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Abstract

In Malawi, Africa, the median age at first marriage is among the lowest on the continent and adolescent fertility rates are among the highest. Using high-frequency panel data from the country designed to follow single women and men into marriage, we examine the extent to which premarital fertility is associated with the timing of marriage. Two notable findings emerge. First, premarital fertility typically leads to a more rapid transition into marriage, compared to those not having had a premarital conception or birth, with controls. The effect is as strong for men as it is for women. Second, among women with premarital fertility, those who are wealthier, and have two parents alive, have lower odds of *not* marrying. Among men with premarital fertility, however, no patterns predict their subsequent marital outcomes. This study contributes to the literature on fertility and marriage in sub-Saharan Africa by including men in the analysis.

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Background

An impressive body of research across a range of disciplines has investigated the process and timing of marriage in sub-Saharan Africa (e.g., Hunter 2016a; Johnson-Hanks 2005; Meekers 1992; Shapiro and Gebreselassie 2014). Marriage may characterize a range of union formation types, such as traditional, civil, religious, those that occur without ceremony, and how people come to define marriage often differs by country context (Ansell et al. 2018; Arnaldo 2004). In Malawi, for instance, people generally consider themselves married upon cohabitation, defining the move-in and establishment of a household as the substantive transition, even if a formal ceremony has yet to occur (Clark, Poulin, and Kohler 2009). By comparison, in South Africa, where 'formal' marriage is delayed until later in life for several reasons (including that bridewealth is an elongated process), typically cohabitation is not construed as marriage per se, and many couples cohabit indefinitely, forgoing matrimony altogether (Hunter 2016b). The process and timing of marriage may also differ by economic and social demographics. Bledsoe (1990) discovered that in Sierra Leone, for example, more educated women progressed quickly through the conjugal process, having their marriages recognized by family, religious organizations, and the state, compared to their less educated counterparts. Notwithstanding these broad definitions and shifts in timing, marriage and union formation in sub-Saharan Africa mark an important life milestone, one that creates ties that are not only legal, but also economic and social. At the same time, over the past 25 years the age at first marriage has been rising across the continent, and these rising trends may be accompanied by major changes in both living arrangements and socioeconomic prospect (Bongaarts, Mensch, and Blanc 2017; Mensch, Singh, and Casterline 2005).

A parallel body of research recognizes first pregnancy and birth as additional, important milestones toward the transition to adulthood. This literature explores the various permutations of how these events shape life outcomes, such as how first birth relates to the formation of kin relations in the present and future, or of how premarital fertility relates to future marriage (Bledsoe and Cohen 2003; Garenne and Zwang 2006; Madhavan 2010; Smith 2001; Smith-Greenaway and Clark 2018). Although older studies have reported on an increase of premarital childbearing in sub-Saharan Africa over time (Gage-Brandon and Meekers 1993; Ocholla-Ayayo, Wekesa, and Ottieno 1993), recent studies have updated this literature. Clark, Koski, and Smith-Greenaway (2017) investigate how trends in premarital fertility may be influenced by the rising age in first marriage over the past couple of decades. Using DHS data from 27 countries across the continent, the authors found heterogeneity in trends; in some countries, fertility prior to marriage has increased by up to 13 percent, while in others, it has decreased by 7 percent. Clark and colleagues attribute the latter finding to the possibility of a delay in sexual debut, along with an increased use of contraception. In another study investigating the link between premarital childbearing and marriage in sub-Saharan Africa, Smith-Greenaway and Clark (2018) find a dual trend. Although the birth of a child results in a quicker transition to marriage for women initially, unmarried mothers, on average, marry at older ages, and remain single for between 2 and 14 years, than women without children. In other words, if the birth of the child does not quickly translate into a faster union for a woman, she is more likely to remain single compared to her childless peers. These findings are similar to Hattori and Larsen (2007)'s study in Tanzania, who found women who spent less than a year in single motherhood were significantly more likely than childless women to enter into a first union. Women who had been

single mothers for five or more years (about two-thirds of women with a premarital birth) were significantly less likely than women without children to enter into a first union.[2]

We contribute to this literature by investigating the extent to which premarital fertility hastens first marriage, in one southern Africa country in particular, Malawi. Does premarital fertility speed up the process of marriage? If so, to what extent? We take our analyses a step further by additionally investigating the background characteristics of the young people who experience premarital fertility and then go on to marry. What can be known about those young people who do marry quickly after premarital conception or birth, and those who do not? By drawing upon a short-run, high-frequency, panel data set in central Malawi, we overcome some of the limitations inherent in cross-sectional surveys—like the DHS—which rely upon respondents' needing to date key events such as first pregnancy and marriage retrospectively. We also consider the role of economic and household characteristics in influencing this relationship, shown to be important in the outcomes of our interest in other studies. School attendance, for instance, is correlated with fertility outcomes and the timing of marriage, orphanhood can result in less schooling and faster sexual initiation, and family instability and wealth influence fertility and marriage (Beegle and Krutikova 2008; Goldberg 2013; Case and Ardington, 2006; Goldberg and Short 2012; Ngom, Magadi, and Omuor 2003; Timaeus and Boler 2007; Zanin, Radice, and Marra 2015).[3] Grant and Furstenberg (2007), for instance, show how the transition to adulthood, including premarital fertility as a marker, has been evolving in Africa alongside increases in female schooling and age at first marriage. Attending school may causally and simultaneously reduce the risk of premarital birth and delay the age at first marriage. In South Africa, where the

[2] Mensch, Grant, and Blanc (2006) found that, with the rising age of first marriage in sub-Saharan Africa, comes a shift in the context of sexual initiation—that is, more women are having first sex prior to marriage.
[3] Data from Malawi's 2010/2011 National Integrated Household Survey 3 show that both maternal and paternal orphans ages 17-22 are statistically more likely to be out of school and more likely to be ever married.

overwhelming majority of early childbearing occurs outside marriage, Kara and Maharaj (2008) find that women living in lower- wealth households are six times more likely to experience early childbearing compared with women living in higher- wealth households. In another study in Malawi, Beegle and colleagues (2015) found that household wealth was associated with a slower transition to adulthood on key events. Relative to their poorer counterparts, young men and women of higher wealth were significantly more likely to report attending school in the end line survey. They were also less likely to be married, to ever be pregnant, or to report ever having had sex.

