Premarital Births and Union Formation in Rural South Africa

Christie Sennott*
Purdue University and University of the Witwatersrand

Georges Reniers
London School of Hygiene and Tropical Medicine

F. Xavier Gómez-Olivé
University of the Witwatersrand

Jane Menken
University of Colorado Boulder

*Corresponding Author. Department of Sociology, Purdue University. 700 W. State St. West Lafayette, IN 47907. Phone: (765) 494-4668. Fax: (765) 496-1476. csennott@purdue.edu

ABSTRACT

CONTEXT: We investigate Black South African women's union formation in a rural area of South Africa where first unions are often delayed until the late twenties and premarital first births are common. We focus on the influence of premarital first births on union entry and union type.

METHODS: We use longitudinal data from the Agincourt Health and Socio-Demographic Surveillance System (HDSS) in rural northeast South Africa from non-migrant women aged 10-35 who were recorded in at least one annual census from 1993-2012 (N = 55,402). We use discrete-time event history models to analyze whether there are differences in the likelihood of first union formation between women who had a premarital first birth and those who did not. We use logistic regression models to analyze the association between single motherhood and the type of unions women enter, differentiating between marriages and non-marital partnerships.

RESULTS: Becoming a single mother is a common event in rural South Africa: almost half of women in the Agincourt HDSS (45.8%) had a premarital first birth. Women who had a premarital first birth were significantly less likely to enter a first union compared to women who did not have a premarital first birth, but there was no difference in their likelihood of entering a marriage versus a non-marital partnership.

CONCLUSIONS: Single motherhood is common in the Agincourt HDSS, and women with premarital first births face challenges in establishing committed unions with partners.

Single motherhood[a] is common among women in South Africa, where premarital first births – often unplanned – regularly occur during the teenage years [1–6] and women's median age at first marriage is 29[b] [7]. Despite the late age at marriage, young people usually begin sexual relationships during their teenage years and consistent contraceptive use is limited among unmarried sexually active women [1,2,8]. Together, these phenomena have led to high rates of premarital births and single motherhood in South Africa [1,2]. In fact, research from the Agincourt Health and Socio-Demographic Surveillance System (HDSS) – the rural setting we focus on in this paper – found that 21% of all births and almost half (47%) of births to women during early adulthood (through age 26) in the 1990s were to never-married women [1,2].

Single motherhood is viewed as an important social problem in South Africa – especially when it results from premarital births to teenagers [see ,9,10]. A growing body of research suggests that premarital births can lead to detrimental social and health consequences for women and their children. For example, several studies from South Africa have found that premarital births often precipitate young women leaving school [11–13]. In other African settings, research has tied single motherhood to a wide array of disadvantages including lower earnings [14], and worse outcomes for children including poor health [15] and a higher risk of death [16]. Ethnographic evidence suggests that young South Africans are well aware of the social, educational, and economic consequences of premarital pregnancies [17–19]. For example, one study from KwaZulu-Natal found that young men and women regarded premarital pregnancies with serious unmarried partners as "mistakes" whereas those with more casual partners were deemed "disastrous" [17(p996)].

[a] We focus on single mothers who have never been in a union, defined as women who were neither married nor in a non-marital partnership when their first child was born.

[b] Research on non-marital partnerships in South Africa is greatly limited due to a lack of reliable data [53]. Therefore, much of the literature reviewed here focuses solely on marriage.

Despite growing evidence of the potential consequences of single motherhood for women's and children's outcomes, few studies from sub-Saharan Africa – and none from South Africa to our knowledge – have examined whether having a premarital birth may influence young mothers' prospects for establishing stable, committed relationships. Given the potentially negative consequences of single motherhood, we consider a premarital first birth to be a "vital conjuncture" [20,21] that may fundamentally alter women's futures, especially the transition to a first union [14,22,23]. In this study, we investigate union patterns in the rural Agincourt HDSS site in South Africa, leveraging longitudinal data from 1993-2012 to analyze the influence of a premarital first birth on women's likelihood of entering a first union during early adulthood (by age 36). We also examine the type of unions women enter, comparing marriages with non-marital partnerships[c], which we discuss in more detail below.

Understanding the marriage prospects for single mothers is important for a number of reasons. To start, receiving the economic support of both parents greatly enhances the long-term prospects for children's well-being [see ,24,25]. Children whose mothers are married or cohabit with a partner are significantly less likely to be living in poverty than children whose mothers are unmarried and whose fathers are absent from the household [26]. Economic support for children born before marriage is often not forthcoming from unmarried young fathers in rural South Africa [17,18], creating challenging economic circumstances for single mothers and their children. Lower rates of school completion among single mothers [11] combined with high rates of unemployment in rural South Africa [27,28] mean that single mothers must often rely on their natal families (especially their own mothers) and the Child Support Grant for economic support for

[c] We adopt the terminology of Hosegood et al. (2009) to differentiate between marriages and non-marital partnerships and refer collectively to these relationships as "unions." Our categorization of unions is based on women's self-report of their union type at the time the union began, rather than on household co-residence. Temporarily living apart due to labor migration is common across relationship types in the Agincourt HDSS.

children[d]. Thus, stable, committed relationships with children's fathers could lessen the economic burden on single mothers and their families, while potentially also providing companionship, help with childcare, and emotional and social support. Additionally, although marriage is becoming increasingly less common [29,30], young South Africans still regard marriage is a central aspiration in life [17,18,26].

