Changing Gender Gaps in the Timing of First Union Formation and Sexual Initiation in Sub-Saharan Africa

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Gender differences in union formation and sexual initiation in sub-Saharan Africa remain poorly documented, in large part due to a scarcity of research on the transition to adulthood among men. We adopt a novel perspective on this topic by examining gender gaps in the ages at first union and sex in 24 countries, focusing on measures of central tendency and dispersion. Gender differences in age at first union decreased, driven by postponement among women with relatively late union formation. Yet, due to concurrent persistence of early unions among a sizable portion of women's populations, within-country heterogeneity in ages at first union increased substantially among women. Thus, although forces responsible for earlier union formation among women than men are weakening, these changes affect population strata unequally. Gender differences in age at first sex decreased to a lesser extent, but in some countries. they disappeared or reversed, uncovering a shift in the relationship between gender and timing of sexual initiation. Changes in union formation and sexual initiation are more heterogeneous across countries among men than women, indicating that these processes among men are more context specific. We show importance of studying men's behavior and exploring heterogeneity in union formation and sexual initiation both within and between populations of women and men.

Introduction

Sexual initiation and first union formation are among the key events during the transition to adulthood that can shape the life course of young adults for

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many years. Although these events occur for women and men, comprehensive research examining levels and trends in the ages at these two events in sub-Saharan African countries has so far mainly focused on women. Because socioeconomic and demographic changes might affect the timing of these events very differently for men and women, trends in gender gaps or the differences in how men and women experience the transition to adulthood—cannot be inferred from the well-documented changes in the transition to adulthood for women. As a result, knowledge about the magnitude of gender differences in the timing of first unions and sexual initiation remains inadequate, as does knowledge about the changes in these gender gaps across cohorts.

To fill this gap in our knowledge, this paper adopts a novel focus on gender gaps, or the differences between men and women, in the transition to adulthood (Lloyd 2005). Our analyses focus on the timing of two key markers of this transition: first union and first sexual intercourse. Changes in the age at first union and first sex reflect the impacts of social and economic factors on young peoples' opportunities, the evolution of norms related to sexual behaviors and marriage practices, as well as changes in the extent of families' control over young peoples' lives (Mensch, Singh and Casterline 2005; Malhotra 1997; Lloyd 2005; Mensch, Grant and Blanc 2006). In settings where family roles, opportunities outside of the domestic sphere, and norms regarding sexuality differ markedly between men and women, examining gender gaps in the age at first union and sex can enhance the knowledge of changes in gender relations, organization of marriage, family, and social systems. This analysis is particularly relevant in sub-Saharan Africa. Although there are vast cultural and institutional differences that translate into a high degree of heterogeneity in social and demographic processes, the region is characterized by high levels of gender inequalities in domains related to schooling, formal labor force participation, and family- and household-decision-making (UNDP 2019; Airhihenbuwa 1995). These inequalities have been linked to union formation among women, which universally occurs earlier than among men (Hertrich 2007; Marston et al. 2009). Due to scarcity of research, however, it is unclear whether women tend to initiate sexual activity earlier than men, as well.

Theories of social and family change, as well as empirical evidence, provide some expectations about the evolution of gender gaps in the timing of first union formation and sexual initiation in sub-Saharan Africa. The region experienced pronounced social and economic transformations including urbanization, Westernization, increasing exposure to mass media and, in particular, increasing education (Majgaard and Mingat 2012; ECA 2017), which have been associated with rising average ages at first union among women in the majority of countries (Garenne 2004). The more egalitarian gender relations that modernization, industrialization, and developmental processes bring about (Goode 1963; Caldwell 1982) could translate into more similar trajectories of first union formation between women and men. At the same time, the rigidity of certain features of marriage behavior in sub-Saharan Africa contradicts the notion that these socioeconomic transformations would inevitably lead to increases in women's status and reductions in gender gaps in marriage-timing. The persistence of high levels of child marriage in countries like Chad, Zimbabwe, or Tanzania suggests that marriage postponement is not universal within countries (Koski, Clark, and Nandi 2017) and points to continued centrality of norms determining women's earlier union formation relative to men's.

Hypothesizing about the evolution of gender gaps in the timing of sexual initiation is also challenging, not least due to limited empirical evidence about the patterns of sexual debut among men. Through more similar patterns of socialization of girls and boys outside of the domestic spheres, such as, for example, in the school environment (Lloyd, Grant and Ritchie 2008), and lessening familial control over young peoples' lives, modernization could be associated with more similar patterns in the timing of first sexual intercourse between the genders. However, due to the complexity of factors affecting sexual behaviors, such as taboos and norms related to the meaning of sexuality and value of virginity (Bhana 2016; Kinsman et al. 2000), a large degree of heterogeneity both within and between countries is likely. Although gender gaps in the age at first sex could follow changes in gender gaps in the age at first union due to the close link between union formation and sexual initiation, rising levels of premarital sex among women (Gage and Meekers 1994) and limited knowledge of changes in sexual behavior among men warrant further investigation.

Gender gaps in the ages at first union and sex, their complexity, and changes over time across sub-Saharan African countries have not been systematically documented. There is limited research on the timing of sexual initiation among men and lack of studies on changes in gender gaps in the age at sexual debut across countries. Research on the timing of first union formation, documenting that differences between men and women decreased in some parts of sub-Saharan Africa (Hertrich 2007), focused on the study of median ages only. As we posit above, changes in the timing of first unions among individuals who form unions relatively early in the region do not appear to follow the course of changes described by the average ages. Measures of central tendency are likely to conceal heterogeneity in how the timing of first union and sex, and gender gaps in these events, are changing within countries. This highlights the relevance of evaluating changes at different points of the distributions of the age at first union and sex, beyond their center. Such investigation is important to cast light on the existence of, as well as changes in, inequalities in the timing of first union and sex within nations. Research on gender differences utilized

information about marital status at the time of surveys, which allows computing only mean or median ages at first union. The retrospective data on the age at first union and sex among men, which permit analyses beyond measures of central tendency, and whose availability increased substantially in the last two decades, remain under-exploited for a large-scale, crosscountry comparative research of gender differences in the timing of these events.

This paper examines how the ages at first union and sex differ between men and women, and whether gender differences in these events decreased in sub-Saharan Africa as fertility declined in most countries, schooling expanded, and societies became more economically developed. Our aim is to provide the first detailed account of the magnitude of gender gaps at different points of the distributions of the ages of first union and sex as well as their changes over time, across a large number of sub-Saharan African countries. To capture the diversity in the patterns of first union formation and sexual initiation, not only between but also within countries, we conceptualize timing of first union and sex more broadly than in previous studies on the topic. Using Demographic and Health Surveys (DHSs) that include retrospective information about the age at first union and sex among women and men, and cover 90 surveys for 24 countries, we calculate ages at which 25 (25th percentile), 50 (median), and 75 percent (75th percentile) of women and men in each cohort experience first sex and union, as well as corresponding interquartile ranges (IRs). We create indicators of gender gaps in these indicators, adopting a cohort perspective that is particularly suited to study behavioral changes. Our methodological approach permits documenting gender differences in a comprehensive manner, by looking at the whole distributions of the ages of first union and sex, as well as by examining differences in the dispersion of these distributions between women and men. Thus, we document heterogeneity in the timing of first union formation and sexual initiation not only between genders and countries, but also within the populations of men and women.

