed, it is well known that a consistent estimate of the marriage effect is obtained by replacing M_i with $\Phi(Z_i\gamma)$, the predicted value from a first stage probit regression (Madalla 1983). But this estimator only provides consistent estimates if the distributional assumptions on u_i are correct. A more robust estimation strategy utilizes the predicted value from a first stage marriage regression, using either the probit or the linear probability model, as an *instrument* for M_i in equation (1) (Angrist 2001).¹⁶ We prefer

¹⁶Under the set up of the model, a fixed effects estimator using repeated observations on y_i , M_i over time would allow us to difference out the $s(u_i)$ term in equation (1). But the assumption that individual ability u_i is constant over time is made for convenience, and is unlikely to be satisfied in practice. What we would expect to see instead is that shocks to ability (unexpected exogenous opportunities) determine entry into marriage as well as changes in the outcomes of interest. The fixed effects estimator no longer provides consistent estimates of the marriage effect once we allow for such shocks. For example, a negative shock could induce entry into marriage, to take advantage of the support that the network provides, while simultaneously reducing non-marital sexual activity. A spurious marriage effect would continue

to use the probit model to construct this instrument for the regressions that we report in this paper because it provides more precise estimates, consistent with Heckman's (1978) conjecture.

Equation (1) specifies that the marriage effect α does not vary by ability. But we could easily imagine, following the earlier discussion, that low ability individuals benefit more from the network, and hence from marriage. We see in the Appendix that the response in the probability of marriage $\lambda(W_{n-1} - W_n)$ to relatedness λ is a function of block size Δ_n . Since Δ_n varies with n , and hence with ability, the response to the relatedness instrument will vary by ability. If the marriage effect varies by ability as well, then the OLS and the instrumental variable estimates are not directly comparable.

Partly in response to the preceding comment we propose an alternative estimation strategy in this paper, which uses marriage prevalence, measured as the expectation of individual marital status in the traditional location $E_i(M_i)$, as an instrument for marital status. This estimator clearly avoids the bias associated with selective marriage *within* the traditional location. It also provides the marriage effect for the individual with average ability in the traditional location, just like the OLS estimate. But since we are now identified from variation in marriage prevalence *across* locations, we must make the (strong) identifying assumption that mean ability, which is correlated with the aggregate marriage statistic, does not vary across locations. If it does, then the aggregate marriage instrument will be correlated with each individual's unobserved ability in equation (1). In contrast, mean ability is allowed to vary across traditional locations when relatedness is used as the instrument. The weaker identifying assumption in this case is that relatedness should be uncorrelated with mean ability in the location.

Ogot (1967:153) tells us that the initial settlement of Nyanza by the Luo "was not a united invasion, planned and executed deliberately. The whole operation was diversified, irregular and unorganized." From our knowledge of the cultural history of individual locations, it also appears that clan configurations and the patterns of relatedness were put in place very soon after the Luo arrived in an area, often within a couple of generations (Ayot 1979). Once these patterns had crystallized, there appears to have been little subsequent alteration over the centuries. This suggests that historical accident when the Luo first arrived might have played a role in determining the relatedness patterns that we see today. But at the same time it is possible that local conditions, such as climate and soil type, as well as the ability distribution among the arriving settlers, gave rise to particular local relatedness

to be obtained in that case. Note that our instrumental variable estimates are unaffected by such shocks since patterns of relatedness were determined long ago and are in any case uncorrelated with idiosyncratic changes in ability.

patterns.

In Lévi-Strauss' (1969) view, endogamy restricts marriage within a narrow social group, such as the caste, to strengthen network ties. In contrast, exogamy exploits gains from trade and risk diversification by spreading network ties. Extending this view, the different levels of relatedness that we observe across Nyanza Province could in principle have arisen as an optimal local response to the trade-off between network enforcement and the gains from trade, at the time when the Luo first settled in the area. Individuals in areas with high relatedness will in general travel further to find a wife, which effectively increases the level of exogamy. Thus we would expect to see high relatedness in areas where the gains from exchange dominated the gains from network enforcement.

The trade-off that we just described would in general depend on local economic conditions, such as the level of risk, as well as the distribution of ability in the population.¹⁷ While initial differences in ability may have disappeared over multiple generations, some local conditions such as climate and soil type are relatively permanent. These local conditions could have determined the patterns of relatedness as noted above, and they could also determine the nature of local economic institutions, the individual's incentive to invest in education, the distribution of wealth, and other characteristics of the local economy today. Relatedness is correlated with unobserved determinants of the migrant's outcomes in the city in that case, to the extent that conditions at the origin determine the migrant's outcomes at the destination, and is no longer a valid instrument. Later in Section 4 we will verify that relatedness is uncorrelated with observed individual characteristics that are associated with ability or conditions at the origin, such as the migrant's inherited wealth and education, as well as demographic structure, measured by the size of the family.

We noted earlier that the relatedness instrument only has bite in Kisumu if the migrants continue to find their partners at home. Partitioning the sample into "early" migrants, who arrived in Kisumu before age 21, and "late" migrants who arrived after that age, we find not surprisingly that relatedness only affects marital status among the late migrants. Consequently, almost all the regressions that we report in this paper restrict attention to late migrants.¹⁸ As a supplementary validation test of the relatedness instrument, we will study the effect of relatedness on labor market outcomes and remittances, separately for early and late migrants. Relatedness has a strong effect on these economic

¹⁷For example, we could imagine that the potential for default would matter more in a location that was settled by less reliable individuals, leading in turn to higher levels of endogamy (lower relatedness).

¹⁸Truncating the sample with a choice variable does not introduce an additional source of bias in this application because relatedness is uncorrelated with the arrival age, and with the level of migration across traditional locations more generally.

outcomes for late migrants; this reduced form result is consistent with the corresponding instrumental variable estimates that report a strong marriage effect. In contrast, relatedness has no effect on economic outcomes for the early migrants. This useful result rules out the possibility that relatedness simply proxies for unobserved economic conditions at the origin, or individual characteristics that are common to migrants from the same origin location, that independently determine outcomes in the city. Relatedness appears to affect those outcomes exclusively through its effect on marital status.

4 The Empirical Analysis

Most of the analysis in this paper uses data from a survey of Luo migrants that we conducted in Kisumu. This section begins with a brief discussion on the survey design and the collection of the data. Subsequently we present descriptive statistics and the regression results.

4.1 The Data

We use two sources of data in this paper: a 5% random sample of Luo men residing in rural Nyanza Province from the 1989 Kenyan census, and information on 2,300 male Luo migrants collected from a survey of Luo men that we conducted in Kisumu in July-August 2001. The survey data will be used for most of the analysis, so we begin with a description of the data collection.

Kisumu town is divided into 13 sub-locations, which are further divided into Enumeration Areas (EAs) by the Central Statistics Bureau of Kenya. Leaving aside EAs with almost no Luos and a few rural areas at the outskirts of the town which attract almost no migrants, we were left with 442 EAs to serve as the sampling frame. Eligible respondents were identified as Luo men, 21-45 years old, who had migrated to Kisumu after birth. All eligible respondents in a selected EA were interviewed. EAs were drawn randomly (without replacement) from the list of 442 EAs, until we had reached the targeted sample size.¹⁹

Before turning to a detailed description of the data we present a preliminary plot of marriage prevalence and divorce rates, over the 21 to 45 age range, using both the rural census data as well as the urban Kisumu data in Figure 2. The 1989 census provides information on current marital status for each individual. With the Kisumu data we can determine in addition whether a migrant had ever

¹⁹Both migrants and locals (those born in Kisumu) were interviewed in the first 25 EAs that we selected. Subsequently, only migrants were interviewed in the remaining 76 EAs that were covered. Information on the local men will be used for analysis that is unrelated to the topic of this paper, so the discussion that follows will focus exclusively on the 2,300 migrants.

been divorced or separated, since a complete marital history was collected from each respondent.

Insert Figure 2 here.

Marriage rates in Kisumu and rural Nyanza Province track very closely from age 21 to 30. But marital prevalence among the migrants continues to grow for nearly a decade thereafter, whereas it flattens out around age 30 in the rural sample.

We also see in Figure 2 that very few individuals (less than 2 percent of the population) are currently divorced/separated in both the urban and the rural samples, and there does not appear to be an appreciable age trend in this statistic. But notice that the proportion of ever divorced/separated migrants is significantly higher than the corresponding statistic for currently divorced/separated migrants, which tells us that remarriage must be common, at least in the city.

Later in Section 4.3 we will describe the relationship between relatedness and marital status. While not reported, a strong negative relationship between these variables is obtained with the rural census data for men aged 21-30, but this relationship weakens substantially for men aged 31-45. In contrast, the relatedness-marriage relationship continues to be sustained over the entire 21-45 age range among the urban migrants.

The rural patterns just described are consistent with the model laid out in Section 3, which predicts a decline in the relatedness effect with age for two reasons. First, lower ability individuals who enter the marriage market as soon as they reach adulthood cannot adjust their time of entry to account for differences in relatedness, and hence the expected delay in finding a partner, across locations. The relatedness effect will hence be stronger for lower ability individuals, and hence at lower ages. Second, fewer individuals are left to marry at older ages, which mechanically reduces the role that relatedness plays in determining marriage prevalence.

The persistence of the relatedness effect in the city can be explained, in part, by the gap between the proportion of ever divorced/separated individuals and currently divorced/separated individuals in Figure 2, which implies that many migrants will re-enter the marriage market at older ages.²⁰ Recall also that marriage prevalence grows until nearly age 40 in the city in the Figure, which might be because single migrants enter the marriage market over a wider age range. Even if the relatedness effect weakens at older ages, this observation suggests that this effect will persist longer in the city.

²⁰In a polygynous society, currently married men will also enter the market at older ages, providing a continuing role for the relatedness instrument. But the prevalence of polygyny has declined dramatically in recent decades, and we would not expect polygyny to be more common in the city in any case.

This discussion motivates the use of the full 21-45 age range for most of the regressions that we report in this paper, as well as for the descriptive statistics that follow.