Premarital Births, Single Motherhood, and Union Formation

The extant evidence from Africa suggests that single mothers may face barriers to forming stable relationships. Research from both Cameroon and Moshi district, Tanzania found that compared to childless women, single mothers were significantly less likely to marry in the long term, although duration of single motherhood mattered: women whose child was less than a year old were more likely to marry than single women without children whereas single mothers with older children (4-5 years) were less likely to marry than childless women [22,23]. However, both of these studies reported that single motherhood was relatively uncommon: 11-17% of Cameroonian women [23] and 35% of women in Moshi district [22] had premarital first births compared to almost half (47%) of young women in rural South Africa [1,2]. Additionally, although the age at first marriage has been increasing in both Cameroon and Tanzania among recent cohorts, it remains considerably lower (18.6 in Cameroon and 18.9 in Tanzania among women born between 1975 and 1979) [31] than in South Africa [7,29]. These differences prompt us to ask whether single mothers are less likely than their childless peers to marry in a context wherein premarital births are much more common.

[d] The Child Support Grant is a needs-based government benefit provided to a child's primary caregiver. It was equal to R330 per child or around USD30 as of August 2015 and is available to support all children under age 18 living in South Africa as long as the caregiver is a South African citizen or permanent resident and earns less than R3300 per month (if single) or R6600 per month (if married). See www.gov.za/services/child-care-social-benefits/child-support-grant.

Women who have premarital births may be less likely to marry compared to other women for a number of reasons. The stigma attached to premarital births [18,19,32] may harm an existing relationship or limit a woman's prospects for future relationships. However, as noted above, research from Cameroon and Moshi district, Tanzania has suggested that single mothers may have a marriage market advantage when they enter unions soon after birth, most likely because they are marrying the child's father [22,23]. Nonetheless, single mothers may be particularly disadvantaged in highly competitive marriage markets, such as in rural South Africa, where men frequently migrate for work [33,34] and AIDS deaths among prime-age adults are common [35]. In the Agincourt HDSS, single mothers commonly leave children with their grandmother when the mother marries a new man [36]. This suggests that bringing step-children into a marriage may be viewed as problematic and could thus serve as a hurdle to marriage for economically disadvantaged single mothers in particular.

Non-marital Partnerships versus Marriages

Marriage in South Africa has often been described as a process that unfolds over time and is typically formalized through the payment of *lobola* (bridewealth), a series of economic transactions that are made from the husband to the wife's family. Traditionally, this economic exchange signified that the husband's family acquired the wife's reproductive capacity, and through this process, the couple's children became part of the husband's family lineage [37,38]. Scholars have argued that this customary practice limits women's agency in relationships [39,40] and lowers their autonomy in reproductive decision-making once they are married [39]. However, this custom also solidifies the bond between partners and families and provides women with symbolic capital in the form of dignity, respect, and status in their households and communities [41]. Additionally, men's readiness to pay lobola is often seen as a sign of their love, commitment

to the relationship, and sense of responsibility to their partner [42,43]. Thus, the custom continues to be viewed as a critical step in cementing a couple's relationship and remains widely supported among both men and women in South Africa [26,41–44].

The commodification of bridewealth over the past few decades has resulted in high costs that are often prohibitive to young couples [34,44,45]. Historically paid in cattle, average amounts of lobola now range from R10,000 to R25,000 (approximately $1,100 to $2,750 USD), which often surpass men's annual income in rural areas [34,44,45]. Despite these economic barriers, Black South Africans maintain high aspirations for marriage, believe that marriage is economically beneficial, and are less socially accepting of non-marital partnerships compared to their white counterparts [26].

If men cannot afford lobola when couples move in together, payments may proceed over months or even years, which means that non-marital partnerships may eventually transition to marriage. Thus, the main difference between couples in non-marital partnerships and those in marriages may revolve around a man's ability or willingness to pay lobola. That is, non-marital partnerships may signal economic disadvantage such that couples in these relationships have access to fewer economic resources than couples where the man pays lobola up front [also see ,26]. The economic disadvantage associated with non-marital partnerships may be especially consequential for single mothers with children to support.

STUDY CONTEXT

The Agincourt HDSS site (see http://www.agincourt.co.za) was established in 1992 to provide reliable population-based data to aid in improving district-level health systems after the end of apartheid in 1994 [46]. Data are collected annually from the complete population of the area, including, at the time of this study, approximately 90,000 individuals in 26 villages in the

Agincourt sub-district of the Ehlanzeni District in Mpumalanga Province, northeastern South Africa. The population of the area is primarily of Shangaan heritage, an ethnic group that lives in this area and across the border in Mozambique, and about one third of the site's population is comprised of refugees of the Mozambican civil war and their descendants.

As in many rural South African communities, infrastructure is limited: residents lack reliable access to piped water and electricity and there is no formal sanitation system [47]. Over one in three women aged 15-34 is HIV positive [48] and access to treatment for eligible adults was limited until 2010 when it was rolled out in local public facilities. Treatment for the prevention of mother-to-child transmission (PMTCT) has been widely available since 2004.

Union patterns in South Africa are in flux. Nationally, the age at first marriage has been steadily increasing over time with marriage now typically postponed until at least the mid-twenties [7,31]. Additionally, marriage rates have been declining over time among all age groups while non-marital partnerships have become more common [29]. These broader trends provide the backdrop for our analysis of premarital births and union formation in the Agincourt HDSS.

METHODS

Data

This study focuses on women aged 10-35 in the Agincourt HDSS data from 1993-2012. The site collects and updates information on all vital events including births, deaths, unions, and moves into and out of the study site each year. Fertility has been monitored prospectively since 1992 when the census began. The HDSS collects detailed information on all pregnancies and births that occur between census rounds. We use prospective fertility data to identify resident women who had their first child in the site between 1993 and 2012 (n = 21,904; 79.6% of births) and

retrospective data on births collected at the baseline census and at the first census for women who moved into the study site (*n* = 5,629; 20.4% of births).

Retrospective union histories, which were first collected in 2005, are updated each year and collected routinely for in-migrants. We use prospective data to identify unions that began in 2005 or later (*n* = 7,502; 54.1% of unions), and retrospective data for unions that began before 2005 (*n* = 6,357; 45.9% of unions). Temporary and permanent migration – often for work – is a common experience in the Agincourt HDSS [33]. Union formation is also frequently associated with changes in residence. The Agincourt HDSS queries respondents who leave their households in the site about the reason for their departure, providing "marriage" as an option. These data allow us to analyze union formation among women who reported on out-migration forms that they were moving for marriage (*n* = 8,038; 58.0% of all unions).