We also contribute to the literature on fertility by including the analysis of young men, who, although not completely missing from studies of reproductive behavior and fertility (e.g., Bledsoe et al. 2000; Paget and Timæus 1994; Randall and LeGrand 2003; Withers et al. 2015; Zhang 2011), have been generally neglected in such studies (Dodoo and Frost 2008). Demographic studies of family planning and fertility in sub-Saharan Africa have overwhelmingly focused on women, whether explaining reproductive outcomes (i.e., children ever born, child spacing) or preferences and aspirations (e.g., Bongaarts 2020; Casterline and Han 2017; Kodzi et al. 2010; Trinitapoli and Yeatman 2018). [4] When men are the subject of research, they tend to be treated as interesting rather than critical for understanding reproductive behavior (e.g., Field et al. 2016; see Goldscheider and Kaufman 1996). Green and Biddlecom (2000) argue that demography's theoretical approaches to reproduction and the empirical neglect of men have been mutually reinforcing and conclude that assumptions about women's primacy in fertility and contraceptive use has devalued men's roles, impoverishing the study of fertility and

[4] One could also look at the implications for children of being born to unmarried parents. Smith-Greenaway (2016) finds that being born premaritally is associated with higher child mortality, but that is only true for children whose mothers have never been to school or discontinued at the primary level and/or never learned to read.

family planning as a whole. In a large literature review covering 1995 to 2013, Vouking et al. (2014) found that a majority of men are aware of contraceptive methods, while far fewer report actively using them; female respondents, in contrast, say that they make decisions about contraception in equal measure with male partners. In other words, men may not dominate decisions in the realm of reproduction, but that does not necessarily mean their involvement in family planning and reproductive decisions in general is limited or irrelevant.

There are signs that this longstanding exclusion of men from fertility research is slowly beginning to erode, as noted by Schoumaker (2019). Along with others, Schoumaker additionally points out that, if fertility is to be understood in particular contexts (as we aim to do here), men must be included (e.g., Calvès 2007; Mturi and Moerane 2001; Shell-Duncan and Wimmer 1999).[5] (This is not a novel statement but slow to be realized; see Goldscheider and Kaufman 1996.) In sub-Saharan Africa, however, research on male fertility has been incredibly scarce (see Bledsoe et al. 2000; Calvès 2000; Donadje 1992; Ratcliffe et al. 2000 for notable exceptions); moreover, the studies of men's fertility-relevant attitudes and behaviors in this region are approached with a social-problems lens that portrays men as a "social concern." In qualitative research in Agincourt, South Africa, for instance, Zwang and Garenne (2008) described declining social pressure on men to take responsibility for a non-marital pregnancy, compared to the recent past (i.e., early half of the 20th century), for a variety of reasons: social, since elders

[5] A particularly rich set of studies on premarital fertility comes from South Africa, a country different in many ways from other countries in that sub-region (e.g., Harrison and O'Sullivan 2010; Marteleto, Lam, and Ranchhod 2008; Sennott, Reniers, Gómez-Olivé, and Menken 2016). Notable differences include that South Africa has lower fertility, higher income, greater inequality, higher open unemployment, and higher adolescent fertility out of wedlock. In addition, South African girls and women who become parents during their teens often return to school following the birth for several reasons, including receipt of parental support (partly attributed to the fact that more educated girls are expected to bring higher amounts of bride wealth payments, see Kaufman, de Wet, and Stadler 2001) and permissive education systems.

have less influence on young adults; economic, since many very young fathers have no income and, therefore, an inability to pay for the bride price (lobola) or support their new family; and geographic, since men might migrate, escaping the acute social pressure of the villages. Zwang and Garenne assess the overall consequence of premarital fertility in this community, not from the perspective of men but children, who "lack of a social father." While certainly valid and worthy of concern, the problem-centered approach to men's reproductive lives has often failed to document how men view their own reproductive roles (Green and Biddlecom 2000). Furthermore, by making negative comparisons between men and women and by focusing almost exclusively on the economic sphere, as a bundle of constraints and obligations, the existing literature has not yet integrated men in the overall portrait of fertility. As such, this oversight may be inadvertently biasing policy options.

Malawi

The country of Malawi, in southern Africa, has a population of 19.3 million people with 82 percent residing in rural areas. Most households get by through subsistence farming, with additional income streams sourced through casual labor, petty trading, and small-scale opportunities (National Statistical Office 2019). Poverty in Malawi remains pervasive and entrenched, with over half of the population (52 percent) impoverished (World Bank 2018a). In 2007, gross national income (GNI) per capita was $360, far lower than the average of $1,516 for the sub-Saharan region, excluding high-income countries (World Bank 2018). Yet, despite these persistent economic challenges, the country as a whole has made great improvements in key life domains, such as in maternal and child health. In urban and rural areas alike, high proportions of mothers receive prenatal care and birth assistance from skilled workers, and vaccines are

administered to most children. Malawians today generally prefer smaller families than in the past, and more and more women are reporting using contraception to monitor spacing and family size, and, in recent years, Malawi's fertility has been in decline. In 2015-2016, Malawi's TFR was 4.4 children, down from 5.7 in 2010, 6.0 in 2005, and 6.7 in 1992, part of the trend in sub-Saharan Africa where, in recent years, fertility rates in general has been dropping (MDHS 2015-2016; United Nations, 2020; World Bank, 2018b).[6] Infant mortality rates have been declining: In 2010, infant mortality stood at 68.4, in 2015 it was 52.6, and in 2020 it is estimated at 41.3 (United Nations, 2020). Yet, young people must still contend with the limitations of very few formal job opportunities and curtailed chances to pursue formal education beyond the teen years, and typically must find alternative paths to forge their own livelihoods. These realities may be reflected in the unchanging statistic of the median age at first birth, which remains at 19.0 years, approximately stagnant over the past two decades (MDHS 2015-2016; see also Baruwa et al. 2020).

Marriage remains nearly universal: according to the most recent DHS, of women aged 25-29, 97 percent have been married at least once, and 99 percent aged 30-34 have ever married. The median age at first marriage among women is 18.2 years and 23.0 for men (MDHS 2015-2016). Malawi is unusual in the East African context, however, as the median age at first marriage is younger than most and parallels countries in West Africa, with rates more similar to Burkina Faso, Guinea, Mali, and Niger, than to Kenya or Tanzania, the latter of which have higher median ages, at 20.2 and 19.2 years for women, respectively. As the numbers reflect, marriage in Malawi is deeply significant socially and economically. Malawian's conventional

[6] Malawi's fertility rate has continued to decline. In 2018, its fertility rate was 4.2. In fact, of the ten countries that have experienced the greatest decline across the globe, seven are in sub-Saharan Africa, with Malawi being one of them (United Nations, 2020).

understandings are that selves are made through social achievements that are critically tied to the obligatory kin relationships generated through marriage. The transitions surrounding marriage tend to be fast: for those not experiencing premarital birth, first marriage is often followed quickly by first childbirth, about a year later. Women become sexually active around age 17 (Boileau et al. 2009).

Data and Methods

The data come from the Marriage Transitions in Malawi (MTM) project, a panel study designed to investigate the social and economic influences on the timing of key life events among young people, such as leaving school, engaging in sex for the first time, and marrying.[7] Beginning in July, 2007, the MTM project collected longitudinal data from a random sample of 1,183 initially never-married women and men in the district of Salima in central Malawi. Respondents were interviewed at short intervals, up to five times within 26 months. Nearly all panel studies in sub-Saharan Africa conduct survey rounds at a minimum of yearly intervals (and often longer), which necessitates a reliance upon retrospective reporting of events, and may bias estimates due to recall error, especially if social desirability influences reporting in terms of premarital childbearing followed by marriage. The MTM data, because they were collected in high-frequency intervals, are largely able to circumvent these issues.