Background

Gender differences in the timing of first union formation and sexual initiation

Traditionally defined family roles, opportunities in schooling, the routes to status achievement, and social and cultural norms regarding sexuality have differed for men and women in sub-Saharan Africa, translating into distinct differences between the genders in the timing of first union formation and sexual initiation.

Men form first unions later than women in sub-Saharan Africa, which has been documented in the analyses of median ages at marriage across countries (Marston et al. 2009; Hertrich 2007) as well as the prevalence of unions across age groups at an aggregate level (Lloyd 2005; Mensch, Singh and Casterline 2005). This is driven by several factors. Women's life courses have been defined by marriage and reproduction; marriage and fertility have been a way for women to gain status and financial security (Hertrich 2017). Within such traditional family settings, in which arranged unions are common and familial control over the choice of the spouse is substantial, parents have an incentive to marry daughters early and close to puberty in order to protect their virginity before marriage (Mensch, Grant and Blanc 2006). There is evidence that familial involvement in young people's spousal selection is inversely related to the age at first union among women and is common in societies characterized by patriarchy and authority of senior family members, by which women's agency and decision-making power is limited. Conversely, financial means have been the primary way of status attainment among men, and higher earnings facilitate their marriage (Pike 2020; Smith 2020). Men are likely to wait with forming unions until they achieve necessary means to support a family, which in the context of some sub-Saharan African countries is related to the time needed to accumulate resources for the payment of bride wealth (National Research Council 1993; Isiugo-Abanihe 1994). These costs make early marriages less attractive for men and also can be a barrier to union formation (Hertrich and Pilon 1997; Pike, Mojola and Kabiru 2018). Thus, later age at first marriage among men than women also reflects expectations regarding the role of men as main breadwinners in contexts where gender and family roles are sharply delineated.

In such gender-stratified settings, parents are predisposed to marry their daughters earlier than their sons, but also prioritize boys' education. Women have lower levels of school attendance, in particular in West and Central Africa (Grant and Behrman 2010), and gender differences in the age at first union reflect unequal opportunities outside of the domestic sphere. Women's earlier marriage relative to men could result from their lower levels of schooling, which are known to be associated with fewer alternative opportunities, greater perceptions of the benefits of early marriage, or more limited professional and personal aspirations and autonomy (Jejeebhoy 1995). At the same time, women's opportunities in school progression and paid work may also be curtailed by early marriage, for example, as a result of school drop-out (Delprato et al. 2015; Sunder 2019). Finally, gender differences in the timing of first unions can be linked to polygyny, widely practiced in West Africa. Not only do women marry early in polygynous contexts, but unions are characterized by large age differences between spouses that have been suggested to prevail in societies where the status of women is low (Gaffney-Rhys 2012; Casterline et al. 1986). Due to power imbalances that accompany large spousal age gaps, wives whose husbands are much older may have limited decision-making

power about aspects of conjugal life, evidence of which is strong in research on, for example, contraceptive decisions (Barbieri and Hertrich 2005; Airhihenbuwa 1995).

Aggregate-level analyses of DHS data suggest that women initiate sexual activity earlier than men (Lloyd 2005), but country-specific studies provide less conclusive evidence. Singh et al. (2000) found that the percentage of young men who initiated sexual activity in adolescence was lower (Ghana, Mali) or similar (Tanzania, Zimbabwe), as compared to young females. According to Doyle et al. (2012), while a smaller proportion of teenage men than women had first sex before the age of 15 in West Africa, in many countries in the rest of the continent the opposite pattern was observed. Amo-Adjei and Tuoyire (2018) also highlighted variation in the relationship between gender and sexual initiation among unmarried individuals across countries. Marston et al. (2009) for Tanzania, Uganda, and Zimbabwe and Slaymaker et al. (2009) for Uganda documented that median ages at first sex were higher among men. Zaba et al. (2004) showed that the median age at first sex was higher among men than women in Ghana and Uganda, it was lower in Kenya, and little difference was observed in Zimbabwe and Tanzania. The comparison of the results between these studies is challenging since they used different measures of timing of sexual initiation, and analyzed different time periods, age groups and population strata according to union status. These heterogenous findings, not only between countries but also between studies for the same country, highlight the need for more cross-country comparative research, including of trends over time, using consistent methodology.

There is no doubt, however, that gender gaps in age at first intercourse are likely to exhibit a large degree of heterogeneity, not only between but also within countries, as they are driven by context-specific taboos, perceptions about the value of virginity as well as double standards with respect to men's and women's sexuality. On the one hand, sex and marriage tend to be more closely connected among women than men (Lloyd 2005); thus, the fact that women in sub-Saharan Africa form unions earlier than do men might result in their lower ages at sexual initiation. If premarital sexual initiation results in pregnancy, sexual debut among women might be quickly followed by marriage (Gage-Brandon and Meekers 1993), especially in contexts where nonmarital childbearing is not socially acceptable. Gender inequalities and power differentials in sexual relations might also foster earlier sexual initiation among women. Men might have a greater choice over when they initiate sexual activity; among women early first sex might result from social pressure (Slaymaker et al. 2009) or the coercion that has been shown to be frequent in countries, such as Uganda, Malawi, Ghana, and Burkina Faso (Moore et al. 2007). Women's limited bargaining power and agency in sexual decisions, especially when the first sexual partner is much older (Mensch, Bruce and Greene 1998), could result in earlier first sex than among men.

On the other hand, since premarital sex is generally more socially acceptable among men (Gage-Brandon and Meekers 1993), their ages at first sex could be lower. Women might delay sex if virginity at marriage is highly valued (Molla, Berhane and Lindtjørn 2008; Bhana 2016) and men might be expected to be sexually experienced before marriage, which reflects gender-specific norms related to sexuality and value of virginity. In Mali, Ghana, Tanzania and Zimbabwe intercourse during the teen years was more likely outside of marriage for men than for women (Singh et al. 2000). Thus, gender differences in the age at first sex might not necessarily follow those in the age at first union, and due to higher levels of premarital sexual activity, men might be experiencing sexual debut earlier. Social norms or peer pressure encouraging young men to be sexually active as a way of proving their masculinity (Eaton, Flisher and Aarø2003; MacPhail and Campbell 2001) could also result in earlier sex among men in some contexts. To sum up, the relationship between gender and timing of sexual initiation is complex, which could result in trends showing either positive or negative gender gaps.

Expectations regarding changes in gender gaps in the timing of first union formation and sexual initiation

Globalization, urbanization, Westernization, and increasing exposure to media affect social norms, expectations regarding gender roles as well as opportunities outside of the domestic sphere, altering patterns of union formation and sexual initiation.

The growth in schooling and employment opportunities, for women in particular, is among the most dramatic changes that occurred over the last decades in young people's lives in low- and middle-income countries (LMICs) (Lloyd, Grant and Ritchie 2008), including in sub-Saharan Africa. Increasing opportunities might change the notion that marriage is the only socially legitimate option for women, break the close connection between puberty and union formation (Malhotra 1997), and eliminate one of the pathways through which women enter unions earlier than men. Moreover, schools and labor markets increasingly shape the lives of young people, loosening family control (Grant and Furstenberg 2007). Increasing employment and earning potential of women, as well as the fact that the investment in women's education might increase the bride wealth price, could encourage parents to give up early marriage for their daughters (Isiugo-Abanihe 1994; Jejeebhoy 1995). Increasing autonomy also gives women more agency in the process of spousal selection. The "individualization of marriage" lengthens the process that leads to union formation until women find a candidate suitable to them (Lloyd 2005; Lesthaeghe, Kaufmann and Meekers 1989).