Dependent Variables

We focus on two outcomes. First, we analyze any union formation (non-marital partnership or marriage) versus remaining single (reference). Second, we analyze union type, differentiating between unions that began as a non-marital partnership versus a marriage (reference). Unions are coded as marriages if *lobola* was paid (99.7%, n=3,683), the marriage was registered at the magistrate (<1%, n=5), or the couple had a religious ceremony (<1%, n=6)[e]. Unions are coded as non-marital partnerships if a woman reported that the relationship began as an "informal union" (instead of a marriage) and none of the union formalization processes (lobola, registration, religious ceremony) had occurred. In models analyzing union type, unions that are identified through out-migration forms are excluded because this information was not collected for these unions. All analyses are limited to first unions.

[e] In 257 (6.9%) of the marriages in our sample, couples completed all three of these steps in formalizing their relationship.

Independent Variables

Two independent variables are used to assess premarital births. In the first variable we identify a premarital birth as one in which a woman reported giving birth at least one calendar year prior to entering a first union. For prospective data, this means that a woman reported a first birth on one census and did not report a first union until a later census, if at all. Based on this definition, we compare women who had a premarital birth with women who did not have a premarital birth (reference). This time-varying variable is coded zero until the year during which a woman reported having a premarital birth. In this variable, women who reported giving birth and entering a first union in the same year are not coded as single mothers. As described below, we use a discrete-time format in our analysis because much of our data on unions is retrospective; therefore, this is the most conservative approach for ensuring that premarital births actually occurred prior to union formation[f].

Second, previous research from other African settings has shown that single mothers have a union formation advantage when they marry within a year of their child's birth, presumably because they are marrying the child's father [22,23]. Therefore, our second independent variable captures the time elapsed since a woman's premarital birth[g], providing nuance to our first measure of premarital births, which combines all single mothers and excludes women who reported giving birth and entering a first union in the same year (n = 1,199). This variable is coded categorically: no premarital birth (reference), less than 1 year [since birth][h], 1-2 years, 3-4 years, and 5 or more years.

[f] We conducted a sensitivity analysis in which we coded these women as single mothers and found results largely consistent with what is reported below: although the association between premarital births and any union formation was attenuated, it remained negative and statistically significant (OR = 0.94, $p < 0.01$).

[g] Of the 25,133 single mothers in our study, 37% (n=9,361) had more than one premarital birth. For this group of women, this variable measures the time since their most recent premarital birth.

[h] This category includes women who reported giving birth and entering a first union in the same year (n = 1,199).

We control for a number of socio-demographic variables known to be associated with both premarital childbearing and union formation: age, educational attainment, and relevant to our study site, nationality (South African or Mozambican). We account for time with a measure of calendar year grouped into four, five-year periods: 1993-1997 (reference); 1998-2002; 2003-2007; and 2008-2012. Age is time-varying and grouped into five-year age intervals. Women age 20-24 serve as the reference category because the highest proportion of this group entered a first union during the study. Information about education was obtained in 1992, 1997, 2002, and 2006. We impute education in the intervening years using the highest previously-observed value. Education is time-varying and coded categorically: no education (reference), primary (1-7 years), some secondary (8-11 years), and completed secondary (12 years or more). We also include a "missing" category to retain the 12.3% of the sample who have missing information on education in all years. To measure nationality, we include a dummy variable indicating whether a respondent is of Mozambican or South African (reference) origin.

Sample

The sample for models analyzing any union formation includes all women aged 10-35 who were never-in union when they were first observed in the study site (1993-2012) (N = 55,158 contributing a total of 323,274 person-years)[i]. The models analyzing union type are limited to women who entered a first union during the study period and provided information about the type of union (non-marital partnership versus marriage) (n = 5,864, with one observation per woman). Less than 1% of women eligible for the sample were excluded due to missing data on nationality (n = 390 contributing 972 person-years).

[i] The Agincourt HDSS was established in 1992 as a longitudinal surveillance of a rural South African population and when we created our sample, we included all women aged 10-35 who were ever resident in the HDSS area during the study period (1993-2012). Therefore, although the population of the Agincourt HDSS in 2012, the latest year of the study, was around 90,000 people, our sample of 55,402 includes women who were part of the surveilled population but that are no longer residents in the study area because they out-migrated or died.

Migration out of the study site is the main cause of attrition from the sample: 35.5% (*n*=19,574) of women in the sample left their households prior to 2012 for reasons other than marriage and thus were censored at the time of migration in all analyses. Therefore, our results are primarily representative of the experiences of non-migrant women who remain residents of the Agincourt HDSS until age 36. We reflect on the implications of this for our results in the discussion section[j].

Analytic Strategy

We first present descriptive statistics of our sample (Table 1) and then employ discrete-time event history models to analyze the likelihood of entering a first union versus remaining single (reference) comparing the experiences of women who had a premarital birth and those who did not (Table 2). As discussed above, a non-marital partnership may serve as a precursor to marriage, or what might be considered an early step in the marriage process. These relationships provide an indication of a couples' level of commitment precisely because non-marital partnerships are likely to be disparaged since they do not include lobola, a highly valued cultural practice [26,49]. Thus, women who report that they are in non-marital partnerships are not simply dating their partners. Rather, they are in more committed relationships that, in many cases, will transition to marriage once economic circumstances improve and a man is able to pay lobola. Thus, in the long term, the experiences of many women who enter non-marital partnerships may parallel those of women who marry. For these reasons and because we cannot account for the transition from non-marital partnerships to marriage, in these models we analyze the likelihood of any union formation by combining the two types of unions into one outcome. In a second discrete-time logistic regression model (Table 3) analyzing this outcome, we investigate whether

[j]We conducted a sensitivity analysis in which we censored all out-migrants (including those who moved for marriage) and results were consistent with those reported below.

there are differences in the likelihood of union formation by the time elapsed since a woman's premarital birth.