There is another unique feature of the MTM data that is relevant for our purposes. Because adolescents and young adults tend to be geographically mobile, the study team made efforts to track respondents who relocated over the course of the panel. This permitted a high

[7] The project details and the publicly available data can be found at https://microdata.worldbank.org/index.php/catalog/3462. See also Beegle and Poulin (2017).

retention of movers, important for this particular inquiry, as marriage often results in a move to a new community. Since more than one-quarter of MTM respondents physically moved during the course of the panel (and overwhelmingly within Malawi), tracking proved important for ensuring re-contact rates (Beegle and Poulin 2013). Of the respondents in the first survey in 2007, 89 percent are re-interviewed in the final round in 2009. The attrition over the course of the panel is attributed mostly to respondents marrying and moving, rather than to refusal or death (see Table 1). The respondents not re-interviewed had similar baseline socioeconomic and demographic characteristics with the respondents re-interviewed (results available upon request).

The MTM study took place in Salima district, one of 28 districts in the country. Salima is located in the Central Region, about an hour's drive east of the capital of Lilongwe, and bordering Lake Malawi, the seventh largest freshwater lake in the world. Salima was selected for the study location for the following, practical reasons: (1) its ethnic composition is diverse and includes the Chewa, the predominant ethnic group in Malawi (65 percent nationally), as well as several other tribal communities; (2) MTM collaborators had experience in the Central Region; (3) keeping the study within one district facilitated high-quality data and higher re-interview rates; and (4) the presence of an HIV/AIDS epidemic in the district, one of the additional areas of focus for the study.[8] Salima town itself is a bustling place of market activity, with a local hospital and several health clinics, bicycle taxis, schools, small businesses, motels, restaurants and bars, and local and international organizations. The town is located along the main road connecting Lilongwe to the lake. Twenty percent of Malawi is covered by water bodies; thus, Malawi has a large fishing economy, and an estimated 9 percent of the people of Salima are supported through fishing (FAO, 2020). Salima district also comprises many rural villages, and the MTM sample

[8] We often use the term 'tribe' to describe ethnic groups or communities to match how Malawians themselves refer to their own ethnic groups or communities.

was therefore stratified by rural and semi-urban enumeration areas to include the range of communities.

The sampling strategy began with a random sample of 60 enumeration areas (EAs), selected out of a possible 215 in Salima, as defined by the National Statistical Office. The project team used data from the Second Integrated Household Survey (2004/05), a nationwide household survey, to perform power calculations on the timing of first marriage in the region to ensure that a sufficient number of women and men transitioned from unmarried status to a first marriage over the course of the panel (2007–09). To that end, the sampling frame was stratified by age, with five categories among women (ages 15, 16, 17, 18, and 19–21) and four categories among men (ages 18, 19–20, 21–22, and 23–25). The target was to allow for the observation of the marriage of 50 percent of the baseline sample by the end of the 26 months; in actuality 33 percent had married by the endline survey. A complete household listing was undertaken to draw the sample from a listing of all age-eligible women (ages 15–21) and men (ages 18–25) in each EA; 10 women and 10 men were randomly selected from each of the 60 EAs. A few EAs had an insufficient number of women and men in the target age category who had never married. In these cases respondents were randomly selected from an adjacent age category (Table 2).[9] The final sample consisted of 1,183 women and men who resided in 1,059 households; in a few households, more than one person was selected for inclusion in the survey (see Beegle and Poulin 2017).

[9] Replacements were used when the field team was not able to interview the original selected respondent. There were 315 replacements for a variety of reasons. In 144 cases, the information from the household listing was inaccurate: the respondent did not actually reside in the household [58], had ever been married [35], wrong age was reported [46], and wrong gender [5]). In 127 cases, the individual was unavailable: away temporarily and not returning during the baseline field work [63], attending boarding school [30], difficult to meet due to work [30], parent away and unable to give consent for minors [2], or in police custody [2]. There were 28 refusals (14 by the respondent and 14 by a parent of a minor). Finally, there were 16 other cases: illness [10], household located on police quarters and required special permission [1], mentally ill [4], and other language [1].

Three annual survey rounds were conducted, in 2007 (HH1), 2008 (HH2), and 2009 (HH3). Key domains relevant to the current research and collected at each of wave include measures of premarital fertility, relationship and partner characteristics, household characteristics, and key events and experiences such as first marriage and school leaving. Women and men were asked identical questions, tailored to their gender when necessary. Two interim survey rounds, called partnership interviews (PIs), were conducted midway between the three annual surveys: PI1 was conducted six months following HH1, and PI2 was conducted six months following HH2. In these shorter interviews (lasting about 45-minutes each), respondents were asked about life events and experiences that had occurred since their last interview, and focused on intimate relationships and sexual partnerships, leaving school, moving, pregnancies, births, changes in households, and marriage. The structure and measures of the annual household surveys and the partnership interviews were developed based on other surveys used in Malawi and other countries; however, new content specific to the MTM purposes was also created. All instruments were extensively pretested.

The sample for each of the two PI rounds was a random selection of two-thirds of the baseline. We cannot discount the possibility that respondents who did not participate in either 'interim' interview have greater overall under-reporting of premarital fertility, due to early miscarriage or other termination, or some other reason. Still, by far most participated in at least one interim interview and, in order to maximize the possible sample size, we include the entire sample across all five waves (See Table 1).

At each interview respondents were asked a series of questions about premarital fertility, including whether they were currently pregnant (or had a partner who was pregnant), or had given birth since the last interview (or, in the past, in the case of the baseline survey), and the

date of the pregnancy and/or birth. We measure premarital fertility as either pregnant prior to marriage (for those still pregnant), or gave birth prior to marriage. [10] Finally, the marriage date [month, day, year] was collected for respondents who married over the course of the panel.

Survival Models

We use survival analysis techniques to estimate the probability of entry into first marriage in each month as a function of individual characteristics and the experience of premarital fertility. The survival analysis allows us to accommodate right censoring for observations due to the end of the study, where not everyone has entered into marriage, with the knowledge that marriage is nearly universal in Malawi. Throughout the survival analysis, the exposure period for the risk of first marriage begins at age 14, which is about the youngest age bound that girls enter marriage in this setting. The end of the exposure period ends at whichever comes first: first marriage, or last interview, or the end of the survey. We fit Cox proportional hazards regression models to test these associations, as it is the best model given our research question, and there is no clear guidance from the literature or in our exploratory analysis on the distribution assumption of the baseline hazards. We report hazard ratios with estimates greater than 1 indicating higher risk of getting married while estimates smaller than 1 indicate lower risk of getting married.