Among men, increasing emancipation from the control of the family could result in decreasing age at first union. For example, diminishing importance of bride wealth might reduce the financial burden associated with marriage and allow men to form unions earlier. There is evidence that the practice of bride wealth has been decreasing, for example, in Mozambique (Chae, Agadjanian and Hayford 2020). A qualitative study from Senegal suggests that some men might be initiating the marriage process earlier due to changing pattern of labor migration that occurs at younger ages than in the past. This gives men who migrate greater control over the onset of the marriage process, free from family control (Mondain, LeGrand and Sabourin 2007). Conversely, the rise in labor migration has been a contributing factor to postponement of unions among women in Mali (Hertrich and Lesclingand 2012), which reflects the interaction between changes in marriage, employment, and parental home-leaving behaviors. Overall, the easing of constraints that used to govern young people's marriage decisions, as well as changing labor market and migration opportunities, may lessen gender differences in the timing of union formation. We might expect decreasing gender gaps also to arise from changes that point to the emergence of more egalitarian gender relations, notably decreasing polygyny, as in Senegal, Kenya, Ghana, and Zimbabwe (Kayase and Liaw 1997) and decreasing spousal hypergamy (Pesando 2021).

The average age at first union among women has increased across the continent (Garenne 2004; Harwood-Lejeune 2001), echoed in the analysis of Pesando and GFC-team (2019), who showed a prominent role of sub-Saharan Africa in speeding, with development, the global convergence in women's singulate mean age at first marriage, a process not observed among men. Hertrich (2007) documented that due to increases in median ages at first union among women, and more modest changes among men, gender differences decreased in some of the sub-Saharan African countries, most notably Southern and Western parts. Although these studies (either indirectly or directly) suggest that the patterns of first union formation between the sexes are converging, the way they conceptualize timing of first union—in terms of the average age—might conceal complexity in this process.

Despite increasing average ages at first union, child marriage in sub-Saharan Africa continues to be prevalent and there is limited evidence of decreases in some countries (Koski, Clark, and Nandi 2017). The fact that laws banning marriage before the age of 18 do not always lead to decreasing prevalence of such unions (Batyra and Pesando 2020) suggests that norms determining women's early marriage remain deeply entrenched.

Since educational expansion in the region did not necessarily go hand in hand with quality of education (Psaki, McCarthy and Mensch 2018), schooling that some women receive might have been insufficient to induce changes in their autonomy or subsequent opportunities, and affect their marriage behavior. Moreover, constraints experienced by youth and their families might encourage early marriage among some women as a way of dealing with poverty, uncertainty, and precarity (UNICEF 2001). For example, conflict has been linked to increases in marriage before the age of 15 among women in Mali (Randall 2005). Growing-season draughts have also been associated with early union formation among women in Malawi, presumably as a way of dealing with resource constraints and related hardships (Andriano and Behrman 2020). Conversely, among men, precarity may be related to further postponement of marriage due to lack of means necessary to start a family. Increasing hardship has been associated with first-marriage delays among men in African capitals due to worsening employment conditions (Antoine 2006; Calvès 2007). It is evident that ongoing social and economic transformations are not shaping young people's opportunities and constrains equally within countries. Thus, we hypothesize that changes in gender differences in the timing of first unions (presumably of sexual initiation as well), which are influenced by these opportunities and constraints, are characterized by considerable diversity within nations. Analysis of such heterogeneity has not been incorporated into existing research on gender differences.

Hypothesizing about changes in gaps in sexual initiation between women and men is even more challenging due to the limited knowledge about the magnitude of these differences. On the one hand, increasing women's opportunities and participation in the public sphere results in activities of boys and girls becoming more similar. Time spent in school environment rather than at home in traditional activities among young women can enhance the process of socialization of girls and boys outside of familial settings (Lloyd, Grant and Ritchie 2008). This could mitigate gendered patterns of behavior and result in similar perceptions of boys and girls about when to initiate sexual activity. Increasing periods spent by youth outside of their villages as labor migrants also induce a change in the way they socialize outside the supervision of elders (Hertrich 2013). Thus, with the weakening of parental control, both males and females have greater discretion to make decisions about their early life-course transitions, free from traditional sexual mores. Increasing modern contraceptive use observed across the region (Behrman et al. 2018) can also contribute to breaking of the link between sexual initiation and marriage by reducing the risk of pregnancy and prompt marriage. As premarital sexual activity among women has been increasing across sub-Saharan Africa (Gage and Meekers 1994; Mensch, Grant and Blanc 2006), we hypothesize that sexual-debut trajectories are becoming more similar between women and men.

On the other hand, we anticipate considerable variation in whether gender gaps in age at first sex are decreasing or increasing given evidence that modernization might affect the timing of sexual initiation of men and women differently. Gupta and Mahy (2003) and Fagbamigbe and Idemudia (2017) documented that higher levels of education were associated with lower probability of early sexual initiation among women, while the reverse was true for men in some countries. Gupta and Mahy (2003) suggested that modernization might be associated with an increasing likelihood of earlier intercourse among men due to, for example, their greater opportunities to meet members of the opposite sex who are potential sexual partners. Given the evidence of a negative association for men and a positive one for women between sexual initiation and modernization in some countries, one could in fact observe divergences in the age at first sex between young men and women. How differences between women and men would be changing in the context of such genderspecific associations, requires establishing whether sexual initiation takes place earlier among women or men, and how these processes differ between countries.

Our study makes several contributions to the discussed body of research. Using retrospective information from DHSs, we focus on sexual initiation and first union formation across the whole reproductive life courses of men and women. Our analyses are not limited to certain age groups and encompass all individuals irrespective of their marital status, thus enhancing comparability of results between countries. This is particularly relevant when studying sexual initiation, as prior research on gender gaps in the timing of this event is limited. We subsequently document the extent to which evolution of gender gaps is driven by changes in the behavior of women or men. Second, in our analysis of how the age at first union and sex differs between men and women and how gender gaps are changing across cohorts, we move beyond the study of mean or median ages. We compute gender gaps in the ages at which 25, 50, and 75 percent of women and men enter first union and sex, as well as in the IRs. We study gender differences at various points of the distributions of the age at first union and sex, as well as changes in these distributions in terms of dispersion. This methodological framework allows us to incorporate into our study the analysis of heterogeneity in the timing of first union formation and sexual initiation, both between and within countries, and deliver a comprehensive examination of changes in gender gaps in these events for sub-Saharan Africa. Finally, we explore the extent to which patterns in the age at first union and sex have differed between 24 nations, as well as between first union formation and sexual initiation.