The discrete-time hazard modeling strategy allows us to model time appropriately and to address the fact that our data are censored. Thus, the data are transformed into person-years representing the years during the study wherein women were at risk of union formation. Person-years of observation begin at age 10 or the age at which respondents immigrate into the study if at least age 10. Person-years continue until the year of union formation (which is the year of migration for women who move out of the site for marriage) [k], or right censoring due to leaving the study site for reasons other than marriage, aging out of the cohort (reaching age 36), or dying. Each respondent can contribute up to 20 person-years (1.7%, $n = 960$ contribute the maximum); the mean number of years contributed is 6 and the median is 9. Standard errors (SE) are adjusted for dependence in reports from the same individual over time and model results are presented as unadjusted odds ratios (OR).

The second analysis uses logistic regression to investigate whether women who entered a union during the study were more likely to enter non-marital partnerships versus marriages (reference), comparing those who had a premarital birth and those who did not (Table 4) and disaggregating single mothers by the time elapsed since their birth. Although as discussed above non-marital partnerships may transition to marriage once lobola is paid or other formalization processes occur (i.e., religious ceremony or registering with the magistrate), relationships that begin as non-marital partnerships may indicate that women's partners are economically disadvantaged because they cannot afford to make lobola payments immediately. Entering a non-marital partnership versus a marriage might also signal that one or both partners are hesitant to

[k] Only person-years in which the outcome event could have been observed are included in order to account for left censoring. For example, a woman who had a child in 1998 but entered the site in 2000 does not contribute person-years to models for the years 1998 and 1999.

fully commit to the relationship. Thus, entering a non-marital partnership versus a marriage may lead to negative short-term consequences for women due to a lack of economic resources and stigma from the community [49]. These unions might also lead to longer-term economic disadvantages for women if they dissolve more frequently than marriages. We expect that women who have a premarital birth will be more likely to enter these economically disadvantaged unions. In this analysis, each woman who enters a union during the study period and provides information about union type contributes one observation to the model.

RESULTS

Table 1 includes individual-level descriptive statistics for women aged 10-35. Almost half (44.8%, *n*=24,746)[l] of the women in the sample had a premarital first birth (not shown) and one quarter of all women in the sample (25.1%) entered a union[m]. Nearly two thirds (63.6%) of unions in the sample were non-marital partnerships. The average age of respondents over the study period was almost 20 years old and almost one third (31.9%) were of Mozambican origin. Among women in the sample who reached age 20 or above—and thus were old enough to have finished secondary school—half (53.1%) had attended and one quarter (25.1%) had completed secondary school.

Columns 2 and 3 include information for women who had a premarital birth and those who did not. Almost one quarter (23.6%) of women who had a premarital birth entered a union compared to 26.3% of women who did not have a premarital birth. Non-marital partnerships were more common than marriages among all women in the study, although women who did not

[l] This does not include women who reported that they gave birth and entered a first union in the same year (*n* = 1,199). If those women are counted as single mothers, as they are in the duration of single motherhood variable (see Table 1), women with premarital births comprise 47.0% of the sample.

[m] Using life tables, we also calculated the cumulative probability of union formation by age 36 among all women in the sample (58.5%), women who had a premarital first birth (51.1%), and women who did not have a premarital birth (69.6%).

have a premarital birth were more likely to enter these relationships (65.8%) than single mothers (60.1%). Women who had a premarital birth had a lower average age at first birth (19.6 years) compared to women who had a first birth after entering a union (21.9 years). Women who had a premarital birth were also more likely to be South African and had completed less schooling by age 20 than women who did not have a premarital birth.

[Table 1 about here]

Premarital Births and Union Formation

Table 2 shows that, controlling for age, nationality, education, and time period of observation, women who had a premarital birth were significantly less likely than women who did not have a premarital birth to enter a first union during the study ($p < 0.001$). All control variables were significantly associated with union formation in the expected direction. Women in their twenties had the highest odds of union formation; Mozambicans were more likely to enter a first union than South Africans; and the odds of entering a union increased with the level of education. Finally, the odds of union formation increased through 2007, after which time they began to decrease, but still remained higher than the odds of union formation in the 1990s (Pearson x^2 test for difference between Periods 3 and 4: $p < 0.05$; and for the difference between Periods 2 and 4: $p < 0.001$)[n].

[Table 2 about here]

We next disaggregated mothers by the time since their premarital birth to test whether women who had a premarital birth had a short-term advantage in entering a union, as other studies from Africa have shown [22,23]. Table 3 shows that single mothers had significantly higher

[n] The increase in the odds of union formation shown here and in Table 3 is driven by significant increases in non-marital partnerships over time. Whereas 68% of the unions among women in the sample in 1993-1997 were marriages and 32% were non-marital partnerships, by 2008-2012 this pattern had reversed: 31% of unions were marriages and 69% were non-marital partnerships (Pearson x^2 test, $p < 0.001$).

odds of entering a first union in the same year as the birth compared to women who did not have a premarital birth ($p < 0.001$). At longer durations, women who had a premarital birth had no advantage or indeed a significant disadvantage in union formation compared to women who did not have a premarital birth. All control variables had similar relationships to union formation as those shown in Table 2.