4.2 Descriptive Statistics

The discussion in this section begins by describing the individual background of the migrants in the Kisumu sample. Next we study their ties to the community, which must be strong if relatedness is to affect marriage in the city. Subsequently we study the organization of the marriage institution, before concluding with a comparison of sexual activity between currently married and single men.

Once the individual is in the city, most women that he meets will belong to a different origin location and will therefore be unrelated to him. Relatedness and marriage will only be linked to the extent that migrants find their wives at home. And, not surprisingly, the relationship between relatedness and marital status is indeed stronger for individuals who move to Kisumu at a later age. We would like to rule out any possibility that the absence of a link between marriage and sexual activity that we find later arises because relatedness is a weak instrument. Much of the empirical analysis will consequently restrict attention to the “late” migrants; recall that these are individuals who arrived in Kisumu after the age of 20. The descriptive statistics that follow will thus compare currently married and single men, separately for the early and the late migrants.

The descriptive statistics that we report do not control for the individual’s age (married men tend to be older) or for selection into the marriage institution. And we will see later that not all the differences between married and single men that we see below hold up to more careful scrutiny.

4.2.1 Individual Background

We begin in Table 1, Panel A, with the individual’s characteristics. Married men are obviously older than single men, and late migrants tend to be older than early migrants, which is not surprising since they have older arrival ages by construction. Education levels are fairly high, around 10 years of schooling, for all groups of migrants.

Insert Table 1 here.

Notice, however, that married men have significantly lower schooling than single men. If low ability individuals marry early, then married men will tend to have lower ability on average than single men over the 21-45 year age range that we consider here. Ability in this paper covers a wide range of

unobserved traits, one of which is intelligence, which in turn will determine the individual's education level. The difference in education levels that we observe could in that case be generated by selection into the marriage institution. Alternatively, if education levels have been increasing over time, then differences in education between married and single men could arise simply because married men are older. Regressions that we report later that control for the individual's age continue to provide a negative and significant correlation between marital status and education.

Turning to labor market outcomes, married men work for roughly three more months in the year, and are 20 percent more likely to be employed. Consistent with this observation, married men earn on average 25-35 thousand Kenyan shillings more than unmarried men (all these differences are statistically significant).²¹ The instrumental variable estimates of the marriage effect that we report later control for the individual's age as well as for selection into marriage, providing us with results that are qualitatively similar to what we see in Table 1.

We complete the description of the individual's background by studying migration patterns among the survey respondents in Table 1, Panel B. Late migrants have obviously spent less time in Kisumu than early migrants. And among both groups of migrants, married men have spent significantly more time in the city than single men, presumably because they are older. While it has been quite a few years on average since all these groups arrived in Kisumu, a very large proportion of the migrants (over 80 percent) report that they have resided continuously in Kisumu since the time they arrived. Migration does not appear to be seasonal, or recurrent, as it is in many parts of the developing world. Consistent with this observation, the wives of migrants (even the late migrants) are likely to cohabit with their husbands, and spend nine months of the year on average with them in Kisumu.

4.2.2 Connection to the Community

We noted earlier that the link between relatedness and marriage among the migrants could only be sustained if they continued to maintain close ties to their origin community and found their wives at home. Our characterization of the marriage institution in sub-Saharan Africa also ties married men more closely to family networks.

To verify that such community connections are indeed maintained, particularly among the married men, we begin by studying the pattern of home visits among the migrants in our sample in Table 2,

²¹We divided the 63 occupations reported by the migrants in our sample into four job categories: unskilled manual, skilled manual, business, and professional/white collar. The mean income in thousands of Kenyan shillings, with standard deviations in parentheses, for these four categories, is 43.68 (38.70), 71.32 (55.11), 74.02 (89.11), 116.20 (106.25).

Panel A. A sizeable proportion of the migrants visited their rural homes at least a few times per month over the last year, with the frequency of these visits being substantially higher among the married men. Late migrants also appear to visit more often than early migrants, suggesting that they have stronger ties to their home communities and will follow traditional marriage patterns more closely.

Insert Table 2 here.

Turning to remittances in Table 2, Panel B, most of the transfers seem to flow to the migrant's family, which includes the extended family, rather than to the home community more generally. This might be because patterns of exogamous marriage build ties between families belonging to different clans, rather than within the same clan. Remittances to the family are as high as 28 percent of the migrant's income, which is in line with other studies from sub-Saharan Africa which report remittances varying from 15 percent (Findley 1997) to 60 percent (Adepoju and Mbugua 1997) of the total income. Once more, married men remit significantly more than single men. Later we will see that this difference between married and single men holds up even when we control for the individual's age and selection into marriage with the relatedness instrument.

Apart from the family networks that each individual has access to, Luo men may also join community associations in most Kenyan cities. These associations were established as early as the 1920's, and are typically organized at the level of the clan, or the traditional location (Parkin 1978). They serve many of the same functions as the family networks: finding marriage partners, jobs, and housing for their members, and in general providing economic and social support. Turning to Table 2, Panel C, we see that both early and late migrants contribute to these associations and attend their meetings. The individuals in our sample, particularly the married men, are clearly very closely tied to the origin community.

4.2.3 The Marriage Institution

An important requirement for successful implementation of the instrumental variable procedure is that migrants in the city should continue to follow the traditional rules of marriage. In the discussion that follows we will provide evidence that migrants continue to marry at home, and that the traditional organization of the marriage institution continues to be maintained.

We begin by studying the basic marriage patterns among the migrants in Table 3, Panel A. 72 percent of the late migrants and 54 percent of the early migrants are currently married. Marriage

prevalence among the late migrants is actually very similar to the corresponding statistic from rural Nyanza Province, for men between 21 and 45, of 70 percent in 1989. 15 percent of the migrants have been married more than once, which suggests a high level of divorce, separation, and/or polygyny. Indeed we see that 9 percent of the migrants have been ever divorced/separated, although only 2 percent are currently divorced/separated. Further, 6 percent of currently married migrants are polygynous, which is only slightly lower than the corresponding figure of 9 percent obtained from the 1989 census.²² With the exception of current divorce/separation and polygyny, all the statistics in Panel A are significantly different for early and late migrants at the 5 percent level.

Insert Table 3 here.

Next, we study the role of the home community in organizing marriage among the migrants. We see in Table 3, Panel B, that a substantial proportion of migrants met their wives in their rural homes, particularly among the late migrants. Continuing further in Panel B we see that this is because late migrants are more likely to have married before they left, and to have used a *jagam* (matchmaker) to find a wife. Early and late migrants have similar backgrounds and connections to the community in Table 1 and Table 2. But late migrants are much more closely tied to their home communities when it comes to marriage, in Table 3. Recall from Table 2, Panel A, that late migrants visit home more frequently, which also increases the probability that they will independently find an acceptable match in the rural area. All of these statistics, taken together, tell us that relatedness should affect marriage more strongly among the late migrants, and later we will verify that this is indeed the case.

Looking finally at the marriage rites, we see in Table 3, Panel C, that over 80 percent of the migrants married in traditional Luo fashion (in contrast to a religious or legal wedding), despite the fact that most are Christian. A large proportion also paid some bridewealth, which was traditionally supposed to legitimate the union. Given that the migrants follow the traditional marriage rituals so faithfully, we certainly expect that they would adhere to the rules of relatedness as well. Over 90 percent of the married respondents reported that they actively checked that their wives were from unrelated clans.²³

²²Polygyny has declined very sharply over time among the Luo. While only 6 percent of the migrants currently have more than one wife, 48 percent of their fathers were polygynous.

²³This statistic most likely understates the extent to which the Luo follow the rule of marital exogamy. Many of the 10 percent who reported that they did not check their wife's relatedness status met their wife in town, and probably knew from her traditional location that they could not possibly be related.

4.2.4 Sexual Activity

We conclude our description of the data by looking at sexual activity among the migrants. Female partners among the Luo can be broadly divided into four categories: wives, *jodiya* (long-term girlfriends), casual partners, and commercial sex workers. The individual will often have multiple *jodiya*, from among whom he may ultimately choose a wife. Our first choice variable, which is also relevant for the spread of HIV/AIDS, will be the number of non-marital sexual partners in the past year. Our second choice variable measures the proportion of risky partners. This statistic is computed using the respondent's last five non-marital partnerships, with risky partners defined to include casual partners and commercial sex workers.²⁴

Under-reporting of non-marital activity is clearly a cause for concern, and the questionnaire was designed to avoid this problem by leading gradually to the section on sexual activity. The interviewers were also specially trained to ask these sensitive questions in a manner that would elicit accurate responses, and to probe (without leading) when the respondent appeared to be reluctant to reveal the full extent of his sexual activity.

As a check on the quality of the data we computed the probability of having a risky partner in two different ways. First, the questionnaire elicited information on the number of non-marital partners and the number of *jodiya* in the past year. The difference between these two statistics allows us to construct a dummy variable for the presence of any risky partners at all. Our second approach uses a different question, on the frequency of encounters with risky partners, to once more construct a dummy variable for the presence of risky partners in the past year. The correlation between the two binary variables is 0.97, which at least verifies the internal consistency of the reported sexual activity, and in addition provides some support for the accuracy of the responses.²⁵

Starting with the first measure of sexual activity in Table 4, we see that single men had approximately two non-marital partners on average in the past year, while married men had one. These differences are statistically significant and are roughly the same for early and late migrants.

Insert Table 4 here.

²⁴One way to assess the riskiness of a partner would be to compute the probability of using a condom with that partner, since we would expect condom use to be positively correlated with riskiness in equilibrium. Among all the partnerships reported in our sample, condoms were used 61 percent of the time with casual partners, 80 percent of the time with commercial sex workers, and 42 percent of the time with *jodiya*.

²⁵As an independent check, the survey supervisors re-visited four percent of the respondents and collected information on the total number of sexual partners in the past year. 96 percent of these selected respondents reported exactly the same number as they had earlier in the survey.