Data and methods

We use DHSs that include information about all women aged 15–49 residing in households randomly selected according to the program's sampling design (ICF International 2012). The ages of men who are interviewed differ depending on the country and survey round; in some of them, all men in randomly selected households are interviewed. For comparability, we restrict the analyses to individuals aged 15–49 at the time of the survey. We encompass all sub-Saharan African countries with at least two rounds of DHS that satisfy the following conditions: (1) surveys include both men's and women's questionnaires; (2) all individuals, irrespective of their marital status, are interviewed;¹ (3) surveys include a question about the age at first union and sex; (4) surveys are recent enough to reconstruct cohort trends for individuals born up until 1980–1984. As a result, we use 90 surveys for 24 countries (Table 1). Although we cannot include all sub-Saharan African countries due to these data requirements, the analysis of 24 nations allows us to study considerable number of diverse settings. We pool all surveys available for each country to generate a long-term series of indicators. To apply sampling weights to the pooled datasets, we de-normalize individual men's and women's weights for each survey according to the DHS guidelines (ICF International 2012). For this purpose, we use estimates of the population of men and women for each survey-year from the 2019 World Population Prospects (United Nations 2019).

Using retrospective questions about men's and women's age at first union and age at first sex,² we calculate measures of the timing of first union formation and sexual initiation for cohorts of men and women born between 1960 and 1989, grouping cohorts into five-year intervals.³ Our aim is to use as much information as possible; therefore, the latest cohorts differ by country depending on the year of the last survey (cohort born 1980–1984 or 1985–1989, depending on the country). Since we show the results separately by country, we must keep this in mind when interpreting the results even though it does not pose any problems for the analysis itself.⁴

For each country, and separately for men and for women, we estimate cohort trends in the ages at first union and sex. Not all individuals in our samples have already entered union or initiated sexual activity. We use survival analysis to take account of right censoring, that is, the fact that some individuals are still at risk of experiencing these events. We conduct separate analyses for sexual initiation and first union formation. We follow individuals from age 8⁵ onward until they experience these events or censor them at the age at the time of the interview. To estimate the ages at first union and sex, we use a Kaplan–Meier estimator that allows us to calculate the median ages, as well as the ages at which 25 and 75 percent of the population experiences these events, providing the IR (Forthofer and Lee 1995; Singer and Willett 2003).

The 25th percentiles of the distributions of the age at first union and sex reflect the ages at which individuals with the earliest pattern of sexual initiation and union formation experience these events, relative to the other members of a given cohort. The 75th percentiles provide corresponding information about individuals who experience these events latest. The IR is a

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TABLE 1

								Sample s	ize ^b	Cohorts	
Country (Abbreviations)	Surveys							Men	Women	Oldest	Youngest
Benin (BJ)	1996	2001	2006	2011	2017			13,363	45,539	1960-1964	1985-1989
Burkina Faso (BF)	1998	2003	2010					7,943	24,096	1960-1964	1980-1984
Burundi (BU)	2010	2016						6,044	15,238	1960-1964	1985–1989
Chad (TD)	1996	2004	2014					5,936	22,195	1960-1964	1985–1989
Comoros (KM)	1996	2012						1,512	4,914	1960-1964	1980-1984
Congo (CG)	2005	2011						4,779	11,015	1960-1964	1980-1984
DRC^{a} (CD)	2007	2013						6,389	14,677	1960-1964	1980-1984
Ethiopia (ET)	2000	2005	2011	2016				22,171	45,217	1960-1964	1985–1989
Ghana (GH)	1993	1998	2003	2008	2014			9,303	18,826	1960-1964	1980-1984
Guinea (GN)	1999	2005	2012	2018				7,596	23,768	1960-1964	1985–1989
Kenya (KE)	1993	1998	2003	2008	2014			13,567	37,254	1960-1964	1980-1984
Liberia (LB)	2007	2013						6,139	9,461	1960-1964	1980 - 1984
Malawi (MW)	2000	2004	2010	2015				13,958	53,155	1960-1964	1985–1989
Mali (ML)	1995	2001	2006	2012	2018			11,987	43,280	1960-1964	1985–1989
Mozambique (MZ)	1997	2003	2011					6,196	28,041	1960–1964	1985–1989
Niger (NI)	2006	2012						4,048	12,376	1960-1964	1980-1984
Nigeria (NG)	2003	2008	2013	2018				31,371	80,727	1960-1964	1985–1989
Rwanda (RW)	2000	2005	2010	2014				10,076	29,455	1960-1964	1980 - 1984
Senegal (SN)	1997	2005	2010	2014	2015	2016	2017	11,755	39,747	1960-1964	1980-1984
Sierra Leone (SL)	2008	2013						5,254	12,717	1960-1964	1980 - 1984
Tanzania (TZ)	1991	1996	1999	2004	2010	2015		11,578	40,849	1960-1964	1985 - 1989
Uganda (UG)	1995	2000	2006	2011	2016			9,201	34,854	1960-1964	1985–1989
Zambia (ZM)	1996	2001	2007	2013				13,171	24,605	1960-1964	1980 - 1984
Zimbabwe (ZW)	1994	1999	2005	2010	2015			19,188	30,165	1960 - 1964	1985 - 1989
^a Total sample size from all survey DRC. Democratic Republic of the	rounds when : Congo.	samples of n	ien and wo	men are res	tricted to ag	e 15–49.					
^b DRC, Democratic Republic of the	rounds when Congo.	samples of II		inch arc res	uriciea lo ag	. 44-CI 9					

measure of dispersion of the distributions of the age at first union and sex and describes how heterogeneous a given cohort is when it comes to the timing of these events. Changes in the IR provide insights into whether this variation is increasing or decreasing. For example, if the IR in the age at first union increases, this means that the gap in the timing of first union formation widens between individuals who transition to unions earliest (bottom 25 percent) and those who do so latest (top 25 percent), within a given cohort. Measures of percentiles are a straightforward yet powerful way of quantifying within-population diversity and heterogeneity in the timing of events using population-level indicators. This approach has an important advantage with respect to comparability, given that our analyses cover populations and cohorts that differ markedly in terms of composition, for example, with respect to measures of socioeconomic status. Our analyses permit capturing divergences and convergences in the timing of union formation and sexual initiation within populations using measures that are comparable between countries and cohorts.

The key novelty of our analyses is the focus on gender gaps in the timing of sexual initiation and first union, that is, the differences between men and women in these markers of the transition to adulthood. We calculate indicators of gender gaps, separately for each country and cohort. Importantly, our analyses focus not only on the average gender gaps but recognizes heterogeneity by highlighting also gender gaps at the early and late end of the distributions. Specifically, the gender gap in the age at first union or sex is the difference between men and women in the median, 25th percentile, 75th percentile or the IR of the age at first union or sex for a given cohort. To examine how these gaps changed across cohorts, we calculate differences in all indicators of gender gaps between the youngest and the oldest cohorts for each country. We also compare changes between the last and the first cohort in a given indicator, between men and women. Although we only show results for the oldest and the youngest cohorts, we use the estimates obtained for the in-between cohorts to examine the consistency of the observed changes over time.⁶ For example, we check whether the trends are consistently in the direction indicated by the change between the last and the first cohort. This gives us confidence that the results we show are not an artifact of the choice of these two cohorts but represent a plausible direction of change over time.