[Table 3 about here]

Non-marital Partnerships versus Marriages

Table 4 presents results for a model analyzing the likelihood of entering a non-marital partnership versus a marriage (reference) among women who entered a union during the study. As in Table 3, we disaggregated women who had a premarital birth by the time since birth. Results show that the odds of entering non-marital partnerships were highest among women who had a premarital birth and entered a union within two years. More specifically, the odds of entering non-marital partnerships were 20% higher among women who entered a union in the same year as the birth ($p < 0.05$) and 35% higher among women who entered a union 1-2 years after giving birth ($p < 0.05$). These results suggest that single mothers who entered a union relatively soon after birth may have had a union formation advantage—as shown in Table 3—because they were entering non-marital partnerships as opposed to marriages. Moreover, the relationship between having a premarital birth and the likelihood of entering a non-marital partnership versus a marriage was positive for all single mothers, though it only reached statistical significance for those who entered unions within two years. Several of the control variables were associated with union type in the expected direction. Non-marital partnerships were more likely among teenage women, Mozambicans, and women with less education, consistent with the argument that these unions are associated with economic disadvantage [26,45].

The association between union type and period suggests that non-marital partnerships have become more common in recent years, consistent with union patterns in other areas of South Africa [29] and research that has shown that the increasing costs of lobola have become a barrier to marriage [34,44,45].

[Table 4 about here]

DISCUSSION

Our analysis of union patterns in rural South Africa demonstrates important differences in the experiences of women who had premarital births and those who did not. Almost half (44.8%) of never-in union young women (aged 10-35) living in the Agincourt HDSS between 1992 and 2012 had a premarital first birth and these women were less likely to enter any union compared to women who did not have premarital first births. When we considered time since premarital birth, however, we found that single mothers were more likely to enter a first union in the same year as the birth than women who did not have a premarital birth. These findings echo past results from two other African regions: Cameroon [23] and Moshi district, Tanzania [22], which is notable given that these areas had lower rates of single motherhood and substantially lower ages at marriage at the time the studies were conducted. Why, then, do we find similar results in South Africa? One answer may lie in our results related to union type. Although single mothers may have had a union formation advantage shortly after giving birth, we also found that these women were more likely to enter non-marital partnerships, which are likely to be marked by social and economic disadvantage [26,45]. In fact, all single mothers who entered unions were more likely to enter non-marital partnerships compared to women who did not have premarital births. This suggests that any union formation advantage single mothers experienced may have been overcome by the type of unions these women entered. Thus, even in a context wherein premarital

first births are a common life course experience [18,50], never-in union single mothers continue to face disadvantages in forming unions.

Our findings suggest several areas for future research. First, our data do not allow us to assess the mechanisms that may be underlying single mothers' lower odds of entering any union compared to women who did not have a premarital birth. One explanation may be that having a premarital birth and getting married are competing risks for young women in rural South Africa. That is, having a premarital birth might preclude marriage and instead put women on a different pathway to non-marital partnerships, as our results suggest. However, another explanation might be that single mothers in rural South Africa prefer to forgo committed relationships and instead support their children on their own or with the aid of their natal kin. Future studies examining the mechanisms driving single mothers' lower likelihood of entering any union would help clarify how women and men respond to premarital births and whether single mothers are able to access other sources of economic support for children, such as their own mothers' pensions [36]. Additionally, research examining whether premarital births have become more common over time could provide nuance to our understanding of the strategies women and their families have developed for coping with unintended first births [also see ,18].

Second, our results show a union formation advantage among single mothers soon after giving birth. The timing of these unions suggests that these mothers are partnering with the child's father, which may enhance men's social and economic support for their children [24]. However, these relationships may also be short-lived and research from South Africa has shown that family instability during childhood is associated with detrimental consequences for young adults [50]. Future research examining the quality of women's relationships and their relationship

trajectories would be useful for assessing the extent to which unions formed soon after birth are likely to provide long-term benefits to women and children.

Finally, consistent with research from other areas of South Africa [29], our results indicate that non-marital partnerships have become more common in the Agincourt HDSS area. This suggests that relationships that do not include lobola may have become a precursor or alternative to marriage if couples are committed to one another but men cannot afford to pay lobola up front [34,44,45]. However, these results should be interpreted with caution because we must rely on retrospective data for unions beginning prior to 2005 and the reporting of non-marital partnerships that occurred in the past may be increasingly biased as time passes. Additionally, unions that began as non-marital partnerships and transitioned into marriages after the payment of lobola (a common sequence of events in the Agincourt HDSS)—all before 2005—may have been misclassified as marriages. Moreover, as mentioned above, the Agincourt HDSS data do not allow us to determine whether any union that began as a non-marital partnership later transitioned into a marriage. Future studies examining the role of lobola in couples' decisions about living together, whether and when partners pay lobola and non-marital relationships transition to marriages, and how these types of decisions affect relationship stability as well as the well-being of women, men, and children are much needed.

One limitation of the Agincourt HDSS data is the lack of complete information about the factors that might be associated with both single motherhood and union formation—such as sexual behavior, and comprehensive measures of socioeconomic status, such as women's income and access to other economic resources[o]. One advantage of the Agincourt HDSS data, however,

[o] Information about household assets is available in the Agincourt HDSS; however, these data are of limited utility for our analysis because they were initially collected only in 2001. Nonetheless, we conducted a sensitivity analysis using a sub-sample of 32,748 never-married women (168,528 person-years) who had non-missing information on household assets in at least one year (2001 or later). Results showed that the significant association between having

is that they allow us to analyze union patterns among a relatively homogeneous sample—non-migrant women—facing similar structural conditions that are likely to impact both premarital childbearing and relationship dynamics. These conditions include overburdened healthcare facilities due to high incidence of both infectious and non-communicable diseases, inadequate school quality, and high unemployment [18,28,46,51,52]. Our findings illustrate the challenges single mothers face in establishing unions during early adulthood in a context wherein premarital births are strikingly common. For those interested in the health and well-being of women and children, our results serve as an impetus to focus on premarital childbearing as an important determinant.

a premarital birth and a lower likelihood of union formation was robust to the inclusion of a measure of household assets in the model.