At this stage of the analysis, there are essentially four reasons why married men have fewer non-marital partners than single men. First, married men already have one permanent partner, and so may have a physiological need for fewer outside partners. However, we take it that individuals have a strong preference for variety. The individual will always add another partner at the margin, if one is available, adjusting the sexual activity and expenses that he incurs with his other partners. The constraint on the number of partners is entirely supply-based in this case, with higher ability (more attractive) individuals having greater access to partners.²⁶

The second explanation for the lower number of non-marital partners among the married men is based on social norms restricting male extra-marital relationships. We have already argued in Section 2 that traditional African culture was not associated with such norms for historical reasons, but the advent of Christianity in the twentieth century could have altered the structure of the marriage institution.

The third explanation is simply an age effect; older men have fewer partners and are more likely to be married. Finally, the fourth explanation is based on selection into the marriage institution. Low ability individuals are more likely to marry, and would attract fewer partners in any case, generating a spurious negative correlation between marriage and sexual activity. The instrumental variable regression results that we present later will provide strong support for this last explanation of the patterns in Table 4.

Continuing with the description of sexual activity, we next report the proportion of men who had a non-marital partner in the past year in Table 4. This is followed by the proportion who had four or more partners in the past year. Sexual activity among single migrants is very similar to what we would expect to see in the United States. 84 percent of single Luo men had at least one partner in the past year, and 15 percent had four or more partners. The corresponding statistics for single (never married) men in the United States, drawn from the 1991 National Survey of Men (Bill et al. 1993), are 90 percent and 18 percent. The major difference between the two groups of men is in the prevalence of extra-marital activity among married men; 44 percent of married migrants report such activity in the past year, whereas the corresponding U.S. statistic is less than 5 percent.²⁷

²⁶Even if there is a financial constraint on the number of partners, we would expect this constraint to have less bite for the high ability individuals, who would have higher incomes.

²⁷Our estimates of non-marital sexual activity are also similar to those reported elsewhere in Africa. For example, a 1989-90 study of sexual activity conducted in the Ekiti district of Southwest Nigeria found that 75 percent of single males and 50 percent of married males had participated in non-marital sexual relations during the previous year (Orubuloye et al. 1991).

Finally we compare the proportion of risky partners among single and married men in Table 4. We find that married men report a significantly higher proportion of risky partners, which is contrary to what we would expect if norms regulating extra-marital sexual activity were in place. But these patterns in the data could arise if lower ability individuals were forced to match with casual partners and commercial sex workers in the sexual market, and such individuals were also (independently) more likely to be married. Consistent with this last explanation, we will see that the link between marital status and riskiness disappears when we control for selection into marriage.

4.3 Regression Results

We saw in the previous section that marriage has a strong effect on sexual activity and labor market outcomes. We now proceed to subject these relationships to more careful scrutiny. The regression analysis controls for the individual's age, which is correlated with marriage and could independently determine the outcomes of interest. The age effect is captured by a young-age dummy, with the cut off at 30 years, which corresponds to the median age in the regression sample. Looking back at Figure 1 notice that relatedness tends to be higher in South Nyanza. This region is situated far from the urban center, Kisumu, and has historically been relatively isolated. A South Nyanza dummy is thus also included in all the regressions in this paper, to ensure that the relatedness instrument does not proxy for unobserved regional effects. Finally, we also account for selection into the marriage institution by instrumenting for marital status. We will see that not all the differences between married and single men reported earlier hold up to more stringent testing.

4.3.1 Validating the Relatedness Instrument

Our instrumental variable strategy is valid if relatedness is uncorrelated with individual ability, broadly defined, which independently determines marital status, non-marital sexual activity, and labor market outcomes. For this we must rely on the idea that relatedness patterns were determined partly by historical accident, and that any economic motivation for the relatedness pattern in any given location when it was first put in place is no longer relevant, particularly in the city. Relatedness continues to determine marriage patterns, due to the inflexibility of social rules, but does not directly determine the other individual outcomes listed above.

To provide some support for this view, we verify that relatedness is uncorrelated with observed characteristics that are associated with the individual's ability, such as education, family size, and

inherited wealth among the migrants in Kisumu, in Table 5. The regressions in Table 5, and all the regressions that follow, include the individual's age and a South Nyanza region dummy as controls.

Including all the migrants in the sample in Table 5, Columns 1-3, we see that relatedness has no effect on the migrant's years of schooling, the number of siblings, or the amount of land that he inherits from his father.²⁸ Note that the relatedness effect in these regressions is both statistically and economically insignificant. The relatedness variable takes values from one to ten in our data. The point estimate in Column 1 tells us that variation in relatedness, over its entire range, would translate into a corresponding variation in schooling of less than half a year. Relatedness can similarly explain little of the variation in family size or inherited land. In contrast, age, which can be interpreted as a cohort effect in these regressions, is negatively correlated with education, while the sign of the relationship is reversed for family size and inherited land.²⁹

Inert Figure 5 here.

4.3.2 Relatedness and Migration

In general the migration decision depends on the individual's ability, conditions at the origin, and opportunities at the destination. Thus the individual's expected ability, conditional on migration, will be a function of conditions at the origin and opportunities at the destination. If relatedness is correlated with conditions at the origin that determine the migration decision, then ability in the city will be correlated with relatedness even if it is orthogonal to the ability distribution in the rural location.

The preceding results, demonstrating that relatedness is uncorrelated with schooling, family size, and inherited wealth, are particularly useful since they are obtained with a sample of migrants in the city. But these results are based on a limited number of observed characteristics. More generally we would like to establish that the level of migration is uncorrelated with relatedness, as a necessary condition for relatedness to be orthogonal to the ability distribution in the city.

We verify that migration does not depend on relatedness by merging the 1989 Kenyan census data

²⁸Inherited land effectively measures average landholdings in the location, which is determined by the quality of the soil, the production technology, and the nature of institutions in the local economy. The absence of any relationship between inherited land and relatedness thus allows us to indirectly verify that relatedness is uncorrelated with a wide range of economic conditions at the origin.

²⁹As a robustness check we verified that relatedness is uncorrelated with education and wealth in rural Nyanza Province as well, using the 1989 census data. We use roof material as the measure of wealth in these regressions. This measure takes a value of one if the roof is constructed with iron, tile, concrete, or asbestos, zero if it is thatched.

with the 2001 Kisumu survey data. As noted, the individual's age in all the regressions that we report in this paper is represented by a dummy variable that takes on a value of one if he is 30 years or younger, zero otherwise. The number of migrants in Kisumu from a given location, for each of the two age categories, divided by the total population of that location and age category in rural Nyanza Province provides us with a measure of the level of migration for that age category-location. South Nyanza lies further away from Kisumu than Central Nyanza, and while South Nyanza accounts for 40 percent of the rural Luo population of Nyanza Province, migrants from that region comprise only 25 percent of the urban sample. Controlling for this regional effect with the South Nyanza dummy (which is negative and significant), we see that relatedness has no effect on migration in Table 5, Column 4. The coefficient on the (young) age dummy is positive and significant, which tells us that younger men dominate in the population of migrants.

Many of the regressions that we report in this paper will restrict attention to late migrants, who arrived in Kisumu after age 20. We consequently go through the same exercise that we described above to verify that levels of late migration are uncorrelated with relatedness. Late migration is measured by the number of migrants in the sample who arrived after age 20 divided by the rural population for the corresponding age category-location. We see in Table 5, Column 5, that the same patterns that we obtained with all the migrants in Column 4 continue to be obtained with the late migrants; in particular, the relatedness effect is completely absent. In a related exercise we regress the age at arrival of the migrants in the Kisumu sample on relatedness, age, and the South Nyanza dummy in Table 5, Column 6. The age at arrival and the migrant's current age are mechanically positively correlated. But the relatedness effect is completely absent, justifying our use of the arrival age (with the cut off at 21 years) to truncate the sample in the regressions that follow.

Finally, when studying the effect of marriage on sexual activity in a migrant population, it is important to consider whether wives live in the city with their husbands. For example, suppose that locations with low relatedness are characterized by lower levels of cohabitation. Now the higher marriage prevalence in these locations could be counter-balanced by the lower cohabitation, erroneously suggesting that marriage effects are absent in the instrumental variable regressions. To rule out this possibility, we proceed to verify that relatedness is uncorrelated with cohabitation. Cohabitation, measured by the number of months in the year that the migrant's wife spends in the city, is regressed on the man's age, relatedness, and the South Nyanza region dummy in Table 5, Column 7. Relatedness has no effect on cohabitation.

4.3.3 Relatedness and Marriage

Once we have verified that relatedness has no effect on observed individual characteristics, migration, and cohabitation, the next step in the analysis is to establish the link between relatedness and marriage, which is the first stage of the instrumental variable regressions. Individuals in locations with mostly unrelated clans are more likely to meet an eligible partner (in terms of our model, λ is high), and we would therefore expect to see a negative correlation between relatedness and marriage prevalence under reasonable conditions, from Proposition 2 in Section 3.2. We begin by verifying this relationship in rural Nyanza Province, using data from the 1989 Kenyan census, in Table 6, Column 1.

Restricting attention to Luo men between 21 and 45 residing in rural Nyanza Province, we see using the 1989 census data that the probability of being currently married is negatively correlated with relatedness as expected. Younger men are significantly less likely to be married, which is consistent with the marriage model that we laid out in Section 3. Finally, notice the higher marriage prevalence in South Nyanza, which might arise because this region is more isolated and rural than the rest of Nyanza Province.

While the results just reported from rural Nyanza Province are reassuring, we must still verify that relatedness affects marital status in the city. The marriage regression in Table 6, Column 2, uses late migrants (those who arrived after age 20) only. We saw earlier in Table 3 that these migrants are more likely to marry women from the rural area, and we know that relatedness will only have bite in the city among migrants who find their wives at home. The regression estimates with the late migrants are very similar to what we obtained with the rural sample earlier. The relatedness coefficient, in particular, continues to be negative and is very precisely estimated.