[10] Of the 598 women, 135 experienced premarital fertility. Of these, 23.7% (n=32) were still pregnant by the end of the study, 2.2% (n=3) miscarried, and 1.5% (n=2) had an abortion. The remainder (n=103) had given birth, with five of these children, all below the age of 5, having died during the study period. Of the 585 men, 105 reported experiencing premarital fertility, with 20.9% (n=22) of partners still pregnant by the end of the survey or last interview, 2 partners had miscarried, 1 partner had a stillbirth, and 9 partners reportedly had abortions. One male respondent said he did not know the outcome of his partner's pregnancy. The remainder (n=83) had partners who gave birth. Of these, 4 of the children died, all under the age of 5. Excluding the very small number of respondents who did not carry pregnancy to term (miscarriage, abortion) during the study period from our models does not alter the results, and we therefore retain them (also, because the pregnancy itself is meaningful).

We control for age with dichotomous categories, and use those aged 15 and younger as the reference group for women, and those aged 18 and younger for men. We also control for tribe—where patterns of social and marital organization coalesce—and code dichotomously as Chewa (62% in this sample), followed by a mixture of other ethnic groups (including Yao=19%; Ngoni=9.2%; and Lomwe=3.8%), similar to the general ethnic composition in all of Malawi.

Based upon the literature described above, all models include three, more distal characteristics, measured at baseline, school enrollment, orphanhood status, and household wealth. Each is a potential correlate of the relationship between premarital fertility and future marriage prospects. Household wealth is constructed as an asset index at baseline using a principal components analysis. We therefore take advantage of the study design and measures to ask the key questions: What is the correlation between premarital fertility and marital timing, and how might social and demographic characteristics alter that relationship? How do these patterns occur for women, and how do they occur for men? Following the survival analysis, we investigate the implications of premarital fertility on marriage patterns, inquiring into how these might differ by individual and household characteristics. Given what we know, for instance, about the incompatibility of schooling and childbearing in Malawi, how might our initial results vary across education status (Frye 2017)? For these analyses we run logistic regression models for transitioning to marriage, comparing school status, wealth, and orphanhood status among those who experienced premarital fertility.

Results

Summary statistics

The overall percentage of respondents reporting premarital fertility in the sample is substantial, 22.5% for women and 17.9% for men. Among girls ages 15 or younger at baseline (n=151), 16.6% had experienced premarital fertility by the study's end. Among women 19 and older at baseline (n=89), 30.3% had experienced premarital fertility by the study's end. Among boys and men ages 18 and younger (n=100), 7% reported having a partner with a premarital pregnancy or birth; among those ages 23 and older, 27% reported the same (Table 3). Given the general age gap between partners in Malawi (Clark et al. 2009), these numbers suggest the reliability of the data at least at the summary level. We cannot know for certain whether the collection of accurate data from men is more difficult compared to women; it is possible men deny paternity to an interviewer. Ethnographic research in the region (as in Uganda, South Africa, and Malawi), however, describes the centrality of fatherhood and paternity to men's identities and notions of masculinity, as well as to family life in general (Hosegood and Madhavan 2012; Hunter 2006; Wyrod 2008). Moreover, because we collected these data at young ages in the men's lives, we have good reason to believe that the mis-reporting by men should be fairly minimal.

Bivariate comparisons show that the fraction of those with premarital fertility varies by school status, but not for other demographic and socioeconomic characteristics (Table 4). Among women with premarital fertility, 36% were in school at the start of the survey in 2007, compared to 61% of women without, a large and significant difference. We observe a similar difference for men: Among those experiencing premarital fertility, 11% were in school at the start of the survey in 2007, compared to 33% of men without.

In terms of marital outcomes, 64.4% of women with premarital fertility were married by the study's end, almost twice the rate of those without (32.8%; Table 5). A similar discrepancy is found among men: 54.3% of those with premarital fertility, compared to 18.5% of those without. These marriages are predominantly to the parent of the child, but not always; 24.6% (n=14) of men married to someone other than the parent, compared with 13.7% (n=12) of the women.

We next calculated Kaplan-Meier hazard functions, stratified by the selected covariates of interest. For both women and men, the hazard of getting married among those experiencing premarital fertility is significantly higher, according to a log-rank test, than among those without (Figures 1.1 and 1.2). For women, for example, the median time to marriage was about 65 months among those with premarital fertility, which was about 28% shorter than that among those without (about 90 months). Figures 2.1 (for women) and 2.2 (for men) show that those in school at baseline had significantly lower hazards of first marriage by the end of the survey, again according to a log-rank test. For women, the median time to marriage was about 98 months among those in school at baseline, which was about 42% longer than that among those not in school at baseline (about 69 months). Figures 3.1 and 3.2 show that for both women and men, those in the wealthiest 25% of the wealth distribution had the lowest hazards of marrying by the survey end around month 72, or age 18. For women, the median time to marriage was about 119 months among those in the wealthiest quartile, which was about 78% longer than that among those in the poorest quartile. Despite their statistical significance, these bivariate associations were descriptive without adjusting for potential confounders. We next tested these associations in Cox models after adding control variables.

All models are presented separately for women and men in Table 6. Across all models and for both genders, having a premarital pregnancy or birth increases the marriage hazards, with

strong effects. The size of the effects does not diminish with the presence of the controls or with the presence of the baseline (more distal) characteristics, suggesting that the relation between pregnancy prior to marriage and a quickening of marriage, on average, is strong and cannot be explained away by being in school (during mid-to-late adolescence), or by having two parents alive, or by household wealth. Panel A: (1) – (4) shows that, for women, the hazard rate of marrying is about twice for those with premarital fertility, compared to those without. That rate drops, however, by nearly half when including the 'in school at baseline' effect (Panel A, Model (2)), although the hazard rate remains statistically significant. Panel B: (1) – (4) shows that, for men, the hazard of marrying if having experienced premarital fertility is about 2.5 times the rate of those without premarital fertility. As with the women, that rate also drops to slightly greater than double (but remains significant) when 'in school' is included in the model (Panel B: (2)). For both young women and men, the in-school and wealth effects are also correlated with transition to marriage, so that being in school at baseline is associated with lower hazards of marrying, and that falling into the upper half of the wealth distribution is associated with lower marriage hazards. Orphanhood status has no effect. (This is the case if paternal orphans are modeled, or if maternal orphans are modeled; results not shown.)

To better understand the processes influencing the relationship between premarital fertility and entry into marriage, we select the sub-sample of women and men with premarital fertility, and compare the background characteristics of those never-married (by survey end) versus those who went on to marry.[11] Odds ratios from logistic regression models for never-marrying by premarital fertility are therefore presented in Table 7. We code as '1' never-

[11] Of the 103 women in MTM who gave birth before the end of the survey, 63.1% (n=65) got married post-conception and pre-birth. Of the 83 men with partners who have given birth, 55.4% (n=46) got married post-conception and pre-birth.

marrying, presuming that not marrying is the riskier outcome for mother's and child's well-being. We include 'upper wealth quartile' at baseline (compared to the lower 75%), 'in school,' having 'both parents alive,' and controls for age and tribe. While the Cox models showed that, on average, both women and men marry faster with premarital fertility, and that school status and wealth also matter, these final analyses reveal differences by gender. For women with a premarital pregnancy or birth, being among the wealthiest at baseline is associated with significantly lower odds of never-marrying by the end of the survey, compared to women in the lower three-quarters of the wealth distribution (OR=0.33; *z* statistic=-2.24). Although the association between being in school at baseline with never-marrying is in the expected direction (lower odds), the association is not statistically significant. Women with premarital fertility yet have two parents alive have 65% lower odds of never-marrying, compared to having at least one deceased parent (OR=0.35; *z* statistic=-2.46). For the men, however, none of these background characteristics are associated with a difference in odds of marital outcome.