REFERENCES

1. Garenne M, Tollman S, Kahn K. Premarital fertility in rural South Africa: a challenge to existing population policy. *Stud Fam Plann*. 2000;31(1):47-54.
2. Garenne M, Tollman S, Kahn K, Collins T, Ngwenya S. Understanding Marital and Premarital Fertility in Rural South Africa. *J South Afr Stud*. 2001;27(2):277-290. doi:10.1080/03057070125205.
3. Kaufman CE, de Wet T, Stadler J. Adolescent pregnancy and parenthood in South Africa. *Stud Fam Plann*. 2001;32(2):147-160. doi:10.1111/j.1728-4465.2001.00147.x.
4. Manzini N. Sexual Initiation and Childbearing amond Adolescent Girls in KwaZulu Natal, South Africa. *Reprod Health Matters*. 2001;9(17):44-52.
5. Statistics South Africa. *Stages in the Life Cycle of South Africans*. Pretoria, South Africa; 2005.
6. Mchunu G, Peltzer K, Tutshana B, Seutlwadi L. Adolescent pregnancy and associated factors in South African youth. *Afr Health Sci*. 2012;12(4):426-434. doi:10.4314/ahs.v12i4.5.
7. Statistics South Africa. *Marriages and Divorces, 2011*. Pretoria, South Africa; 2012.
8. Wood K, Jewkes RK. Blood Blockages and Scolding Nurses: Barriers to Adolescent Contraceptive Use in South Africa. *Reprod Health Matters*. 2006;14(27):109-118.
9. Makiwane M. The Child Support Grant and teenage childbearing in South Africa. *Dev South Afr*. 2010;27(2):193-204. doi:10.1080/03768351003740498.
10. Makiwane M, Desmond C, Richter L, Udjo E. Is the Child Support Grant associated with an increase in teenage fertility in South Africa ? Evidence from national surveys and administrative data. *Methodology*. 2006;(December). ww.hsrc.ac.za/Document-2027.phtml.
11. Madhavan S, Thomas KJA. Childbearing and Schooling: New Evidence from South Africa. *Comp Educ Rev*. 2005;49(4):452-467.
12. Marteleto L, Lam D, Ranchhod V. Sexual Behaviour, Pregnancy and Schooling Among People in Urban South Africa. *Stud Fam Plann*. 2008;39(4):351-368.
13. Grant MJ, Hallman KK. Pregnancy-related school dropout and prior school performance in KwaZulu-Natal, South Africa. *Stud Fam Plann*. 2008;39:369-382. doi:10.1111/j.1728-4465.2008.00181.x.
14. National Research Council and Institute of Medicine. *Growing up Global: The Changing Transitions to Adulthood in Developing Countries*. Washington D.C.: The National Academies Press; 2005.
15. Gage A. Familial and Socioeconomic Influences on Children's Well-being: An Examination of Preschool Children in Kenya. *Soc Sci Med*. 1997;45:1811-1828.
16. Clark S, Hamplova D. Single Motherhood and Child Mortality in Sub-Saharan Africa: A Life Course Perspective. *Demography*. 2013;50:1521-1549.
17. Harrison A, O'Sullivan LF. In the Absence of Marriage: Long-Term Concurrent Partnerships, Pregnancy, and HIV Risk Dynamics Among South African Young Adults.

AIDS Behav. 2010;14:991-1000.

18. Madhavan S, Harrison A, Sennott C. Management of non-marital fertility in two South African communities. *Cult Health Sex*. 2013;15(5):614-628. /pmc/articles/PMC3674186/?report=abstract.
19. Zwang J, Garenne M. Social Context of Premarital Fertility in Rural South-Africa. *Afr J Reprod Health*. 2008;12(2):98-110.
20. Johnson-Hanks J. *Uncertain Honor: Modern Motherhood in an African Crisis*. Chicago: The University of Chicago Press; 2006.
21. Johnson-Hanks J. On the Limits of Life Stages in Ethnography: Toward a Theory of Vital Conjunctures. *Am Anthropol*. 2002;104(3):865-880.
22. Hattori MK, Larsen U. Motherhood status and union formation in Moshi, Tanzania 2002-2003. *Popul Stud (NY)*. 2007;61(2):185-199. doi:10.1080/00324720701331367.
23. Calvès A-E. Marginalization of African single mothers in the marriage market: Evidence from Cameroon. *Popul Stud (NY)*. 1999;53(3):291-301. doi:10.1080/00324720308090.
24. Richter L, Chikovore J, Makusha T. The Status of Fatherhood and Fathering in South Africa. *Child Educ*. 2010;86(6):360-365.
25. Collinson MA. Striving against adversity: the dynamics of migration, health and poverty in rural South Africa. *Glob Health Action*. 2010;3:5080.
26. Posel D, Rudwick S. Attitudes to marriage, cohabitation and non-marital childbirth in South Africa. In: Paper presented at the Micro-econometric Analysis of South African Data conference (MASA); 2012.
27. Blalock C. Labor Migration and Employment in Post-Apartheid Rural South Africa. 2014.
28. Klasen S, Woolard I. Surviving Unemployment Without State Support: Unemployment and Household Formation in South Africa. *J Afr Econ*. 2008;18(1):1-51.
29. Hosegood V, McGrath N, Moultrie T. Dispensing with marriage: Marital and partnership trends in rural KwaZulu-Natal, South Africa 2000-2006. *Demogr Res*. 2009;20(13):279-312. doi:10.4054/DemRes.2009.20.13.
30. Garenne M. A century of nuptiality decline in South Africa: A longitudinal analysis of census data. *African Popul Stud*. 2016;30(2 (Supp)):2403-2414.
31. Garenne M. Age at marriage and modernisation in sub-Saharan Africa. *South African J Demogr*. 2004;9(2):59-79.
32. Harrison A. Hidden Love: Sexual Ideologies and Relationship Ideals among Rural South African Adolescents in the Context of HIV/AIDS. *Cult Health Sex*. 2008;10(2):175-189.
33. Collinson MA, Tollman SM, Kahn K. Migration, settlement change and health in post-apartheid South Africa: triangulating health and demographic surveillance with national census data. *Scand J Public Heal*. 2007;35(Suppl 69):77-84. doi:10.1080/14034950701356401.
34. Posel D, Casale D. The Relationship between Sex Ratios and Marriage Rates in South Africa. *Appl Econ*. 2013;45:663-676.
35. Zwang J, Garenne M, Kahn K, Collinson M, Tollman SM. Trends in mortality from

pulmonary tuberculosis and HIV/AIDS co-infection in rural South Africa (Agincourt). *Trans R Soc Trop Med Hyg*. 2007;101(9):893-898. doi:10.1016/j.trstmh.2007.04.023.