We saw in Table 5 that relatedness is uncorrelated with education. The relatedness coefficient is, as expected, completely unaffected by the inclusion of years of schooling as an additional regressor in Table 6, Column 3. But we note that education significantly lowers the propensity to marry; one extra year of schooling lowers the probability of marriage by one percentage point. Education is a good proxy for individual ability, so this result provides direct empirical support for the view that higher ability individuals are less likely to marry in this economy.³⁰

As noted earlier, we use a conservative arrival age cut off in the regression analysis to reduce the

³⁰An alternative interpretation of this result is that individuals delay entry into the labor market and the marriage market to complete their schooling. But we verify that the same result is obtained when the age range is restricted to 25-45 years; very few individuals study beyond the age of 25 in this economy.

possibility that the absence of a link between marriage and sexual activity arises because relatedness is a weak instrument. A strong relatedness effect in Columns 2-3 would be obtained if we lowered the cut off for the arrival age from 21 to 18 years, but the relatedness effect is much weaker and statistically insignificant for younger arrival ages. This is apparent in Column 4, which includes the full sample of migrants, with a late arrival dummy and relatedness interacted with late arrival as additional regressors. The relatedness coefficient, which now measures the effect for early arrivals, is very small and statistically insignificant. The relatedness-late arrival coefficient, which in that case effectively measures the relatedness effect for late arrivals, is not surprisingly similar in magnitude to what we obtained in Columns 2-3. Relatedness affects marital status for late migrants only, and we will take advantage of this observation later to provide additional validation for the relatedness instrument.

Next, we report linear probability estimates of the marriage regression in Table 6, Column 5. Marriage and relatedness are negatively correlated with the linear probability model as well. While the estimated relatedness effect in Columns 1-4 is statistically significant, the linearity in Column 4 allows us to easily verify that this effect is economically significant as well. Relatedness varies from one to ten in the data, so variation along the entire range of values for this variable would translate into a corresponding variation in marriage prevalence of as much as 17 percentage points.

The results that we just described provide strong support for the negative relationship between relatedness and marriage. These results are also robust to alternative construction of the age variable. We experimented with cut offs at 27 years and 35 years to divide the sample of migrants into three equal groups, as well as with age as a continuous variable, without affecting the estimated relatedness coefficient.³¹ We next proceed to present supplemental evidence that supports the mechanism underlying this relationship; specifically that high relatedness restricts the individual's marital options, forcing him to match later on average. In particular, we will show that individual matching strategies, as well as other aspects of marriage, respond to underlying variation in relatedness.

The probability of marrying a woman in the city is the product of two probabilities: the probability of being single on arrival and the probability of marrying a woman in the city conditional on being single on arrival. Marriage prevalence is in general lower in high relatedness locations, and relatedness is uncorrelated with the age at migration, so it must be that individuals from such locations are more

³¹All of the results that we report in this paper are unaffected by these alternative methods of constructing the age variable, except that the precision of the age effects declines.

likely to be single when they arrive in the city. Among single men in the city, those belonging to high relatedness locations are more likely to find a partner there, since their options at home are limited. The two effects just described work in the same direction, suggesting that individuals from high relatedness locations should be more likely to marry a woman from the city.

We begin by verifying that individuals from high relatedness locations are less likely to marry before they migrate. The probability of being married before arrival is negatively correlated with relatedness, as expected, in Table 6, Column 6. Individuals from high relatedness locations are also less likely to have met their wives in the rural area in Table 6, Column 7, consistent with the preceding discussion, although the relatedness effect in these regressions is only significant at the 10% level.

We saw above that expanding the search for marital partners to the city is one way to reduce the constraints imposed by high relatedness. An alternative mechanism takes advantage of a matchmaker or *jagam*, and the marriage arrangement networks that are already in place in each community. We would expect that individuals have a greater propensity to turn to these arrangement networks when search costs are high, and indeed we see in Table 6, Column 8, that the probability of using a *jagam* is positively correlated with relatedness.³²

Apart from individual matching strategies, we would expect other aspects of marriage to respond to variation in relatedness across Nyanza Province. For example, polygyny was traditionally widely practiced among the Luo, and while the prevalence of this institution has declined over time, 7% of the currently married migrants in our sample are polygynous. If low relatedness improves the efficiency of the search technology, then we should also expect a higher prevalence of polygyny among currently married men from such locations. Relatedness is indeed negatively correlated with polygyny in Table 6, Column 9, with younger men less likely to be polygynous as expected. Notice that the South Nyanza dummy is positive and significant in this regression, consistent with the view that this relatively isolated region has retained many aspects of traditional Luo culture.

Finally, we turn to the link between divorce and relatedness. The simple model of marriage that we presented in Section 3 did not allow for the possibility of divorce. However, 13% of ever married migrants in our sample have been ever divorced or separated. The individual may be more likely to exit from a marriage when the possibility of (rapid) remarriage is higher, in which case relatedness

³²Single men at home search exclusively in their rural location, while single men in the city search both at home and in the city. For simplicity imagine that all individuals search in the city alone, but that individuals belonging to high relatedness locations will use a *jagam* to search at home. The arrangement network cannot fully compensate for the disadvantage of belonging to a high relatedness location, so all the implications for the timing of marriage and the location of the match discussed above follow through.

would be negatively correlated with divorce/separation as well. We see in Table 6, Column 10, that this is not the case. In fact, relatedness, age, and the South Nyanza dummy, all have absolutely no effect on divorce/separation. Such random (and relatively frequent) exit, which generates steady re-entry into the marriage market, may explain why relatedness continues to be negatively correlated with marital status in the Kisumu data, even among the older men.

4.3.4 Marriage and Sexual Activity

The preceding discussion provided strong support for the view that relatedness determines marital status among the migrants in Kisumu. We now proceed to estimate the effect of marriage on sexual activity, using relatedness as the instrument for marital status. The first step in this analysis will be to estimate OLS regressions of sexual activity on marriage. Subsequently we report the instrumental variable results that account for selection into marriage.

As noted earlier, we use two measures of sexual activity in this paper: the number of non-marital partners in the past year, and the proportion of risky non-marital partners. We begin with the number of partners in Table 7, Columns 1-4. The OLS regression in Column 1 makes essentially the same comparison between married and single men as the descriptive statistics presented earlier, except that we now control for the individual's age and the South Nyanza region effect. Sexual activity continues to decline significantly with marital status, while young men have more partners and the region effect is absent.

Insert Table 7 here.

We subsequently proceed to the reduced form regression in Table 7, Column 2, which replaces marital status with relatedness. We saw earlier that marriage is negatively correlated with relatedness (the point estimate with the Linear Probability model in Table 6, Column 5 is roughly -0.02) as well as the number of partners (the point estimate in Table 7, Column 1 is roughly -1.0). If the OLS estimates in Column 1 are unbiased, then we would expect to see a relatedness coefficient of roughly 0.02 in the reduced form regression. Instead, we obtain a point estimate of 0.003 in Column 2, which tells us that the OLS estimates of the marriage effect must be biased downwards substantially.³³ Not surprisingly, the instrumental variable regression in Column 3, which uses the predicted value from

³³No stigma is attached to non-marital relationships between members of related clans, or even the same clan, as long as these relationships do not lead to marriage. There is thus no reason for relatedness to have a direct effect on non-marital activity, and the sexual culture more generally, in the traditional location.

the probit marriage regression as the instrument for current marital status, shows absolutely no effect of marriage on the number of partners.

One potential concern with the instrumental variable results is that they apply to individuals who are particularly responsive to relatedness, and who will typically be endowed with ability that differs from the average ability in the population. An alternative estimation strategy uses marriage prevalence, computed by age category for each location, as the instrument for individual marital status. This strategy provides estimates that apply to the individual with average ability in his location, but we must now make the stronger identifying assumption that the ability distribution does not vary across locations. The estimates with this alternative approach, presented in Table 7, Column 4, are qualitatively similar to the instrumental variable results reported in Column 3.

Another concern with the results that we have just reported is that the standard errors on the marital status coefficient in the IV regressions are very large. But we can indirectly infer that marriage effects are absent by comparing the age effects, which are more precisely estimated, across the OLS, reduced form, and IV regressions. Notice that the young-age coefficient is fairly stable across Columns 2-4, and is larger than the corresponding OLS point estimate in Column 1. Age is correlated with marital status, and so selection bias in the OLS regression would affect this variable as well. However, the reduced form age coefficient should match the corresponding instrumental variable coefficient if marriage effects are absent, since age only has a direct effect on the number of partners in the reduced form regression in that case. This is once again what we see, comparing Column 2 with Columns 3-4.

All of the results just described are consistent with negative selection into marriage; marriage in the OLS regression simply proxies for unobserved individual ability, which tends to be lower for married men, but the marriage effect disappears or at least weakens substantially when we correct for selection. It is easy to see why high ability migrants, who independently obtain more non-marital partners, have a lower propensity to marry in a network-based economy - these individuals would end up providing jobs, housing, and other costly support to their affines, which they might want to avoid. Our earlier observation that educated men are less likely to be married, after controlling for age, is entirely consistent with such negative selection since we would expect education to be correlated with intelligence, which is one dimension of ability.

Replacing the number of non-marital partners with the proportion of risky non-marital partners in Table 7, Columns 5-8, we go through the same exercise described above, starting with the OLS estimates, followed by reduced form and instrumental variable estimates. The OLS estimates in

Column 5 that control for the individual's age and region effects match what we noted earlier with the descriptive statistics; marriage appears to increase the proportion of risky partners. But this effect disappears in the reduced form regression in Column 6 and when we instrument for marital status in Columns 7-8. Once again the difference between the OLS and the instrumental variable estimates can be attributed to selection into marriage, if lower ability individuals who are more likely to be married also independently match with riskier non-marital partners in equilibrium.