There are advantages of using retrospective information about the age at first union and sex over the current-status measures of marriage and sexual activity. Retrospective data allow us to reconstruct long-term cohort trends in these events spanning across the same period, even though for some countries men's DHS questionnaires are available only for more recent surveys. Moreover, they permit calculating indicators pertaining to different points of the distributions of the age at first union and sex, which is one of the novelties of our research. Nonetheless, retrospective survey questions have limitation in that they can suffer from recall errors. Older respondents in particular might have difficulty recalling events that happened at an early stage of life (Gage 1995; Pullum 2006). Questions about sexual activity and marital status in general can be subject to biases related to the unwillingness of young individuals to report that they are sexually active (Neal and Hosegood 2015; Weiss, Shelan and Gupta 1996) or to interviewer effects, particularly in contexts where survey concepts might be different from local concepts and interviewers distant from respondents socioeconomically (Randall et al. 2013). The main limitation of questions about union status in sub-Saharan Africa is that union formation might be a long process, which proceeds in stages, rather than a discrete one, and can involve a prolonged period of "conjugal testing" during which partners take incremental steps toward union formation (Bledsoe and Pison 1994). Conversely, among some ethnic groups, a marriage ceremony takes place before cohabitation and sexual relations (Meekers 1992). Due to the fluidity of conjugal practices in sub-Saharan Africa, it might be difficult for an individual to identify the start of a union and to state the exact age at which the union was initiated.

These issues demonstrate the limitations of surveys in capturing processes that are so culturally heterogeneous. Another problem that can arise is that age at first union corresponds to the age at first marriage or cohabitation since no distinction is made between these two types of unions, thus limiting our ability to explore the intricacies of union formation dynamics. When it comes to sexual initiation, reporting might be influenced by local cultural norms. Young people might be hesitant to disclose information about their sexual lives to outsiders, especially in cultures were premarital sexual activity is considered inappropriate or when sexual initiation resulted from coercion (Mensch, Bruce and Greene 1998). Such biases should be kept in mind when analyzing changes in the timing of sexual debut over time. Although we are not aware of existing evidence, it is theoretically possible that changing norms around sexuality, which we aim to capture using survey questions, might also influence reporting of sexual activity. We acknowledge these limitations; nonetheless, there are currently no other measures, free from such shortcomings, which could be used for the purpose of a large-scale, cross-national study of the timing of first union and sex.

Results

Gender gaps in the timing of first union formation and sexual initiation

Gender differences in the median ages at first union and sex for the oldest and the youngest cohorts are presented in Figure 1. Specifically, the gray



FIGURE 1 Gender gaps in the median age at first union and the median age at first sex, the oldest and the youngest cohorts

NOTE: Gender gap is calculated as a difference in a value of a given indicator for men minus a value for women. Change between cohorts is calculated as a difference in a value of a given indicator for the 1960–1964 cohort minus a value for the most recent cohort, as specified in Table 1.

and black dots represent the difference between men and women in the median age of entering the first union, with positive values indicating that men experience first unions on average at a later age than women. Black dots pertain to the oldest cohort, gray dots to the youngest (most recent) cohort. Countries are ordered according to the magnitude of gender gaps in the age at first union for the oldest cohort. Full dots and arrows are used for countries if the change from the oldest to youngest cohort is larger than one year, which we consider a substantively relevant change, and dots are hollow if the change across cohorts is less than one year.

Figure 1 shows that men transition to first union on average later than women, indicated by the fact that gender gaps are consistently greater than 0, corroborating findings from prior studies (Marston et al. 2009; Mensch, Singh and Casterline 2005; Lloyd 2005; Hertrich 2007). The magnitude of these differences varies from around 12 years in Senegal to around four years in Burundi.⁷ Gender differences in the median age at first union decreased in around half of the countries and were concentrated in settings where they are initially largest.⁸ This suggests that social, cultural, and economic forces contributing to earlier union formation among women than among men are weakening in countries where they were previously strongest. These changes are driving a trend toward convergence in the magnitude of gender gaps of countries where they were initially larger with countries where they were smaller. Nonetheless, differences between men and women did not disappear, and in most countries, they continue to be larger than five years.

Gender gaps in the median age at first sex, represented by brown (oldest cohort) or yellow (youngest cohort) dots in Figure 1, are positive among the oldest cohorts. Thus, historically, women experienced sexual debut earlier than men. This finding is partially expected given the strong link between union formation and sexual initiation among women and the fact that they form unions earlier than men. There is no country included in our analyses in which men initiate sexual activity earlier than women in the oldest cohorts. This is surprising, given that sexual activity, including premarital, is generally more socially acceptable among them (Gage-Brandon and Meekers 1993). Nonetheless, our results indicate that the relationship between gender and timing of sexual debut changed over time in some countries. Gender gaps disappeared in Congo, or even became negative in Comoros and Kenya. Although still positive, gender gaps are close to 0 for the youngest cohorts, for example, in Malawi, Mozambique, Tanzania, and Zambia. A trend toward convergence in the timing of sexual debut between women and men across several countries suggests that gender-specific norms related to the value of virginity and meaning of sexuality might be weakening.

Gender gaps in the timing of sexual debut are smaller than in the timing of first unions for the oldest and youngest cohorts, as indicated by the brown/yellow dots being to the left of the gray/black dots, suggesting that first sex and union formation continue to be more closely connected for women than for men. Largest changes in gender gaps in the median age at first sex occurred in countries where corresponding changes in the median age at first union were largest as well, but the pattern is not entirely consistent. Although in some countries, gaps in both first union and first sex



FIGURE 2 Gender gaps in the age at first union: 25th and 75th percentiles (left panel) and interquartile range (IR) (right panel), the oldest and the youngest cohort

NOTE: Gender gap is calculated as a difference in a value of a given indicator for men minus a value for women. Change between cohorts is calculated as a difference in a value of a given indicator for the 1960–1964 cohort minus a value for the most recent cohort, as specified in Table 1.

decreased (e.g., Nigeria), in other, only the union-gap (e.g., Mali) or the sex-gap (e.g., Mozambique) changed. Thus, the evolution of gender differences in the timing of sexual debut does not always follow first-union changes.

The focus on gender gaps in the median age in Figure 1 conceals the complexity in the evolution of differences in the age at first union between men and women. Importantly, gender gaps, and the changes thereof, differ markedly between cohort members with a relatively early and relatively late entry into first union. To illustrate, the left panel in Figure 2 shows gender gaps in the age at which 75 percent of individuals in a given cohort enters first union (pink dots), as compared to the gender gap in the age when 25 percent of a cohort enters first union (green dots). The gender gaps at the age when 75 percent of a cohort enters first union were substantially larger than differences in the age when 25 percent initiate unions. Therefore, differences in the timing of union formation between men and women who enter unions relatively late were much larger than among those who enter unions relatively early. However, in the majority of countries, and irrespective of the magnitude of the initial gap, gender differences in the age at

which 75 percent of the population of women and men form first union decreased, a process not observed when looking at the 25th percentile.

These results provide unequivocal evidence that gender gaps in the timing of union formation have shrunk across cohorts, however, this process is occurring mainly through the changes in the upper tails of the distributions of the age at first union (i.e., among individuals with relatively late union formation). These findings indicate that the lack of changes in gender gaps in the median age does not mean that differences between men and women in the timing of first union formation are not shrinking. Although gaps in the medians did not substantially change in, for example, Ghana or Zambia, there is an erosion of differences between women and men at the upper tails of the age-at-first union distributions. Moreover, gender gaps among individuals who form unions relatively early (bottom 25 percent) show no sign of decreases even there where gender gaps in the median ages eroded (e.g., Senegal or Mali). These results provide evidence that gender gaps are not changing uniformly within countries.