36. Schatz E. "Taking care of my own blood": older women's relationships to their households in rural South Africa. *Scand J Public Health Suppl*. 2007;69:147-154. doi:10.1080/14034950701355676.
37. Goody J, Tambiah SJ. *Bridewealth and Dowry*. (Press CU, ed.). Cambridge, MA; 1973.
38. Steyn AF, Rip CM. The Changing Urban Bantu Family. *J Marriage Fam*. 1968;30(3):499-517.
39. Horne C, Dodoo FN-A, Dodoo ND. The Shadow of Indebtedness: Bridewealth and Norms Constraining Female Reproductive Autonomy. *Am Sociol Rev*. 2013;78(3):503-520.
40. Dodoo FN a. Marriage type and reproductive decisions: A comparative study in Sub-Saharan Africa. *J Marriage Fam*. 1998;60(14873):232-242. doi:10.2307/353454.
41. Shope JH. "Lobola is here to stay": Rural Black Women and the Contradictory Meanings of Lobolo in post-Apartheid South Africa. *Agenda*. 2006;20(68):64-72.
42. Hunter M. *Love in the Time of AIDS: Inequality, Gender, and Rights in South Africa*. Bloomington, IN: Indiana University Press; 2010.
43. De Haas M. Is there anything more to say about Lobolo? *Afr Stud*. 1987;46(1):33-55.
44. Posel D, Rudwick S, Casale D. Is marriage a dying instituion in South Africa? Exploring changes in marriage in the context of ilobolo payments. *Agenda*. 2011;25(1):102-111.
45. Casale D, Posel D. The Male Marital Earnings Premium in the Context of Bride Wealth Payments: Evidence from South Africa. *Econ Dev Cult Change*. 2010;58(2):211-230. doi:10.1086/647976.
46. Kahn K, Collinson MA, Xavier Gómez-Olivé F, et al. Profile: Agincourt health and socio-demographic surveillance system. *Int J Epidemiol*. 2012;41:988-1001. doi:10.1093/ije/dys115.
47. Kahn K, Tollman SM, Collinson M a, et al. Research into health, population and social transitions in rural South Africa: data and methods of the Agincourt Health and Demographic Surveillance System. *Scand J Public Health Suppl*. 2007;69(785022301):8-20. doi:10.1080/14034950701505031.
48. Gómez-Olivé FX, Angotti N, Houle B, et al. Prevalence of HIV among those 15 and older in rural South Africa. *AIDS Care*. 2013;25(January):1122-1128. doi:10.1080/09540121.2012.750710.
49. Posel D, Rudwick S. Ukukipita (Cohabiting): Socio-Cultural Constraints in Urban Zulu Society. *J Asian Afr Stud*. 2014;49(3):282-297.
50. Goldberg RE. Family Instability and Pathways to Adulthood in Cape Town, South Africa. *Popul Dev Rev*. 2013;39(2):231-256.
51. Worden N. *The Making of Modern South Africa: Conquest, Apartheid, Democracy*. Fourth Edi. Oxford: Wiley-Blackwell; 2007.
52. Tollman SM, Kahn K, Sartorius B, Collinson MA, Clark SJ, Garenne ML. Implications of mortality transition for primary health care in rural South Africa: a population-based

surveillance study. *Lancet*. 2008;372:893-901. doi:10.1016/S0140-6736(08)61399-9.

53. Budlender D, Chobokoane N, Simelane S. Marriage Patterns in South Africa. Methodological and substantitive issues. *South African J Demogr*. 2004;9(1):1-26.

ACKNOWLEDGMENTS

This project was supported by a William and Flora Hewlett Foundation/Institute of International Education Dissertation Fellowship (Hewlett Grant No. 2007-1542; IIE Program No. F480000); and grants to the University of Colorado from the Eunice Kennedy Shriver National Institute of Child Health & Human Development (NICHD) for the CU Population Center (R24HD066613), from the National Institute on Aging (R24AG032112), and from The William and Flora Hewlett Foundation (2009-4069). The Agincourt Health and Demographic Surveillance System site is supported by the University of the Witwatersrand and Medical Research Council, South Africa, and the Wellcome Trust, UK (grants 058893/Z/99/A; 069683/Z/02/Z; 085477/Z/08/Z; 085477/B/08/Z). The content is solely the responsibility of the authors and does not necessarily represent the official views of the funders. The authors thank Chodziwadziwa Kabudula, Sulaimon K. Afolabi, and Casey Blalock for their assistance with data preparation.

Table 1: Individual-Level Descriptive Statistics for Women aged 10-35, Agincourt HDSS 1993-2012

		All women	Had premarital birth	Did not have premarital birth
% women in union by age 36***		25.1%	23.6%	26.3%
Union type***	Of which, % in informal union[a]	63.6%	60.1%	65.8%
	Of which, % in formal union[a]	36.4%	39.9%	34.2%
Time since premarital birth[b]				
	No premarital birth	53.0%		
	<1 year	4.6%		
	1-2 years	12.6%		
	3-4 years	9.6%		
	5 or more years	20.2%		
Mean age***		19.7 (6.6)	22.3 (6.4)	16.7 (5.5)
Mean age at first birth***		19.7 (3.6)	19.6 (3.7)	21.9 (4.5)[c]
Nationality***				
	South African	68.1%	70.0%	66.5%
	Mozambican	31.9%	30.0%	33.5%
Highest level of education reported***[d]				
	None	9.2%	10.0%	7.5%
	Primary	25.6%	27.1%	23.0%
	Some secondary	28.0%	28.1%	27.9%
	Completed secondary	25.1%	24.0%	27.0%
	Missing	12.1%	10.8%	14.6%
% of person-years in each time period***				
	1993-1997	27.3%	30.5%	23.8%
	1998-2002	24.1%	26.0%	22.1%
	2003-2007	26.2%	24.4%	28.2%
	2008-2012	22.4%	19.1%	25.9%
		55,158	24,746	30,412
N (person-years)		323,274	169,653	153,621

Note: Percentages or means with standard deviations in parentheses.