The results that we report in Table 7 are robust to alternative sample sizes and additional controls (not reported here). The relatedness effect remains strong even at older ages in the urban Kisumu data, allowing us to use the complete 21-45 age range in the empirical analysis. But marriage prevalence does begin to decline by age 35 in Figure 2. Restricting the age range to 21-35 years, marriage continues to have no effect on the number of non-marital partners and the proportion of risky partners. Our second robustness test includes the Euclidean distance from the traditional location to Kisumu as an additional control. We have noted that Central Nyanza, where Kisumu town is located, may have slight cultural differences from South Nyanza, which is more isolated and therefore more traditional. Since Central Nyanza also has lower levels of relatedness, as is visible in Figure 1, region dummies must be included to avoid the possibility that relatedness simply proxies for unobserved region effects. Once the South Nyanza (region) dummy is included, distance to Kisumu does not appear to be correlated with relatedness within either region. By including distance to Kisumu as an additional regressor we allow for such a possibility in any case, and verify that distance to Kisumu and marital status (as before) have no effect on sexual activity. Finally, we verified that our results are robust to alternative construction of the age variable, in three equal categories and as a continuous variable, and to alternative cut offs, higher and lower than 21 years, for the arrival age.

4.3.5 Marriage, Labor Market Outcomes and Remittances

While marriage may not regulate sexual activity in Kisumu, our network-based view of the marriage institution tells us that marital status should still have a positive effect on labor market outcomes (employment and income), as well as the individual's obligations, measured by the level of remittances. As before we begin with an OLS regression before turning to instrumental variable estimates that control for selection into marriage.

We saw in Table 1 that married men are employed on average for about three months longer in the year than single men. This difference holds up in the OLS regression in Table 8, Column 1, which

controls for the individual's age and the South Nyanza region effect. In contrast with the results on sexual activity, the marriage effect actually grows larger, and continues to be significant, when we instrument for marital status with the predicted value from the probit marriage regression in Table 8, Column 2. And a strong marriage effect continues to be obtained, although it is slightly less precisely estimated, when marriage prevalence is used as the instrument in Table 8, Column 3.

Insert Table 8 here.

Similar results are obtained when we replace employment with annual income (in logs) in Table 8, Columns 4-6 and subsequently by remittances (measured as the percent of annual income) in Columns 7-9. We saw in Table 1 that married men earn more than single men, and that married men remit a greater fraction of their income than single men in Table 2. These differences hold up in the corresponding OLS regressions in Column 4 and Column 7. And as before, the instrumental variable estimates of the marriage effect with relatedness as the instrument are substantially larger than the OLS estimates, while the estimates with marriage prevalence as the instrument lie somewhere in between.

The pattern of OLS and instrumental variable estimates that we observe in Table 8 is easily explained by our model of selective marriage. Individuals with lower ability, who perform poorly on the labor market and contribute less to the community, also have a greater propensity to marry. This selection into marriage biases the marriage effect downward across all the OLS regressions in Table 8. But we also know that individuals who respond to the relatedness instrument might be endowed with ability that differs from the average ability in the population; the OLS and IV estimates are not directly comparable in that case. Notice, however, that the estimates using marriage prevalence as the instrument continue to differ from the corresponding OLS estimates, although these differences are not as large as what we obtain when relatedness is used as the instrument. More importantly, strong marriage effects are consistently obtained in Table 8, regardless of the estimation strategy that is employed, in contrast with the results reported with sexual activity as the dependent variable.³⁴

As with the sexual activity regressions, we verified that our results are robust to alternative sample sizes and to additional controls (not reported here). The results in Table 8 are qualitatively unchanged when we restrict the age range to 21-35 years, and include distance to Kisumu as an additional control.

³⁴The potential non-comparability of the OLS and the IV estimates is not relevant for the sexual activity regressions that we reported earlier, since we would expect that marriage has no effect on sexual activity at all ability levels. Thus, the IV estimates apply to the entire ability distribution.

We also experimented with alternative construction of the age variable, in three equal categories and as a continuous variable, and with alternative cut offs for the arrival age, without changing the results.

Treating the OLS estimates in Table 8 as conservative estimates of the marriage effect, the role of the marriage institution in improving labor market outcomes in this economy is still substantial. After controlling for age and region effects, the single men in our sample work on average for eight months in the year and earn 54 thousand Kenyan shillings. Marriage increases the employment duration by three months and the annual income by 24 thousand Kenyan shillings.³⁵ These benefits are associated with increased social responsibility. After controlling for age and region effects, single men in our sample remit 18 percent of their annual income to their families. Marriage increases these remittances by seven percentage points.

4.3.6 Validating the Relatedness Instrument: Early versus Late Migrants

One concern with the relatedness instrument is that it is correlated with conditions at the origin that determine individual characteristics and access to resources, and which in turn determine sexual activity and labor market outcomes in the city. We showed earlier that relatedness is uncorrelated with observed individual characteristics such as education, inherited land, and family size. An alternative test to validate the relatedness instrument takes advantage of the observation in Table 6, Column 4, that relatedness affects marital status for late migrants, but not for early migrants. The reduced form regression corresponding to the IV regressions in Table 8 should provide us with the result that relatedness determines employment, income, and remittances among the late migrants. But we expect to see no relatedness effect for the early migrants if relatedness only affects the outcomes of interest through marital status.

We report reduced form employment, income, and remittance regressions, separately for early and late migrants, in Table 9. Relatedness has a strong effect on each of the dependent variables among the late migrants, consistent with the instrumental variable results in Table 8, whereas the relatedness effect is absent for early migrants.³⁶ The difference between early and late migrants in Table 9 would seem to rule out the possibility that relatedness in the instrumental variable regressions simply proxies

³⁵One reason why increases in income do not translate into increased non-marital sexual activity may be that the net increase in the man's discretionary income will be small once the additional household expenses that go with marriage and a family are accounted for.

³⁶The coefficient on the relatedness variable for the late migrants is roughly 10 times larger than the corresponding coefficient for the early migrants. It is also fairly precisely estimated for the late migrants, except with income as the dependent variable, which tells us that the IV estimates of the effect of marriage on income that we saw earlier in Table 8 need to be treated with some caution.

for unobserved conditions at the origin that directly determine the outcomes of interest for all migrants from the traditional location. But could it be that the differences in the relatedness effect for early and late migrants in Table 9 arise because those two groups of individuals are inherently different?

Insert Table 9 here.

Table 10 explores this possibility by comparing education, family size, and inherited land for early and late migrants in Columns 1-3. Origin location dummies are included in all the regressions in Table 10 to compare early and late migrants within each location. A young age dummy is included as usual, to control for cohort effects. The coefficient on the late migration dummy is small in magnitude and statistically insignificant in Columns 1-3. This tells us that early and late migrants do not differ, at least with regard to permanent characteristics that would seem to be correlated with individual ability.

Insert Table 10 here.

While early and late migrants have similar characteristics, the fact that late migrants arrived in Kisumu at an older age implies that they might be more tied to their communities, even in the city. The Luo have well established community associations in many large Kenyan towns and cities, including Kisumu. These associations are typically organized at the level of the clan or the traditional location, and it is possible that late migrants are more active in the associations than early migrants. Table 10, Columns 4-5, replace individual characteristics with attendance in the association meetings, and contribution to the association, as the dependent variables. Once again we see no difference in the level of participation in these associations between early and late migrants.

Ultimately we are left with different marriage market behavior as the only available explanation for the difference between early and late migrants in Table 9. We see in Table 10, Columns 6-7, that late migrants are much more likely to be married before they arrive in the city, and in general are much more likely to have met their wives at home. This explains the strong link between relatedness and marital status for the late migrants, and the absence of this link for the early migrants, noted earlier in Table 6. And it also explains why relatedness affects labor market outcomes and remittances for the late migrants only; presumably because it only affects those outcomes through marital status.

5 Conclusion

Our basic objective in this paper is to estimate the effect of marriage on male sexual activity, labor market outcomes, and remittances in urban Africa. The statistical problem that we must deal with when estimating the marriage effect is that men select into the marriage institution. If men with low ability, who tend to have less favorable outcomes, are more likely to marry to take advantage of the network ties that this institution provides, then the estimated marriage effect could be biased downward.

We test the link between marriage and sexual activity on a sample of migrants in Kisumu, Western Kenya. A preliminary OLS regression shows that marriage reduces sexual activity significantly, but this marriage effect disappears when we instrument with relatedness or marriage prevalence in the origin location. In contrast, marriage has a positive and significant effect on labor market outcomes, which actually increases after instrumenting. These results are consistent with negative selection into marriage.

A negative externality is quite possibly associated with sexual activity involving multiple partners in this high HIV area, but social norms restricting such activity are yet to emerge. The marriage institution regulates sexual activity in many societies, and we see that it is able to regulate other aspects of individual behavior among our migrants, so this would seem to be a natural institution around which to situate new norms. Moreover, it is not as if the marriage institution in sub-Saharan Africa is impervious to change. The institution of polygyny has declined dramatically over time, particularly in East Africa. Urbanization is a relatively recent phenomenon in Africa, yet urban networks that exploit marriage ties have already emerged. Understanding why the marriage institution, and community-based institutions more generally, can adapt to change along some dimensions but are so rigid along other dimensions would thus seem to be a useful area for future research.

6 Appendix: Matching in the Marriage Market

Taking W_{n-1} as given, and assuming an equal measure of men and networks in the marriage market, an individual with ability u belonging to the n^{th} block chooses $w(u)$ to maximize

$$V(u) = \lambda \int_{w(u)}^{W_{n-1}} g(w)f(w)dw + \delta \left[1 - \lambda \int_{w(u)}^{W_{n-1}} f(w)dw \right] V(u), \quad (3)$$

where λ represents the probability that the network that the individual pairs with in any period is eligible (unrelated). $f(w)$ is the density of the average ability distribution at w , and δ is the discount factor. After some manipulation, the first-order condition for this choice problem can be expressed as

$$g[w(u)](1 - \delta) = \delta \lambda \int_{w(u)}^{W_{n-1}} (g(w) - g[w(u)]) f(w)dw. \quad (4)$$

At this point we make the assumption that w is uniformly distributed, $f(w) = 1$, which will turn out to be very convenient below when studying selection into marriage. $g(w)$ is independent of u , and so all individuals in the n^{th} block face the same choice problem. It will consequently be convenient to replace $w(u)$ with W_n . The first-order condition can then be written as

$$\frac{1 - \delta}{\lambda \delta} = \frac{\int_{W_n}^{W_{n-1}} g(w)dw}{g(W_n)} - (W_{n-1} - W_n). \quad (5)$$

Taking a linear approximation to the g function at each of the cut off points W_1, W_2, \dots, W_N , the first order condition can be rewritten as

$$\frac{2(1 - \delta)}{\lambda \delta} = \frac{g'(W_n)}{g(W_n)} \cdot \Delta_n^2, \quad (6)$$

where $\Delta_n \equiv (W_{n-1} - W_n)$ is the size of the n^{th} block, and $g'(W_n)$ is the slope of the g function evaluated at W_n .