Discussion

The results from these analyses utilizing longitudinal data over a two-year period show that, for both young women and young men in central Malawi, having a premarital pregnancy or birth hastens the timing of first marriage. This association holds in the presence of controls and important background characteristics, and is strong for both women and men: Women who experienced premarital fertility marry at about twice the rate as do women without a premarital pregnancy or birth. For the men in the sample, the rate is even faster, so that men who report having or had a partner who is pregnant or gave birth have 2.5 times the rate of entry into marriage, compared to those without having the experience of premarital fertility. The Cox

models also showed that being in school at baseline, and being in the upper-half of the wealth distribution, were strongly associated with lower hazards of marrying. Others have found—often using DHS data, but not always—that pregnancy or birth before marriage hastens the transition to marriage. Pregnancy is part of the marriage process for many couples, and the findings in this paper contribute to and validate this body of literature. In addition, the data we use were designed specifically for the goals of this study: the MTM project collected data from a sample of initially never-married women and men to track key life events, over time, as they transitioned into adulthood. In this way, the findings from these particular data are arguably quite robust.

We took our analyses a step further, however, and investigated more closely questions around *who* are those who marry, or do not marry, following premarital pregnancy or birth. While the Cox models confirmed the relationship between premarital fertility and subsequent transition to marriage, they did not tell us how this relationship might depend upon important social and economic characteristics. To this end, we investigated three critical characteristics at baseline that has also been shown to influence the timing to marriage: school enrollment, wealth, and orphanhood status (Pike 2020). We ran logistic regression models, with the dichotomous outcome variable of 'never-marrying,' and included the controls.

Among women with premarital fertility, those in the upper wealth quartile of the distribution, and with both parents alive, have lower odds of never-marrying, compared to their reference groups. Women with two parents have 67% lower odds of not marrying, relative to women with at least one deceased parent. Further analyses (not shown) reveal this effect is driven by paternal orphanhood. Of the 135 girls and women who became pregnant or gave birth prior to marriage, 25 were paternal orphans, 7 were maternal orphans, and 4 were double orphans. Running the logistic model with paternal orphanhood status, replacing 'both alive,'

reveals that women with a deceased father have 4 times the odds of never-marrying compared to those with a father alive, suggesting that girls without fathers face a double-risk: Should they experience fertility prior to marrying, they also face increased chances of not marrying early on in that experience.

Regarding wealth, we considered who might be protected: The wealthiest women with premarital fertility have significantly lower odds of *not marrying*, perhaps suggesting the protective effects of (relative) wealth on transitioning to marriage following an early pregnancy. The wealth differential may also be indicative that the pregnancy is part of the marital process, although we cannot know for certain with these data. Finally, although women in school at baseline is associated with lower odds of not marrying, the effect is not significant.

We found here a gender difference: Despite the robust effects of orphanhood and wealth on (divergent) marital outcomes for women, among men, none of the tested background characteristics was associated with significantly different odds in staying single, in the presence of premarital fertility. Although the logistic regression models are limited for this portion of the inquiry, since they cannot account for right-censoring—and thus the findings in these particular models should be viewed with some caution—the fact that we find strong effects for women and not for men is suggestive evidence that the processes of earlier marriage following premarital fertility operates differently across the genders. We also note here a limitation of our study, that because of the sample sizes with which we have, and because the design of the MTM is such that transitions are captured as they are happening, we needed to use both premarital pregnancies and births in our measure of premarital fertility. We acknowledge that these are distinct life events, and each can (and *do*) have different implications for future marriage. Yet, we also contend that there remains value in any measure of premarital fertility and the life course.

The MTM rates of premarital fertility for women are higher than those found in the DHS and those compared regionally by Clark, Koski, and Smith-Greenaway (2017). Comparing cohorts from 1960-1964 to 1985-1989 in Malawi, the authors found that the probability of premarital birth for women started and has remained low, reporting a fluctuation of around 10%, under their self-described stringent definition of premarital birth, and between 10-20% for their less restrictive definition. We are unable to directly compare our results to theirs using the general population from the MDHS because our sample of not-yet-married young women at our baseline is select, and some of whom subsequently married. For men, to note there are very little survey data available in sub-Saharan Africa about paternity and fertility patterns, despite the vast number of population-based and household-level surveys that exist (Hosegood and Madhavan 2012). We do, however, make attempts to compare the reports in the MTM sample with reports in the MDHS. We use the MDHS from 2010, the year closest to the MTM data collection.

We use the MDHS 2010 from the Central Region (excluding Lilongwe), as proximate to Salima as is possible. We look to women who were between the ages of 15 and 19 in 2010, the same age range as the MTM sample; for men in the MDHS, we look to those between the ages of 17 and 22. Both women and men in the DHS report on the month and year of first marriage (or cohabitation, which has been quite rare in Malawi, and which we name marriage). Women in the MDHS are asked about the date of birth of their first child (and full birth history). Our estimates for the MDHS women are based on the date of first marriage, the date of first birth, and the gap between these two.

Men are asked at what age they were when their first child was born, and not the date of the child's birth, and we therefore make assumptions for the men based upon other information that we are able to gather. We assume that the date of birth of the child is six months after the

reported (respondent's) age of the birth, given the respondent's birth month and year. For instance, let's consider a man who reports his first child's birth at age 20, and the respondent was born in September 1980. We then estimate that the child's birth date is in February 2001. To derive whether his first birth was prior to marriage, we then compare this date with the date of his first marriage, which is known in the MDHS.

For women in the MDHS 2010, the breakdown of the categories of pregnancy and marriage is: 2.7% had a premarital pregnancy prior to marrying (measured as ever-married, and had first birth < 7 months after got married); 11.9% married prior to getting pregnant (ever married and had first birth > 6 months after got married); 8.3% were married but had no births; 74.6% had never-married and had not given birth; and, 2.5% had never-married, but had given birth. Thus, in these cross-sectional data, about 5.2% (2.7 + 2.5) of young women experienced premarital fertility. As for our estimates of premarital fertility among the men, and the calculations we report above, the MDHS show the following: 3.6% with a partner who was pregnant prior to marriage; 6.2% had a partner who got pregnant after marriage; 6.5% were married and had not fathered a child; 82.2% had never married and had not fathered a child; and 1.5% had never-married, but had a partner who gave birth. For the cross-sectional sample of men, 5.1% (3.6 + 1.5) experienced premarital fertility. These low incidence rates in the MDHS compared to our concurrent panel data suggest that some combination of social desirability bias and recall error may lead to underestimates of these events in data collected retrospectively. The MTM sample is selected on never-married people, which also likely contributes to the discrepancy. This warrants more in-depth study.