The analysis of IRs provides a new dimension for understanding the differences in the patterns of first union formation between women and men (Figure 2, right panel). For the oldest cohorts, gender gaps in IRs are as large as four years in Mali or Guinea. These results mean that once a substantial minority of individuals enters first union within a cohort, this process occurs more quickly in the rest of the population among women than among men. Thus, the first union formation is a process that is more "spread out" across ages among men; among women it is concentrated within a narrower age range. Although it is known that marriages among men overall occur until much later ages, in particular in polygynous contexts, which determines wider age ranges at which they marry, our study shows that the first-union trajectories are much more heterogenous within the populations of men as well. Greater diversity in the timing of first unions within men's population could be a result of a larger degree of freedom that men in sub-Saharan Africa have to decide about the timing of their marriages, as compared to women. It could also be related to the fact that men's marriage decisions are dependent on the accumulation of the resources for the costs of marriage (Pike 2020; Pike, Mojola and Kabiru 2018), which is a constraint that might exhibit a large degree of heterogeneity within populations. Differences in IRs decreased, however, substantially across cohorts in most countries; in some, they disappeared (e.g., Rwanda, Mozambique). Changing gender gaps in the spread of the distributions of the age at first union are an important dimension of shrinking gender differences in union formation.

The patterns in the 25th and 75th percentiles as well as IRs are different in the case of the age at first sex (Figure 3). Gender gaps in ages at which 75 and 25 percent of individuals have first sex are more similar and smaller than in the case of first unions, ranging from 0 (e.g., Kenya)



FIGURE 3 Gender gaps in the age at first sex: 25th and 75th percentiles (left panel) and interquartile range (IR) (right panel): the oldest and the youngest cohort

NOTE: Gender gap is calculated as a difference in a value of a given indicator for men minus a value for women. Change between cohorts is calculated as a difference in a value of a given indicator for the 1960–1964 cohort minus a value for the most recent cohort, as specified in Table 1.

to around five years (e.g., Ethiopia). Thus, not only are gender gaps in the timing of first sex generally smaller (as seen in Figure 1), but differences in the dispersion of the distributions of the age at first sex between women and men are less pronounced. The analysis of gender gaps in IRs, which are less than three years in most settings, and in countries like Mozambique, Kenya, or Sierra Leone close to 0, supports this conclusion (Figure 3, right panel). Overall, the patterns of sexual activity are more similar between women and men than the patterns of union formation, and this is the case across the whole distributions of the age at first sex. The changes over time in gender gaps in the timing of sexual initiation were also more modest than it was observed for first unions. This pertains specifically to gender gaps in IRs that remained relatively constant, except for Guinea, Comoros, Ethiopia, and Rwanda. Nonetheless, in countries where gender gaps in the timing of first sex were considerable, a trend toward convergence of the behavior of women and men is visible when examining the 25th and 75th percentiles, notably in Senegal, Guinea, Nigeria, Ethiopia, Burkina Faso, and Sierra Leone. These changes do not follow a consistent pattern and are taking place through decreasing gender gaps at the lower (Sierra Leone), upper (Senegal, Nigeria, Burkina Faso, Ethiopia) or both (Guinea) tails of the age at first sex distributions. They are also mainly confined to countries where gender gaps in the median age at first sex decreased, which overall suggests that changes in gender gaps in the timing of first sex are much more homogenous within countries than those pertaining to first unions.

Changes in the timing of first union formation and sexual initiation among women and men

Our subsequent analyses focus on whether changes in women's or men's transition to adulthood were primarily responsible for the trends in gender gaps illustrated in Figures 1–3. For this purpose, Figures 4–6 show indicators of the timing of first union and sex, separately by gender (women on the vertical, and men on the horizontal axis). Specifically, the solid arrows in Figures 4-6 indicate the direction of change in a given indicator across cohorts, by gender, for countries where gender gaps changed by at least one year in our prior analyses (Figures 1–3).⁹ Arrows begin at the point defined by men's and women's age at first union (or first sex) in the oldest cohort (darker shade), and end at the point defined by the corresponding ages in the youngest (most recent) cohort (brighter shade). Arrows that point upward indicate that the age at first union (or first sex) increased only for women, but not for men, while horizonal arrows pointing to the right indicate that to the age at first union (or first sex) increased only for men, but not for women. Arrows that point toward the top right indicate that the age at first union (or first sex) changed for both women and men across cohorts, and if the arrows are parallel to the diagonal, the magnitude of change is identical for men and women.

In countries where gender gaps decreased by at least one year, the median age at first union as well as the 25th and 75th percentiles increased among women (except for Sierra Leone, arrows are pointing upward in Figure 4). Among men, changes varied between countries: in some, the age at first union increased (e.g., Ethiopia, Nigeria); in others, it decreased (e.g., Comoros, Sierra Leone). The fact that most arrows are steep rather than flat and point upward indicates that, in line with existing research on median ages, changes in the age at first union in sub-Saharan Africa were generally larger and more consistently toward postponement among women than among men (Marston et al. 2009; Hertrich 2007). Several discrete findings emerge highlighting the complexity of changes in the timing of first union among men and women.

First, changes in the age at which 25 percent of the population forms first unions were similar among men and women in most countries (except for Congo, Uganda, and Comoros). This involved mainly a small degree of first-union postponement among both men and women, though in some countries, there has been virtually no gender change. Contrary to this





NOTE: Change in gender gap between cohorts is calculated as a difference in a value of a given indicator for the 1960–1964 cohort minus a value for the most recent cohort, as specified in Table 1.



FIGURE 5 Interquartile range: age at first union and age at first sex, by gender, the oldest and the youngest cohorts

NOTE: Change in gender gap between cohorts is calculated as a difference in a value of a given indicator for the 1960–1964 cohort minus a value for the most recent cohort, as specified in Table 1.

result, the ages at which 75 percent of the population form first unions increased markedly among women (e.g., up to around five years in Ghana or Ethiopia), which highlights differences in how early and late union formation is evolving within countries. These changes are responsible for the decreasing gender gaps in the ages at which 75 percent of men and women form first unions, and negligible change in the gender gap described by the 25th percentile (shown in Figure 2). In virtually all countries, more than one quarter of women still enter first unions below the age of 18 in the youngest cohort, while this is not the case in any of the countries among men.





NOTE: Change in gender gap between cohorts is calculated as a difference in a value of a given indicator for the 1960–1964 cohort minus a value for the most recent cohort, as specified in Table 1

Our results in Figure 4, therefore, provide evidence that shrinking gender gaps in the timing of first union formation in sub-Saharan Africa are driven by postponement of relatively late unions, while there is little evidence of "catching up" with men of women who marry relatively early. Moreover, Figure 4 suggests that changes among men exhibit substantial variation across countries not only in terms of direction and magnitude, but also between percentiles. In some countries, changes among men contributed to decreasing gender gaps (e.g., in Comoros for all indicators). In a few countries, shrinking gender differences were driven by changes in the behavior of men; namely, in Mali, Sierra Leone, and Mozambique, changes in the 75th percentile were greater among men than among women, and gender differences in this indicator shrunk due to decreasing age at first marriage among men. Related pattern among men is that of contrasting changes in the 25th and the 75th percentiles. In Senegal, Burkina Faso, and Mozambique, while the age at which 75 percent of men enter first union decreased, the age at which 25 percent of men form first union increased.¹⁰ Thus, in some nations, concurrent increases and decreases in the age at first union within men's populations has taken place.