Proposition 1: *The block size Δ_n is increasing (decreasing) in n if $g'(w)/g(w)$ is increasing (decreasing) in w .*

Proof. To prove this Proposition we make use of the following expression:

$$\frac{d}{dn} \left[\frac{g'(W_n)}{g(W_n)} \right] = \frac{d}{dW_n} \left[\frac{g'(W_n)}{g(W_n)} \right] \cdot \frac{dW_n}{dn}.$$

If $g'(w)/g(w)$ is increasing in w , then $g'(W_n)/g(W_n)$ must be increasing in W_n . Moreover, $dW_n/dn < 0$ by construction.

This tells us that $\frac{d}{dn} \left[\frac{g'(W_n)}{g(W_n)} \right] < 0$, which implies in turn that Δ_n must be increasing in n to satisfy the equality condition in equation (6). The analogous argument holds when $g'(w)/g(w)$ is decreasing in w .

Proposition 2: *Marriage prevalence is increasing in the probability of an eligible match λ when Δ_n is decreasing in n .*

Proof. Under the assumption that w is uniformly distributed, the probability that an individual belonging to the n^{th} block will match successfully in any period is given by $\lambda(W_{n-1} - W_n)$. This probability of being married is increasing in λ if

$$\Delta_n + \lambda \left(\frac{dW_{n-1}}{d\lambda} - \frac{dW_n}{d\lambda} \right) > 0. \quad (7)$$

$\Delta_n > 0$. To sign the second term on the left side of equation (7), we write

$$\frac{dW_n}{d\lambda} = \frac{\partial W_n}{\partial \lambda} + \frac{\partial W_n}{\partial W_{n-1}} \cdot \frac{\partial W_{n-1}}{\partial \lambda}. \quad (8)$$

Implicitly differentiating the first order condition, equation (5), and then taking a piece-wise linear approximation to the g function, we obtain

$$\frac{\partial W_n}{\partial \lambda} = \frac{\delta \Delta_n^2}{2[(1 - \delta) + \lambda \delta \Delta_n]} > 0.$$

It is easy to verify from the expression above that $\partial W_n / \partial \lambda$ is increasing in Δ_n . A similar exercise derives

$$\frac{\partial W_n}{\partial W_{n-1}} = \frac{\lambda \delta \Delta_n}{(1 - \delta) + \lambda \delta \Delta_n} > 0.$$

Once more it is easy to verify that $\partial W_n / \partial W_{n-1}$ is increasing in Δ_n .

The comparative statics that we have just derived tell us that all three terms on the right side of equation (8) are positive, which tells us in turn that all the cut offs W_1, W_2, \dots, W_N shift upward when λ increases. Since all the terms on the right side of equation (8) were shown to be increasing in Δ_n above, they must be decreasing in n as well if Δ_n is decreasing in n . This tells us in turn that $dW_{n-1}/d\lambda - dW_n/d\lambda > 0$, completing the proof.

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Table 1: Individual Background

Migrant type: Current marital status:	Early Migrants		Late Migrants	
	Single	Married	Single	Married
	(1)	(2)	(3)	(4)
Panel A: Individual Characteristics				
Age	23.47 (0.13)	28.76 (0.23)	25.83 (0.27)	33.95 (0.24)
Education	10.57 (0.11)	9.37 (0.09)	10.42 (0.15)	9.71 (0.10)
Months worked	7.73 (0.20)	10.93 (0.09)	7.34 (0.27)	10.69 (0.10)
Employment dummy	0.78 (0.02)	0.99 (0.004)	0.82 (0.02)	0.98 (0.004)
Income	36.72 (1.63)	60.48 (1.64)	37.79 (2.51)	71.13 (2.02)
No. of observations	575	676	293	782
Panel B: Migration Patterns				
Years since migration	9.75 (0.28)	14.03 (0.30)	2.23 (0.16)	6.73 (0.20)
Continuous residence dummy	0.86 (0.01)	0.82 (0.02)	0.92 (0.02)	0.91 (0.01)
Months cohabited	--	9.79 (0.13)	--	8.94 (0.15)
No. of observations	575	673	292	781

Note: Means reported for all variables, with standard errors in parentheses.

Early migrants arrived in Kisumu before age 21, late migrants arrived after age 20.

Income is measured per year, in thousands of Kenyan shillings. \$1 was approximately 70 Kshillings in 2001.

Top 1% of incomes among early and late migrants are dropped from the analysis.

Employment dummy=1 if worked for more than one month in the year, 0 otherwise.

Continuous residence dummy=1 if resided in Kisumu continuously after migrating, 0 otherwise.

Cohabitation measured as the number of months of the year during which the migrant's wife lived in Kisumu.

Cohabitation statistics are computed for currently married men only. For men with multiple wives this applies to the wife who spent the most time in the city.

All means for single and married men are statistically different at the 5% significance level except Continuous residence dummy.

Table 2: Connection to the Community

Migrant type:	Early Migrants		Late Migrants	
	Single	Married	Single	Married
Current marital status:	(1)	(2)	(3)	(4)
Panel A: Pattern of Home Visits				
Frequency of home visits in the last year (%)				
Few times in a week	4.55	6.10	3.81	9.62
Few times in a month	27.97	41.37	33.56	48.08
Few times a year	47.90	40.77	42.56	35.51
Once only	11.89	6.85	9.34	5.13
Never	7.69	4.91	10.73	1.67
Total	100.00	100.00	100.00	100.00
No. of observations	572	672	289	780
Panel B: Remittances				
Remittances to home community	3.34 (0.27)	4.58 (0.26)	4.09 (0.50)	4.87 (0.28)
Remittances to family	16.35 (0.84)	28.18 (1.02)	17.58 (1.15)	25.32 (0.84)
No. of observations	489	651	249	757
Panel C: Participation in Clan Associations				
Attendance dummy	0.14 (0.01)	0.32 (0.02)	0.10 (0.02)	0.34 (0.02)
Contribution dummy	0.26 (0.02)	0.51 (0.02)	0.24 (0.03)	0.55 (0.02)
No. of observations	573	668	289	781

Note: Means reported for all variables, with standard errors in parentheses.

Early migrants arrived in Kisumu before age 21, late migrants arrived after age 20.

Remittances to community/family measured as percent of total income.

Top 1% of remittances among early and late migrants are dropped from the analysis.

Attendance dummy=1 if attends association meetings regularly, 0 otherwise.

Contribution dummy=1 if contributes to association, 0 otherwise.

All means for single and married men in Panel B and Panel C are statistically different at the 5% level except for Remittances to community - Late migrants.

Table 3: The Marriage Institution

Migrant type:	Early migrants	Late migrants
	(1)	(2)
Panel A: Marriage Structure		
Currently married	0.54 (0.01)	0.72 (0.01)
Multiple marriages	0.11 (0.01)	0.17 (0.01)
Ever divorced/separated	0.07 (0.007)	0.10 (0.01)
Currently divorced/separated	0.02 (0.003)	0.02 (0.004)
Currently polygynous	0.05 (0.01)	0.07 (0.01)
Panel B: Marriage and the Community		
Met wife at home	0.39 (0.02)	0.55 (0.02)
Married before migrating	0.03 (0.01)	0.55 (0.02)
Arranged marriage	0.40 (0.02)	0.48 (0.02)
No. of observations	672	781
Panel C: Marriage Rites		
Traditional marriage	0.87 (0.01)	0.82 (0.01)
Paid bridewealth	0.48 (0.02)	0.69 (0.02)
Checked relatedness	0.91 (0.01)	0.91 (0.01)
No. of observations	673	780

Note: Means reported for all variables, with standard errors in parentheses.

Early migrants arrived in Kisumu before age 21, late migrants arrived after age 20.

Currently married=1 if married at the time of the survey, 0 otherwise.

Multiple marriages=1 if the respondent had more than one wife over his life time, 0 otherwise.

Polygynous=1 if respondent currently has more than one wife, 0 otherwise.

Traditional marriage=1 if respondent had traditional marriage, 0 if religious or legal marriage.

Currently married, multiple marriages, and divorce/separation are computed using the full sample of migrants

(1248 and 1081 obs, respectively), while Polygynous is measured using currently married men (673 and 781 obs, respectively).

All statistics in Panel B and Panel C apply to currently married men. For men with more than one wife, these statistics are computed for the first wife.

All variables in Panel B and Panel C are binary variables.

All means for early and late migrants are statistically different at the 5% significance level except:

Currently divorced/separated, Polygynous, and Checked Relatedness.

Table 4 : Sexual Activity

Migrant type:	Early Migrants		Late Migrants	
	Single	Married	Single	Married
Current marital status:	(1)	(2)	(3)	(4)
Number of non-marital partners	2.21 (0.10)	0.97 (0.08)	1.85 (0.09)	0.74 (0.08)
One or more non-marital partners	0.86 (0.01)	0.46 (0.02)	0.81 (0.02)	0.42 (0.02)
Four or more non-marital partners	0.16 (0.02)	0.05 (0.01)	0.13 (0.02)	0.02 (0.005)
No. of observations	576	672	300	781
Proportion risky partners	0.35 (0.02)	0.50 (0.03)	0.34 (0.02)	0.46 (0.03)
No. of observations	496	310	250	326

Note: Means reported for all variables, with standard errors in parentheses.

Early migrants arrived in Kisumu before age 21, late migrants arrived after age 20.

One/Four or more non-marital partners are binary variables.

Risky partners include casual partners and commercial sex workers.

Proportion risky partners is the ratio of the number of risky partners to the number of non-marital partners.