Conclusions

The key findings from this research in Malawi are broadly twofold. First, like young women, young men marry more quickly in the presence of premarital fertility. The results from the Cox models showed that men with an experience of premarital fertility marry at a rate that is 2.5 times faster than do those without, net of age, tribe, and socioeconomic characteristics. This is a finding that stands in contrast to the blanket notion that young men are either inclined to abandon, or unable to support, their female partners, suggesting that many young men are committing upon pregnancy or birth prior to marriage. This finding also suggests that premarital pregnancy or birth may be part of the marriage process for men. For the women in the sample, those who experienced a premarital pregnancy or birth had a rate of marrying that was about twice as fast than those not experiencing premarital fertility, also net of controls. Second, there appear to be important gender differences in the conditions underlying the link between premarital fertility and subsequent marriage. For men, the association between premarital fertility and marital outcome seems *not* to be influenced by the important social and economic characteristics that we examined in this study – namely, school enrollment, wealth, and orphanhood status. Although the Cox models demonstrated that wealth and school enrollment are correlated with the timing of marriage (with being in school and being wealthier, at baseline, associated with lower hazards of marrying by the end of the study), the characteristics did not mitigate the premarital fertility-marriage link, nor are they able to predict (at the descriptive level), for those with premarital fertility, who ends up marrying or not. In other words, the findings broadly suggest that men's partners' premarital pregnancies or births themselves do hasten marriage for men, but, the usual economic and demographic suspects can not further explain this link. This is not, however, the case for women. For women who experienced a

premarital pregnancy or birth, having both parents alive, and falling into the wealthier portion of the wealth distribution, is associated with lower odds of *not* marrying. Their odds of marrying are greater. Flipped around, in the presence of premarital fertility, having a deceased parent (which we discovered is driven by paternal orphanhood), and being poorer, is associated with increased odds of not marrying. These women seem to face multiple burdens: being poor, or having a deceased parent, is additionally disadvantageous in the face of premarital fertility in this setting.

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Data Availability

The Marriage Transitions in Malawi (MTM) data are available online at https://dss.princeton.edu/catalog/resource3999. You may contact the principal investigators, Kathleen Beegle, kbeegle@worldbank.org, or Michelle Poulin, mpoulin@worldbank.org.

TABLE 1 Panel sample details

Survey round	Interviewed (N)	% of baseline reinterviewed	Reason not reinterviewed (N)			
			Not found	Refused	Deceased	Not selected for interview
Household survey 1 (2007)	1,183		-	-	-	-
Partnership interview 1	746	89.4%	76	9	3	349
Household survey 2 (2008)	1,090	92.1%	74	14	5	-
Partnership interview 2	694	83.0%	118	19	5	347
Household survey 3 (2009)	1,048	88.6%	87	42	6	-

Note: The partnership interviews were conducted for a random subsample of the 1,183 core respondents.

TABLE 2 MTM sample of respondents

Women			Men		
Age	**Target sample**	**Actual sample**	**Age**	**Target sample**	**Actual sample**
13	0	1	14–16	0	3
14	0	27	17	0	15
15	60	123	18	60	82
16	180	154	19–20	180	221
17	180	120	21–22	300	201
18	120	84	23–25	60	62
19–21	60	87	26	0	1
23 and 25	0	2			
Total	600	598		600	585

Note: Target sample was the intended sample design. The actual sample is the sample of the Household Survey collected in June–August 2007.

TABLE 3 Respondents who experienced premarital fertility by last interview, or endline (2009)

	Women			Men	
Age at baseline	**%**	**Total**	**Age**	**%**	**Total**
<16	16.6	151	<19	7.0	100
16	22.1	154	19	12.6	103
17	22.5	120	20	18.6	118
18	26.2	84	21	21.4	112
19+	30.3	89	22	24.7	89
			23+	27.0	63
Total	22.5	598		17.9	585

Note. Respondents are never-married at baseline (2007).

TABLE 4 Characteristics of respondents by premarital fertility status

	Women			Men		
	Premarital fertility (N=135)	**No premarital birth or preg** (N=463)	**t-value** (t=test)	**Premarital fertility** (N=105)	**No premarital birth or preg** (N=480)	**t-value** (t=test)
In school	.36	.61	5.23***	.11	.33	4.82***
Never attended	.02	.02	-0.38	.05	.03	-0.17
Wealth Q1	.26	.26	-0.00	.20	.25	1.00
Wealth Q2	.21	.23	0.48	.39	.23	-3.36***
Wealth Q3	.31	.25	-1.46	.21	.25	0.88
Wealth Q4	.22	.27	1.02	.20	.27	1.50
Yao	.22	.18	-0.99	.24	.19	-1.03
Chewa	.64	.61	-0.65	.65	.60	-0.87
Ngoni	.07	.10	0.95	.06	.10	1.26
Parents both alive	.73	.75	0.38	.60	.69	1.73
Paternal orphan	.19	.16	-0.82	.24	.19	-1.23
Maternal orphan	.05	.05	-0.00	.06	.05	0.21
Both parents deceased	.03	.04	0.71	.11	.08	-1.02

Notes. Characteristics as measured in the first household survey, baseline (2007). *significance at .10 level, ** at .05 level, and *** at .01 level.

TABLE 5 Marital status transition 2007-2009

	Women		Men	
	Premarital fertility	**No premarital preg or birth**	**Premarital fertility**	**No premarital preg or birth**
Total n	n=135	n=463	n=105	n=480
Married	64.4%	32.8%	54.3%	18.5%
Married the parent post-pregnancy or birth	n=70		n=40	
Married post-preg or birth but not the parent	n=12		n=14	
Married post-preg or birth, unclear if the parent	n=5		n=3	
Never married post-preg or birth	35.6%		45.7%	
Never married		67.2%		81.5%

Note. Draws on outcomes based on most recent interview, or end of survey, 2009.