The fact that some men within these populations form marriages earlier across cohorts suggests that forces governing their late union transitions, such as financial and social constraints, might be weakening. At the same time, ages at first union could be increasing among other strata of men who are experiencing hardship related to worsening economic conditions, as argued to be the case in some of the African cities (Antoine 2006; Calvès 2007). The study of Calvès (2007) also showed that, in Burkina Faso, higher levels of education among men were associated with later entrance into union. Thus, the age at first union could be increasing among those men who have benefited from schooling expansion. Although we are unable to identify mechanisms behind these changes, our methodological approach allows us to identify and quantify not only considerable variation, but also contrasting changes in the timing of first union formation within the populations of men.

Finally, the pronounced change in the age at which 75 percent of women in a given cohort enter first union, both in absolute terms and relative to men, explains appreciable increases in IRs among women (Figure 5) and decreases in gender gaps in that measure (Figure 2). The distributions of the age at first union among women widened across cohorts (e.g., IRs increased from around 5 to 9 in Ghana), and have become more similar to those observed among men (Figure 5). Such increasing within-population heterogeneity in the contexts where a substantial portion of the population of women continues to enter first unions at ages that are known to be detrimental to women's health and well-being (Dahl 2010; Girls Not Brides 2019), can be interpreted as an evidence of growing inequality in the timing of first union within the populations of women. Finally, although changes

among women in the IRs were in most cases more pronounced than among men, in some countries, gender gaps in this measure shrunk also due to decreases in IRs among men (e.g., in Senegal or Mozambique). Overall, contrary to what has been observed among women, IRs among men decreases in around half of the countries, providing further evidence how the dynamics of transition to first unions have differed between men and women.

In line with the findings from Figures 1 and 2 showing that differences between men and women in the timing of sexual initiation are much smaller, most of the points relating to both the youngest and the oldest cohorts, lie closer to the 45° equality line than was in the case of the age at first union (Figure 6). In countries where gender gaps decreased by at least one year, among women, the median age at first sex either increased (e.g., Kenya or Nigeria) or remained relatively stable (e.g., Guinea or Sierra Leone). Postponement of sexual initiation among women was less pronounced than in the case of first unions. Among men, changes in the age at first sex again varied between countries, and to a greater extent than among women. In nations where gender gaps in the median age at sexual initiation changed by at least one year, the age at first sex among men decreased (e.g., Sierra Leone, Mozambique) or increased slightly (Nigeria, Comoros). Although changes in the age at first union among women are generally more pronounced than among men in countries where gender gaps decreased, this pattern is less evident for sexual initiation. By looking at the medians, it is evident that in Kenya, Comoros, and Nigeria, changes among women were larger than among men. However, the opposite was true in Guinea, Sierra Leone, Mozambique, and Congo. Thus, in the context of sexual initiation, deceasing gender gaps are also driven by a downward trend in the age at first sex among men. In this analysis, we have observed and examined the consistency of trends over time among men, given decreases in the age at first sex in an appreciable number of countries. We find that these trends are consistently downward across cohorts, indicating that they represent a plausible trend toward earlier ages of first sex among men.

The marked diversity in how the age at first sex is changing among women and men, as well as across nations, is likely to reflect cultural diversity in norms and values related the meaning of sexuality and value of virginity. The decreasing median age at first sex among men in some countries is in line with research that hypothesized that modernization might be associated with earlier sexual initiation among men (Gupta and Mahy 2003). It could also be a result of changing timing of first union formation among men, as shown in Figure 4. Although sex and marriage are less closely connected for men than for women, decreasing median age at first union could have contributed to decreasing median age at first sex among men in countries like Sierra Leone and Congo. The comparison of changes in the timing of first union and sex within countries provides further evidence of how heterogenous the behavior of men is. In some countries the median age at first sex and union changes in the same direction, but in other nations, a pattern of de-coupling of first union formation and sexual initiation can be observed (Guinea and Mozambique).

Finally, since changes in gender gaps across different points of the distributions of the age at first sex were much less pronounced than in the case of the age at first union, the gender-specific changes in the age at first sex are also more similar across percentiles. As a result, changes in IRs for sexual initiation were smaller and less consistent in terms of direction and magnitude across countries (Figure 5). Figure 5 confirms findings from Figure 3 that IRs of the age at first sex distributions were similar in magnitude among men and women, and additionally shows that IRs for the age at first sex themselves have been smaller than for the age at first union for both genders. Thus, once a substantial minority of women and men initiates sexual activity, the process occurs more rapidly among the rest of the population than it is in the case of first union formation. These results suggest that sexual initiation is an event that is concentrated within a narrower age range within the populations of both genders, as compared to union formation, and is a process that is more homogenous within the national populations. As we discussed throughout the study, both union formation and sexual initiation are known to be associated with individuals' socioeconomic status. Nonetheless, union formation is an event that is particularly transformative; more often than sexual initiation, it involves leaving parental home, taking up job responsibilities or leads to parenthood. It is thus dependent on opportunities (e.g., educational, labor market) as well as constrains (e.g., financial) to a larger extent that sexual initiation, which could explain why it exhibits greater variation within nations.

Discussion and conclusion

Prior to this study, there has been no systematic and comparative analysis of differences between men and women with respect to two key markers of the transition to adulthood: first union and first sex. Although these behaviors have been extensively studied for women, and to a lesser extent for men, our study is the first to provide a comprehensive picture of changing gender gaps in the timing of first unions and sexual initiation in sub-Saharan Africa. Importantly, by focusing not only on measures of central tendency, but also on indicators of variation, our findings highlight the complex dynamics of how the socioeconomic and demographic changes during the last decades have transformed sexual initiation and first union formation differentially for men and women. Our results emphasize the importance of taking a broad perspective to understand better the evolution of nuptiality and sexual activity across cohorts.

Although gender gaps in the timing of first union persist, our study documents decrease in differences in the age at union formation between men and women. Importantly, changes in the median ages suggest that gender gaps shrunk in around half of the countries, indicating that social, cultural, and economic forces contributing to earlier union formation among women than among men are weakening. Yet, these results pertaining to medians mask substantial heterogeneity. The measure describing changes at the higher ends of the distributions of the age at first union reveals that gender gaps have decreased in many countries. At the same time, gender differences in early unions remain largely unchanged. Our results provide evidence that decreasing gender gaps in the timing of first union are driven by postponement of relatively late unions as opposed to reductions in early marriages among women. Thus, although our findings support the notion that social norms that divide gender roles and differences in opportunities outside of the domestic spheres between women and men might be diminishing, they also suggest that these changes are not taking place among individuals who are likely to be part of the most gender-stratified cultures. These particular findings have implications for future research on nuptiality patterns in sub-Saharan Africa. They show that the timing of first union formation exhibits complexity that measures of central tendency, which have so far been the primary way of studying trends in and determinants of this process, do not fully capture. We showed that not only are gender gaps not changing uniformly within countries, but the timing of first union formation is characterized by increasing diversity within the populations of women.