This statistic is computed for men having any non-marital partners only.

All means for single and married men are statistically different at the 5% significance level.

Table 5: Validating the Relatedness Instrument

Sample: Dependent variable:	all migrants			rural+migrants		all migrants	
	education	siblings	inherited land	migration	late migration	arrival age	cohabitation
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Relatedness	0.047 (0.061)	-0.036 (0.108)	-0.076 (0.081)	-0.003 (0.009)	-0.001 (0.004)	0.003 (0.106)	0.091 (0.093)
Young dummy	0.577 (0.127)	-1.252 (0.269)	-0.473 (0.187)	0.139 (0.036)	-0.001 (0.016)	-7.318 (0.366)	0.264 (0.218)
South Nyanza dummy	0.170 (0.304)	0.729 (0.512)	0.854 (0.446)	-0.160 (0.042)	-0.065 (0.019)	0.520 (0.376)	-0.563 (0.376)
R ²	0.056	0.017	0.035	0.392	0.227	0.187	0.024
Number of observations	2,297	2,300	2,277	60	60	2,307	1,445

Note: Standard errors in parentheses.

Standard errors are robust to heteroscedasticity and clustered residuals within each traditional location. All regressions include sublocation dummies.

Rural sample refers to a 5 percent random sample of Luo men 21-45 residing in rural Nyanza Province obtained from the 1989 census.

Early and late migrants are drawn from the 2001 Kisumu survey. Early migrants arrived in Kisumu before age 21, late migrants arrived after age 20.

Column 1 uses the migrant's years of schooling as the dependent variable.

Column 2 uses the migrant's number of siblings to measure the migrant's family size.

Column 3 uses inherited land as a measure of the migrant's wealth at home. This variable is the ratio of father's land (in acres) to the migrant's number of brothers.

Columns 4-5 study the level of migration, by traditional location, among late migrants and all migrants.

Migration is measured as the number of migrants from a given location in the Kisumu sample divided by the population of that location from the census.

This statistic is computed separately for Young and Old individuals, with the cut off at 30 years.

Late migration computes the corresponding statistic for late migrants, who arrived in Kisumu after age 20.

Column 6 uses the migrant's arrival age as the dependent variable.

Column 7 treats cohabitation as the dependent variable, where cohabitation measures the number of months in the year that the migrant's wife spends in Kisumu.

This statistic is computed for currently married men. For men with multiple wives, this statistic applies to the wife who spent the most time in the city.

Young dummy=1 if the individual is less than or equal to 30 years, 0 otherwise.

South Nyanza dummy=1 if the location is in South Nyanza, 0 otherwise.

Table 6: Relatedness and Marriage

Model:	Probit			LP	Probit			currently married	ever married	
Sample:	rural	all late migrants	all migrants	all late migrants	ever married late migrants	late migrants	late migrants	late migrants	late migrants	
Dependent variable:	current marital status			marrital status	where met	marriage	currently	ever divorced/		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
					at arrival	wife	arrangement	polygynous	separated	
Relatedness	-0.025 (0.009)	-0.064 (0.019)	-0.056 (0.018)	0.004 (0.023)	-0.017 (0.005)	-0.057 (0.031)	-0.038 (0.024)	0.071 (0.033)	-0.150 (0.041)	-0.011 (0.050)
Relatedness-late	--	--	--	-0.042 (0.024)	--	--	--	--	--	--
Young	-1.095 (0.027)	-1.465 (0.131)	-1.464 (0.128)	-1.499 (0.091)	-0.397 (0.026)	-0.912 (0.082)	-0.301 (0.103)	-0.315 (0.076)	-0.929 (0.210)	-0.070 (0.100)
South Nyanza	0.329 (0.050)	0.309 (0.108)	0.286 (0.104)	0.144 (0.096)	0.078 (0.028)	0.199 (0.135)	0.182 (0.107)	0.007 (0.125)	0.600 (0.161)	-0.032 (0.178)
Education	--	--	-0.038 (0.014)	--	--	--	--	--	--	--
R ²	0.130	0.211	0.216	0.187	0.220	0.107	0.033	0.032	0.096	0.006
Number of observations	8,535	1,061	1,057	2,307	1,063	1,061	803	800	724	794

Note: Standard errors in parentheses.

Standard errors are robust to heteroscedasticity and clustered residuals within each traditional location. All regressions include sublocation dummies.

Rural sample refers to a 5 percent random sample of Luo men 21-45 residing in rural Nyanza Province obtained from the 1989 Census.

Early and late migrants are drawn from the 2001 Kisumu survey. Early migrants arrived in Kisumu before age 21, late migrants arrived after age 20.

Column 1-5: currently married=1, single=0. Column 6: married at arrival=1, single=0. Column 7: met wife at home=1, met in city=0.

Column 8: arranged marriage=1, individual search=0. Column 9: currently polygynous=1, monogamous=0. Column 10: ever divorced/separated=1, 0 otherwise.

Relatedness is interacted with a late arrival dummy in Column 4. The late arrival dummy is also included separately in that regression; the point estimate with standard error in parentheses is 0.294(0.075).

Young dummy=1 if the individual is less than or equal to 30 years, 0 otherwise.

South Nyanza dummy=1 if the location is in South Nyanza, 0 otherwise.

Education is measured by years of schooling.

Table 7: Marriage and Sexual Activity

Dependent variable: Model:	number of non-marital partners				proportion of risky partners			
	OLS	reduced form	IV (probit)	IV (prevalence)	OLS	reduced form	IV (probit)	IV (prevalence)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Current marital status	-0.961 (0.141)	--	-0.022 (1.397)	-0.244 (0.647)	0.125 (0.041)	--	-0.056 (0.451)	-0.037 (0.170)
Relatedness	--	0.003 (0.029)	--	--	--	-0.003 (0.010)	--	--
Young	0.444 (0.196)	0.827 (0.163)	0.819 (0.681)	0.729 (0.321)	-0.010 (0.051)	-0.068 (0.048)	-0.095 (0.225)	-0.084 (0.072)
South Nyanza	-0.173 (0.126)	-0.212 (0.152)	-0.204 (0.121)	-0.198 (0.131)	-0.031 (0.036)	-0.018 (0.050)	-0.023 (0.032)	-0.024 (0.035)
R ²	0.092	0.059	--	--	0.059	0.042	--	--
Number of observations	1,063	1,063	1,061	1,063	571	571	571	571

Note: Standard errors in parentheses.

Standard errors are robust to heteroscedasticity and clustered residuals within each traditional location. All regressions include sublocation dummies.

Current marital status=1 if married, 0 if single.

Young dummy=1 if the individual is less than or equal to 30 years, 0 otherwise.

South Nyanza dummy=1 if the location is in South Nyanza, 0 otherwise.

Sample restricted to late migrants who arrived in Kisumu after the age of 20.

Proportion of risky partners is computed up to five partners in the last year. Casual partners and commercial sex workers are classified as risky.

IV (probit) regressions use predicted value from probit marriage regression as instrument for current marital status.

IV (prevalence) uses marriage prevalence as the instrument. Marriage prevalence measures the proportion of currently married men, by traditional location and age category.

Table 8: Marriage, Labor Market Outcomes and Remittances

Dependent variable: Model:	employment			ln (income)			remittances		
	OLS	IV (probit)	IV (prevalence)	OLS	IV (probit)	IV (prevalence)	OLS	IV (probit)	IV (prevalence)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Current marital status	2.934 (0.315)	11.114 (3.309)	2.682 (1.543)	0.487 (0.083)	1.469 (0.794)	0.850 (0.374)	7.608 (1.094)	39.487 (22.245)	9.731 (5.864)
Young	-0.747 (0.230)	2.507 (1.183)	-0.834 (0.621)	-0.325 (0.066)	0.028 (0.287)	-0.161 (0.142)	-1.152 (1.138)	10.356 (7.964)	-0.013 (2.255)
South Nyanza	-0.102 (0.228)	-0.365 (0.275)	-0.085 (0.250)	0.023 (0.067)	-0.008 (0.066)	0.011 (0.068)	-0.870 (1.802)	-1.847 (2.042)	-0.953 (1.778)
R ²	0.188	--	--	0.112	--	--	0.050	--	--
Number of obs	1,061	1,059	1,061	1,009	1,007	1,009	996	994	996

Note: Standard errors in parentheses.

Standard errors are robust to heteroscedasticity and clustered residuals within each traditional location. All regressions include sublocation dummies.

Current marital status=1 if married, 0 if single.

Young dummy=1 if the individual is less than or equal to 30 years, 0 otherwise.

South Nyanza dummy=1 if the location is in South Nyanza, 0 otherwise.

Sample restricted to late migrants who arrived in Kisumu after the age of 20.

Employment is measured as the number of months worked in the last year.

Income in last year is measured in thousands of Kenyan shillings.

Remittances measured as the percent of total annual income sent home to family. Top 1 percent of the remittances distribution is dropped from the sample.

IV (probit) regressions use predicted value from probit marriage regression as instrument for marital status.

IV (prevalence) uses marriage prevalence as the instrument. Marriage prevalence measures the proportion of currently married men, by traditional location and age category.

Table 9: Validating the Relatedness Instrument: Early versus Late Migrants

Dependent variable:	employment		ln (income)		remittances	
	late migrants	early migrants	late migrants	early migrants	late migrants	early migrants
Sample:	(1)	(2)	(3)	(4)	(5)	(6)
Relatedness	-0.216 (0.079)	-0.023 (0.127)	-0.031 (0.029)	-0.003 (0.042)	-0.802 (0.463)	-0.035 (0.408)
Young	-1.895 (0.209)	-2.028 (0.194)	-0.499 (0.054)	-0.498 (0.050)	-3.847 (1.218)	-5.478 (1.169)
South Nyanza	0.577 (0.316)	-0.042 (0.480)	0.121 (0.124)	0.079 (0.120)	1.476 (2.305)	2.592 (2.215)
R ²	0.094	0.089	0.076	0.058	0.034	0.041
Number of obs.	1,061	1,246	1,009	1,158	996	1,138

Note: Standard errors in parentheses.