TABLE 6 Cox regression models of first marriage (hazards ratios)

	Panel A: Women				Panel B: Men			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Premarital fertility	2.067***	1.669***	2.075***	2.086***	2.672***	2.137***	2.715***	2.526***
	(5.247)	(3.637)	(5.268)	(5.320)	(5.637)	(4.387)	(5.686)	(5.298)
Age (vs. 15 + younger)								
16	0.505***	0.436***	0.506***	0.536***				
	(-3.246)	(-3.926)	(-3.236)	(-2.980)				
17	0.207***	0.156***	0.208***	0.205***				
	(-6.340)	(-7.363)	(-6.312)	(-6.354)				
18	0.076***	0.060***	0.076***	0.079***				
	(-8.472)	(-9.229)	(-8.463)	(-8.389)				
19	0.042***	0.027***	0.042***	0.044***	0.468*	0.534	0.463*	0.481*
	(-9.700)	(-10.92)	(-9.711)	(-9.592)	(-1.819)	(-1.533)	(-1.840)	(-1.753)
20					0.327***	0.295***	0.330***	0.326***
					(-2.779)	(-3.095)	(-2.747)	(-2.776)
21					0.122***	0.095***	0.122***	0.132***
					(-4.860)	(-5.549)	(-4.846)	(-4.673)
22					0.040***	0.029***	0.040***	0.039***
					(-6.971)	(-7.753)	(-6.964)	(-6.971)
Chewa	0.984	0.947	0.981	0.930	1.471**	1.395*	1.454**	1.389*
	(-0.116)	(-0.391)	(-0.139)	(-0.521)	(2.156)	(1.856)	(2.087)	(1.823)
Baseline characteristics								
In school		0.338***				0.150***		
		(-7.320)				(-5.114)		
Both parents alive			1.099				1.156	
			(0.598)				(0.812)	
Upper half of wealth distribution				0.460***				0.596***
				(-5.575)				(-2.953)
Observations	598	598	598	598	585	585	585	585
Log Likelihood	-1194.32	-1166.59	-1194.14	-1178.04	-751.22	-729.46	-750.90	-746.72

Notes: *** p<0.01, ** p<0.05, * p<0.10 The sample comes from initially never-married women and men in Salima, Malawi, as part of the Marriage Transitions in Malawi project (2007-2009). Robust z statistics (adjusted for clustering on the individual) in parentheses.

TABLE 7. Logit regression models for never-marrying following premarital fertility, odds ratios

	Women	Men
Upper wealth quartile	0.33**	1.49
	(-2.24)	(0.77)
In school	0.69	1.00
	(-0.93)	(0.00)
Both alive	0.35**	0.72
	(-2.46)	(-0.77)
Observations	135	105
Pseudo R-Squared	0.071	0.014
Log Likelihood	-80.36	-67.28

Notes: Characteristics as measured at baseline. *significance at .10 level, ** at .05 level, and *** at .01 level. Robust z-statistics in parentheses. Models control for age, age-squared, and ethnic group.