These seemingly contradictory processes, that is, the persistence of early union formation and union postponement among women within the same populations, and consequently, unequally changing gender gaps, might be an expression of growing inequality in the context of rapid socioeconomic transformation observed in sub-Saharan Africa. These changes could be a result of social stratification that determines increasingly differentiated trajectories of first unions among women, given that the countries we study are characterized by high levels of social and economic inequality (Chancel et al. 2019; Adesina 2016). Such inequality can be manifested in differences in the quality of schooling, access to information or differentiated impacts of crises on families, which pave the way to inequalities in other domains of young people's lives, including marriage. It is possible that the most advantaged groups, such as women who receive higher quality education, urban women or women experiencing few social and economic constraints benefit most from modernization processes. Accordingly, they might be postponing unions much as men do (or are foregoing marriage altogether). On the other hand, the persistence of norms relating to very early marriage might be strongest among the least advantaged, among whom resistance to change by the family or

constraints that drive their earlier union formation relative to men could be acute.

There is evidence that increases in the age at first union among women in sub-Saharan Africa have been more pronounced in urban areas (Garenne 2004); thus, divergent trends in union formation between places of residence could be partially driving our results. Although examination of urban-rural differences was beyond the scope of this research, our supplemental analysis suggests that changes we documented for total populations were indeed larger in urban than in rural areas (i.e., decreases in gender gaps in median ages and IRs) (Figures A2–A4 of the Appendix in the Supporting Information). Future studies could explore urban-rural differentials in depth, and data permitting, quality of schooling. Relatively high levels of education might be required before women are able to resist traditional norms surrounding marriages (Jejeebhoy 1995). Although gender gaps in schooling decreased (Grant and Behrman 2010), the percentage of women who complete primary school and have basic literacy decreased in some countries (Psaki, McCarthy and Mensch 2018). Thus, only a selected group of women might be receiving quality education that translates into union postponement and first-union trajectories that are more like those observed among men. Postponement of marriage enhances women's empowerment in the long term (Yount, Crandall and Cheong 2018), while early union formation adversely affects women's health and well-being (Dahl 2010; Girls Not Brides 2019). Thus, growing gaps between women who marry earliest and those who marry latest within countries could not only be driven by, but also further lead to perpetuation of social and economic inequality.

Our results also highlighted several features of change in marriage patterns among men. For example, we showed that the timing of first union is characterized by greater variation within the populations of men than women. Although among women this diversity increased markedly, the opposite pattern was observed among men in around half of the countries. Thus, social and economic transformations have affected disparities in the timing of first union within the populations of women and men differently. Overall, our results show that the distributions of the age at first union in terms of dispersion are different and are not changing uniformly between women and men. Beyond providing evidence that within-population heterogeneity is an important dimension of gender differences in union formation, these findings are important for theorizing about the determinants of the timing of first unions at the macro level. Development in LMICs has been associated with increasing average ages at first union among women, but not men (Pesando and GFC-team 2019). Our study shows that such rising median ages at first union among women took place concurrently with divergences in the patterns of first union formation within nations. Among men, the more stable trends in the median age at first union were accompanied by shrinking of the age-at first union distributions in some countries. These results raise an important question about what the relationship is between development and inequalities in the timing of first unions within populations, as well as how modernization shapes these inequalities differently between men and women.

When it comes to differences in the timing of sexual initiation, we documented that in the majority of sub-Saharan African countries, women continue to initiate sexual activity earlier than men, providing the most comprehensive to date documentation of how men and women differ in terms of their sexual debut across the region. Contrary to our expectations that men would initiate sexual activity earlier than women, at least in some contexts, we found little evidence to support this hypothesis. Although earlier sexual debut among women still prevails in most countries, in several nations gender differences have been falling toward 0 and in two countries they became negative. This represents a shift in the context of sexual initiation, whereby gender differences begin to disappear. This finding is in line with our hypothesis that enhanced processes of socialization of young women and men outside of traditional familial constrains with modernization would be associated with the erosion of gendered patterns of sexual behavior.

We show that the narrowing of gaps between men and women is taking place due to multitude of changes related to their behaviors, which differ between countries. In some countries, changes in men's behavior were responsible for decreasing gender differences in sexual initiation. This is a pattern distinct from that observed in the case of gender gaps in first unions, which were predominately driven by postponement of unions among women. We thus believe that more research on men is needed. Based on our study it is evident that, across some settings, men are experiencing sexual debut earlier across cohorts. From a policy perspective, this earlier initiation is noteworthy when considering the sexual and reproductive health needs of young men. Beyond importance for understanding of gender differences in sexual relations, these findings are vital given that young people who have first sex earlier are more vulnerable to sexually transmitted infections (Wand and Ramjee 2012). Thus, our results cast light not only on sexual behaviors, but also on the sexual and reproductive health risks associated with the ongoing changes in the timing of first sex.

This research illuminates how social and economic transformations are affecting women's and men's early-life transitions dissimilarly. Our results contribute to studies showing that the relationship between development and changes in family formation in LMICs differs between men and women (Pesando and GFC-team 2019), so does the relationship between socioeconomic status and timing of sexual debut (Gupta and Mahy 2003). In our analysis, as well, changes in the timing of first union and sex among men appear to be more context specific, not only than among women, but also than many general theories of family change presume. Knowledge of the determinants of these processes among men is still limited. Given increasing data availability, examination of the events that mark transition to adult-hood among men more broadly, including country-specific analyses and according to measures of socioeconomic status, would be a fruitful direction for future research. Overall, our study enriches the understanding of the dynamics of first union formation and sexual initiation in sub-Saharan Africa by highlighting new dimensions and complexity of nuptiality and sexual activity, which future studies could profitably explore in greater depth. Finally, the findings on age gaps by gender in the timing of sexual debut and first union provide a note of caution in the power of broad theories of convergence to explain the changes we have observed.

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Notes

1 We exclude countries where only ever-married women were interviewed.

2 The age at first union in DHSs corresponds to the age at first marriage or age at first cohabitation since no distinction is made between these two types of unions when this information is collected.

3 To ensure the representativeness of our results for a given cohort-group, we restrict the analyses to those for which the information about all five cohorts was available for a given country.

4 Our conclusions are not sensitive in confining the analyses to cohorts born between 1980 and 1984 for all countries.

5 There were very few individuals with age at first sex or union below age 8 and we excluded them from the analysis.

6 The results for all the cohorts are available on request.

7 Maps in Figure A1 of the Appendix (in the Supporting Information) show that although differences between men and women in the median ages at first union and sex tend to be largest in Western Africa, there is a substantial degree of diversity within the regions.

8 Although we show absolute changes in gender gaps across cohorts, calculation of relative changes (i.e., percentage changes) in gender gaps also indicates that they decreased to a larger extent in countries where they were initially largest.

9 Results are also shown in form of tables in the Appendix in the Supporting Information (Tables A1 and A2). 10 Decreases in 75th percentile are highlighted with solid arrows for these three countries and can be identified with country codes. Increases in 25th percentile for these three countries are presented with dotted arrows, therefore country codes for these countries are not included for consistency. Detailed estimates for each country can be found in Tables A1 and A2 of the Appendix in the Supporting Information.

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