Standard errors are robust to heteroscedasticity and clustered residuals within each traditional location. All regressions include sublocation dummies.

Current marital status=1 if married, 0 if single.

Young dummy=1 if the individual is less than or equal to 30 years, 0 otherwise.

Late migrant dummy=1 if migrant arrived in Kisumu after the age of 20, 0 otherwise.

South Nyanza dummy=1 if the location is in South Nyanza, 0 otherwise.

Columns 1-2: number of months worked in the last year.

Column 3-4: income in last year is measured in thousands of Kenyan shillings.

Columns 5-6: remittances to the family, measured as the percent of total annual income. Top 1 percent of the remittances distribution dropped from the sample.

Table 10: Comparing Early and Late Migrants

Sample:	all migrants						ever married migrants
	education	siblings	inherited land	attendance	contribution	marital status at arrival	where met wife
Dependent variable:	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Late migrant	0.175 (0.106)	0.001 (0.265)	-0.303 (0.271)	-0.008 (0.018)	0.007 (0.024)	0.343 (0.015)	0.128 (0.027)
Young	0.632 (0.136)	-1.303 (0.265)	-0.572 (0.266)	-0.136 (0.024)	-0.190 (0.021)	-0.200 (0.018)	-0.092 (0.033)
R ²	0.080	0.033	0.089	0.062	0.082	0.311	0.079
Number of obs.	2,306	2,310	2,287	2,309	2,309	2,319	1,505

Note: Standard errors in parentheses.

Standard errors are robust to heteroscedasticity and clustered residuals within each traditional location.

All regressions include Kisumu sublocation dummies and traditional location dummies.

Late migrant dummy=1 if migrant arrived in Kisumu after the age of 20, 0 otherwise.

Young dummy=1 if the individual is less than or equal to 30 years, 0 otherwise.

Column 1 uses the migrant's years of schooling as the dependent variable.

Column 2 uses the migrant's number of siblings to measure the migrant's family size.

Column 3 uses inherited land as a measure of the migrant's wealth at home. This variable is the ratio of father's land (in acres) to the migrant's number of brothers.

Column 4: attendance=1 if the migrant attends clan association meetings regularly, 0 otherwise.

Column 5: contribution=1 if the migrant contributes to the clan association, 0 otherwise.

Column 6: married at arrival=1, single=0.

Column 7: met wife at home=1, met in city=0.

Figure 1: Relatedness across Traditional Locations

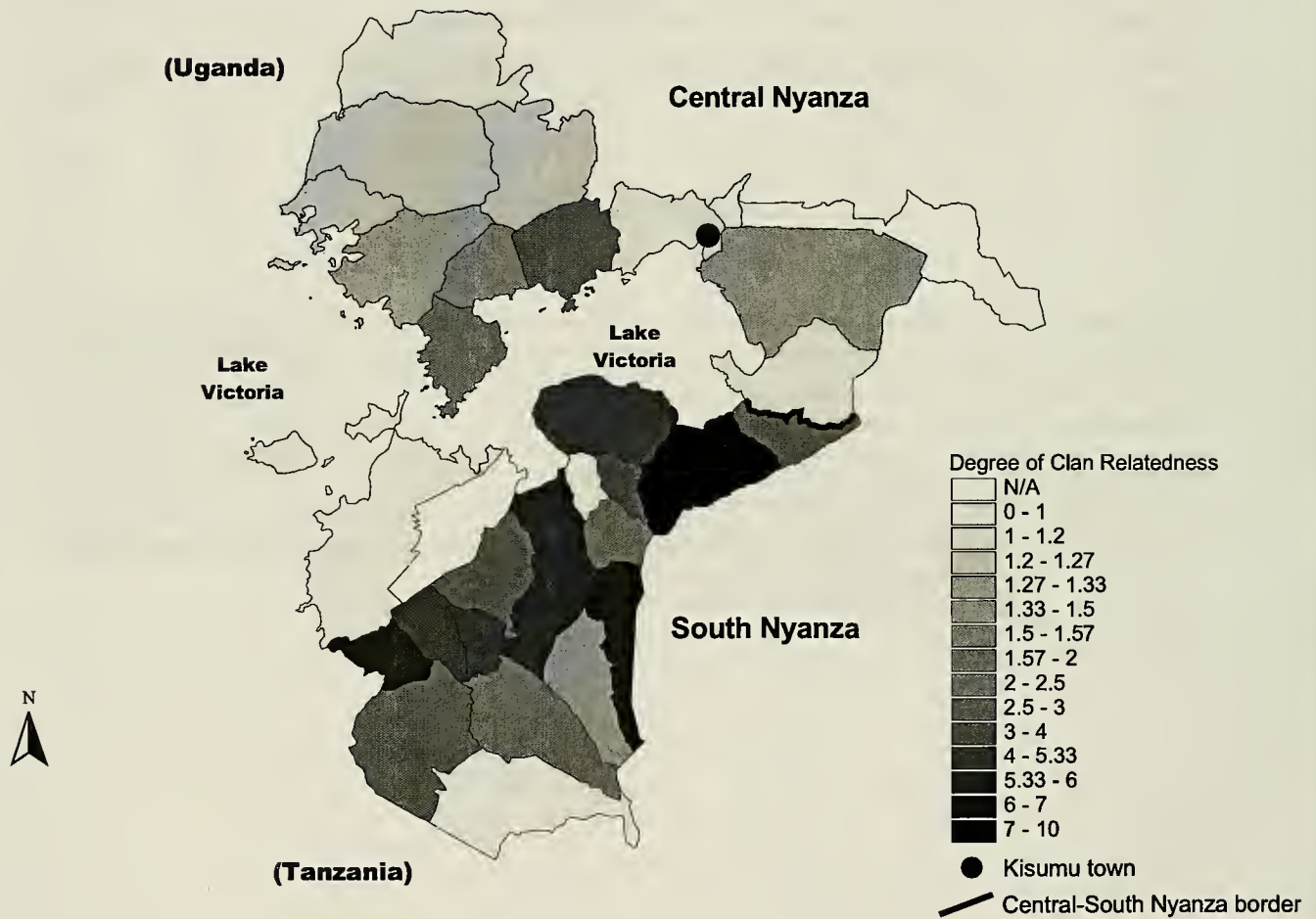
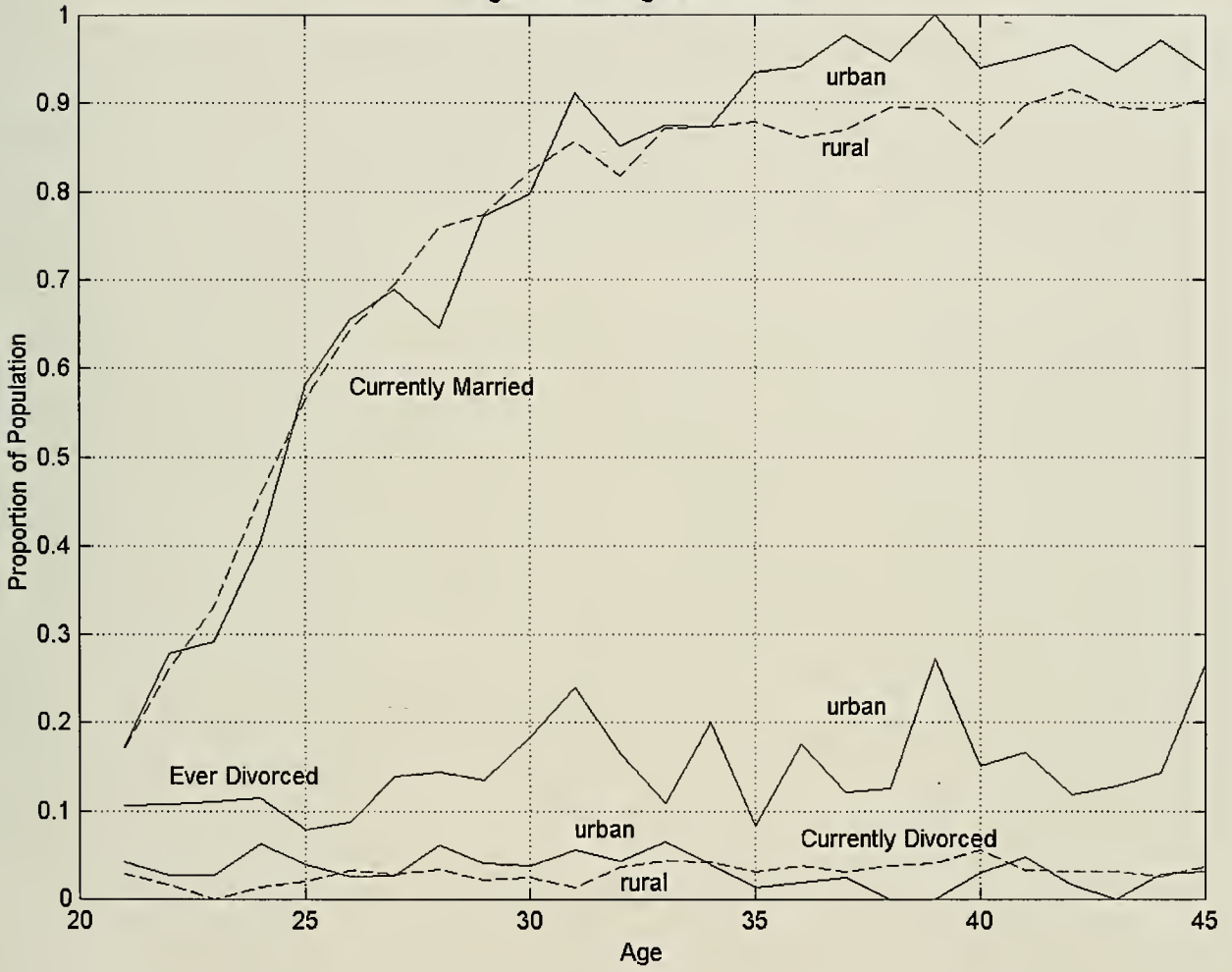


Figure 2: Marriage and Divorce



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