FIGURE 1a Hazard estimates to first marriage by premarital fertility, Women

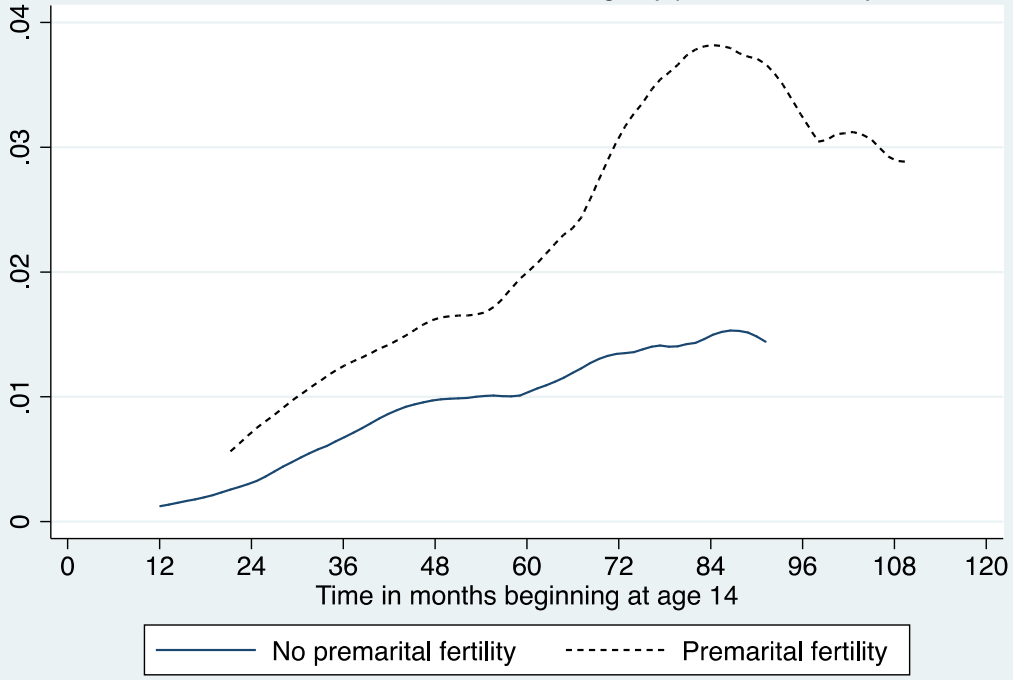

FIGURE 1b Hazard estimates to first marriage by premarital fertility, Men

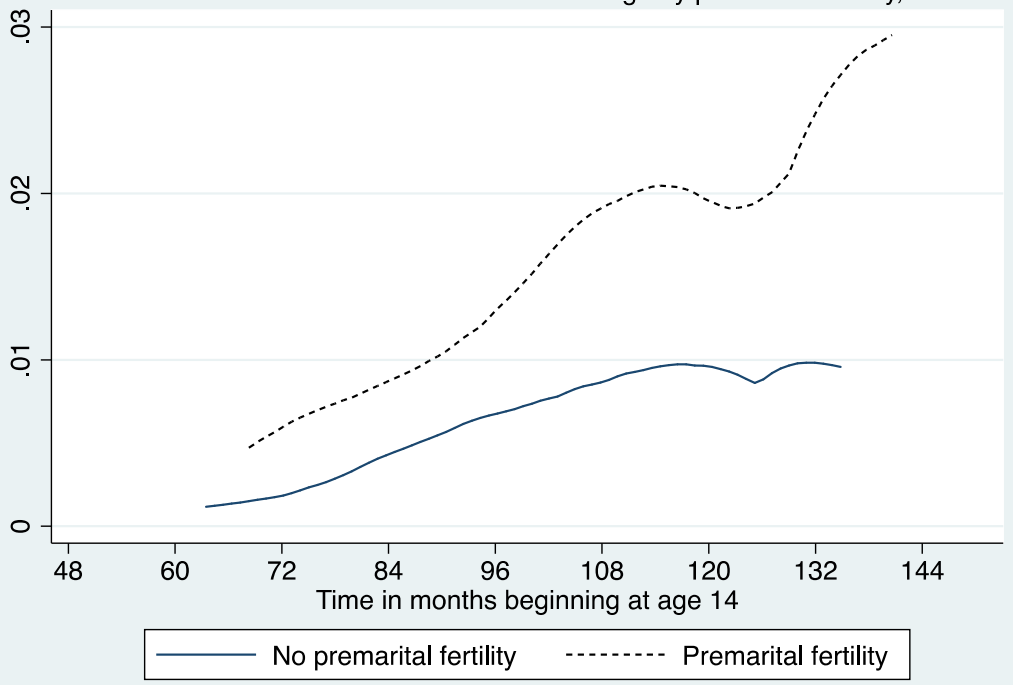

FIGURE 2a Hazard estimates to first marriage by school status, Women

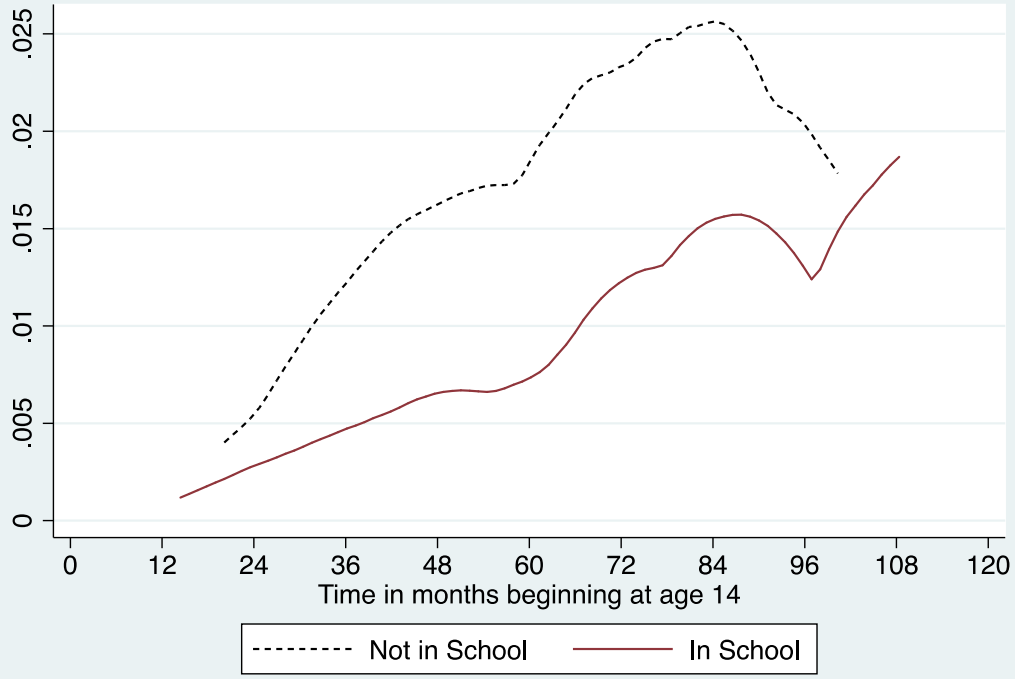

FIGURE 2b Hazard estimates to first marriage by school status, Men

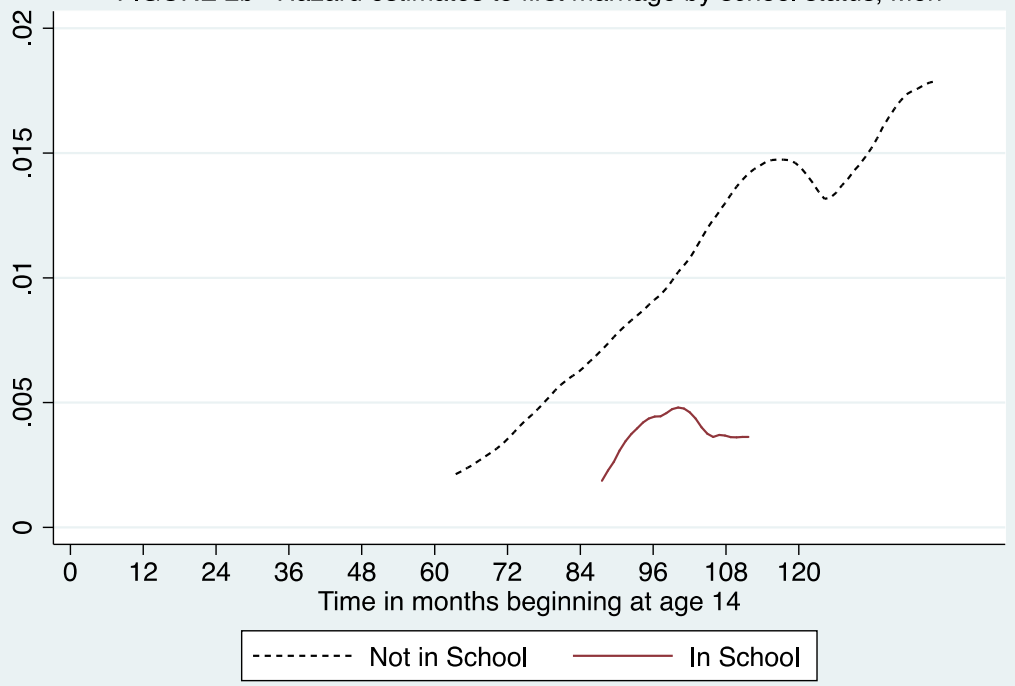

FIGURE 3a Women: Hazard estimates to first marriage by wealth, Women

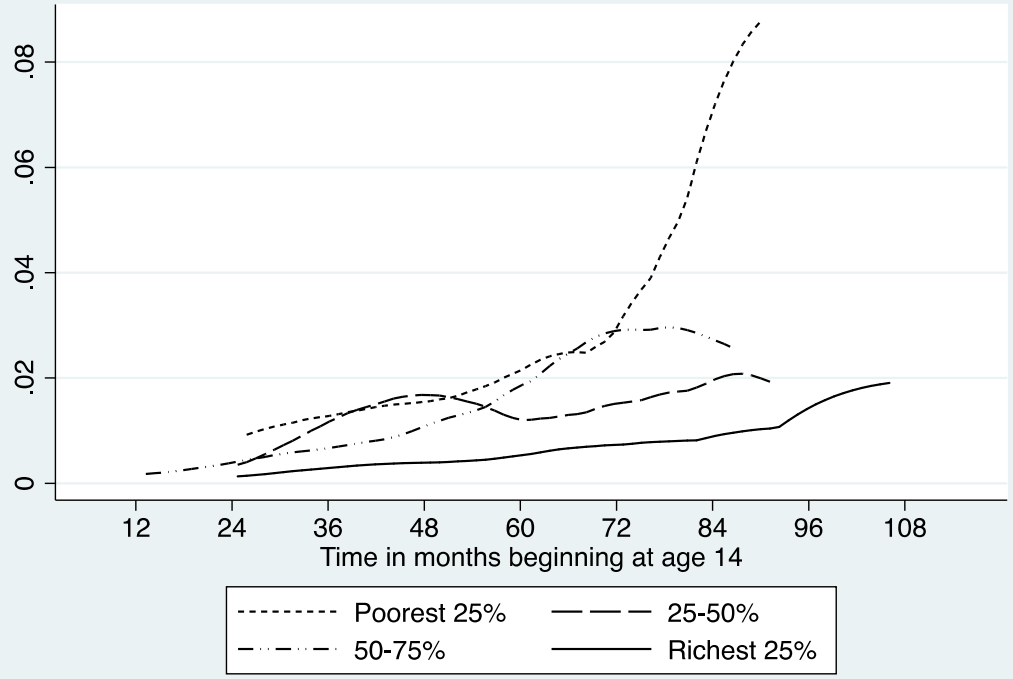

FIGURE 3b Hazard estimates to first marriage by wealth, Men