[a]Limited to women who provided information about union type (n = 5,864).

[b]As reported in the year of union formation or censoring.

[c]Limited to women who had a child after entering a union (n = 2,871).

[d]Limited to women age 20 and above (n = 34,674).

*** $p < 0.001$, Pearson x^2 test for differences between women who had a premarital birth and those who did not.

Table 2: Discrete-Time Logistic Regression Model of Any Union Formation, Comparing Women age 10-35 who had a premarital birth and those who did not, Agincourt HDSS 1993-2012

		OR		*SE*	*CI*
Premarital birth					
	No (ref)	1.00			
	Yes	0.61	***	0.01	0.58-0.64
Age (time-varying)					
	10-14	0.02	***	0.00	0.02-0.03
	15-19	0.50	***	0.01	0.48-0.53
	20-24 (ref)	1.00			
	25-29	1.01		0.02	0.97-1.06
	30-35	0.62	***	0.02	0.58-0.66
Nationality					
	South African (ref)	1.00			
	Mozambican	1.34	***	0.03	1.29-1.40
Level of education (time-varying)					
	None (ref)	1.00			
	Primary	1.82	***	0.08	1.67-1.99
	Some secondary	2.16	***	0.10	1.97-2.36
	Completed secondary	2.41	***	0.12	2.19-2.65
	Missing education	6.62	***	0.33	6.00-7.30
Time period					
	1993-1997 (ref)	1.00			
	1998-2002	1.31	***	0.04	1.23-1.39
	2003-2007	1.81	***	0.05	1.71-1.92
	2008-2012	1.72	***	0.05	1.62-1.82
N (women)		55,158			
N (person-years)		323,274			
Pseudo-R^2		0.107			

Note: OR =odds ratio. Standard errors (*SE*) adjusted for clustering on respondent.
CI =95% confidence intervals.
***$p < 0.001$

Table 3: Discrete-Time Logistic Regression Model of Any Union Formation, Comparing Time since Premarital Birth among Women age 10-35, Agincourt HDSS 1993-2012

		OR		*SE*	*CI*
Time since premarital birth					
	No premarital birth (ref)	1.00			
	<1 year	1.51	***	0.05	1.41-1.60
	1-2 years	0.91	**	0.03	0.86-0.97
	3-4 years	0.96		0.03	0.90-1.03
	5 or more years	0.76	***	0.02	0.72-0.80
Age (time-varying)					
	10-14	0.03	***	0.00	0.02-0.03
	15-19	0.57	***	0.01	0.54-0.60
	20-24 (ref)	1.00			
	25-29	0.97		0.02	0.92-1.01
	30-35	0.59	***	0.02	0.55-0.63
Nationality					
	South African (ref)	1.00			
	Mozambican	1.33	***	0.03	1.27-1.38
Level of education (time-varying)					
	None (ref)	1.00			
	Primary	1.79	***	0.08	1.64-1.95
	Some secondary	2.11	***	0.98	1.93-2.31
	Completed secondary	2.44	***	0.12	2.21-2.68
	Missing education	6.46	***	0.32	5.86-7.13
Time period					
	1993-1997 (ref)	1.00			
	1998-2002	1.30	***	0.04	1.23-1.39
	2003-2007	1.83	***	0.05	1.73-1.94
	2008-2012	1.71	***	0.03	1.61-1.81
N (women)		55,158			
N (person-years)		323,274			
Pseudo-R^2		0.105			

Note: OR =odds ratio. Standard errors (*SE*) adjusted for clustering on respondent.
CI =95% confidence intervals.
** $p < 0.01$, *** $p < 0.001$

Table 4: Logistic Regression Model of Non-marital Partnerships versus Marriages, Comparing Time since Premarital birth among Women age 10-35, Agincourt HDSS 1993-2012

		OR		*SE*	*CI*
Time since premarital birth					
	No premarital birth (ref)	1.00			
	<1 year	1.20	*	0.10	1.03-1.41
	1-2 years	1.35	*	0.16	1.07-1.71
	3-4 years	1.08		0.16	0.82-1.44
	5 or more years	1.04		0.08	0.89-1.22
Age (time-varying)					
	10-14	3.34	*	1.68	1.25-8.96
	15-19	1.83	***	0.16	1.55-2.16
	20-24 (ref)	1.00			
	25-29	0.56	***	0.05	0.43-0.65
	30-35	0.53	***	0.05	0.43-0.64
Nationality					
	South African (ref)	1.00			
	Mozambican	1.33	***	0.10	1.14-1.54
Level of education (time-varying)					
	None (ref)	1.00			
	Primary	1.21		0.21	0.87-1.69
	Some secondary	0.80		0.14	0.58-1.12
	Completed secondary	0.26	***	0.05	0.19-0.37
	Missing education	0.79		0.14	0.56-1.12
Time period					
	1993-1997 (ref)	1.00			
	1998-2002	2.67	***	0.41	1.98-3.60
	2003-2007	8.14	***	1.21	6.08-10.91
	2008-2012	10.74	***	1.62	7.98-14.44
N(women)		5,864			
Pseudo-R^2		0.143			

Note: OR =odds ratio; *SE* =standard error; *CI* =95% confidence interval.

* p <0.05, *** p < 0.001