Lucky Late Bloomers? The Consequences of Early Marriage for Women in Western Kenya

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Abstract:

We examine the impact of early marriage across a wide range of outcomes for women in rural western Kenya. The timing of physical maturation in girls has been shown to influence marriage timing in a quasi-random manner, and we find that each additional year that menarche is delayed is associated with an increase of 0.25 years in age at first marriage. Using age of menarche as an instrument for marital age, we show that delayed marriage increases female educational attainment, some academic test scores, and self-reported measures of health. At the same time, age of marriage appears to have little direct effect on many other important life outcomes including labor market participation, earnings, attitudes and beliefs, marriage market outcomes, and child health.

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I. Introduction

Despite a recent narrowing of the gender gap in health, education, and labor market outcomes, women still generally fare worse than their male counterparts in less-developed countries. To what extent can this disparity be attributed to gendered social norms and roles within the household? Adolescent marriage, patrilocal exogamy, weak household bargaining positions, and limited property rights are common facets of life for women in these regions. Women typically marry and start families younger than men and bear a larger physical and economic cost to household fertility decisions. Nevertheless, little research has been undertaken to causally explore how large of an impact these social institutions and norms have on female life outcomes.

This paper examines the impact of early marriage using a rich longitudinal dataset of young adults in rural western Kenya. To overcome endogeneity concerns, we employ a research strategy pioneered by Field and Ambrus (2008), using timing of menarche as an instrumental variable (IV) for timing of marriage. Menarche represents a constraint on marriage, and the timing of menarche provides an exogenous source of variation by creating a lower bound on the age of entry into the marriage market.[1] In our study area, over 36 percent of women marry within 5 years and 62 percent marry within 10 years of reaching reproductive maturation.[2] Indeed, in this region of Kenya, later physical maturation in girls is clearly associated with later age at first marriage. Among ever-married women in our sample, each additional year that menarche is delayed is associated with an increase of 0.25 years in marriage age. We use this IV strategy to study the impact of early marriage on a wide range of adult outcomes among Kenyan women.[3]

Adolescent marriage is still a very common practice in the developing world. A recent study by UNICEF using Demographic and Health Survey data finds that among women aged 15–24, 48 percent of women in South Asia, 42 percent in Africa, and 29 percent in Latin America and the

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[1] Accounts of marriage practices among the Luhya and Luo, the two main ethnic groups in our study region, suggest that marriage prior to menarche is uncommon in western Kenya (Clark, Kabiru, and Mathur, 2010). In fact, 99 percent of women in our study area report menarche before marriage.

[2] While adolescent marriage is technically restricted in Kenya, the law in place at the time of maturation in our sample is vague. Section 14 of the Child Act of 2001 states that "No person shall subject a child to female circumcision, early marriage or other cultural rites, customs or traditional practices that are likely to negatively affect the child's life, health, social welfare, dignity or physical or psychological development" (National Council for Law Reporting, 2010).

[3] Similar results hold when we use age of menarche as an instrument for age of family formation, which we define as the age at which a woman marries or becomes pregnant, whichever comes first. Nearly 35 percent of women in our sample become pregnant before formally marrying, in many cases because marriage is expensive and couples live together for some time prior to marrying. We find that each year that menarche is delayed is associated with an increase of at least 0.31 years in age of family formation (not shown).

Caribbean were married before the age of 18 (UNICEF, 2005). Kenya is by no means extreme in this regard, with the same studying estimating that across the country one-quarter of women are married by their eighteenth birthday.

Previous research has shown that early marriage is accompanied by earlier age at first birth, higher total fertility, lower utilization of maternal healthcare, lower female education, and poor health outcomes (Jensen and Thornton, 2003; Field and Ambrus, 2008). We show that delayed marriage causally influences several outcomes. First, it improves female educational outcomes. In particular, each additional year of delay in age at first marriage for women in this region increases educational attainment by 0.48 years. Each year of delayed marriage is associated with a higher probability of completing primary school (13.3 percentage points), attending secondary school (5.6 percentage points), and completing secondary school (3.9 percentage points). These patterns can be seen in Figure 1 – which depicts the distribution of schooling attainment by age of menarche. We also find evidence that delayed marriage improves some academic test scores, in particular, performance on a math examination.

Second, we find that certain dimensions of adult health are impacted by delayed marriage. Specifically, our results suggest that self-reported measures of health including general wellbeing and incidences of illnesses may be improved by later marriage. Finally, we document that a broad range of other adult outcomes including labor market participation, earnings, attitudes and beliefs, marriage market outcomes, and child health are largely unaffected by age of marriage.

Our analysis makes several contributions to the existing literature. In addition to exploring a wider range of causal impacts of early marriage than has been done in the past, this paper serves as a demonstration of external validity for the findings of Field and Ambrus (2008). In the context of quasi-experimental research methods, validation research is not especially common, particularly for studies which examine social institutions (see Glazerman, Levy, and Myers (2002) for an overview). Specifically, our findings suggest that the results for the Bangladeshi case, where adolescent and arranged marriage are more prevalent, extend to Kenya, a region characterized by later (although still early compared to more highly developed economies) marriage and by a different set of religions and local customs. The strength of our observed association between marriage and education indicates that their findings are likely to generalize more broadly within the developing world.

Our research also suggests that increases in marital age may improve female educational outcomes in the Kenyan context. In many parts of the developing world, there is a trend towards increasing age of marriage (Westoff, 2003; Mensch, Grant, and Blanc, 2006; Chari, Maertens, and

Srinivasan, 2014). Extrapolation implies that this pattern is likely to reinforce positive educational outcomes in a virtuous cycle. In addition to changing social norms, our findings suggest that policies which restrict adolescent marriage or incentivize later marriage for women are also likely to yield improvements in educational outcomes and potentially in perceptions of health and wellbeing. At the same time, our results provide no evidence to suggest that these advances from delayed marriage will be directly complemented by gains in other areas, such as increased participation in the formal labor market, increased earnings, or better marriage market outcomes for women (although such changes may occur for other reasons).

This paper proceeds as follows. Section II discusses the study context and examines the existing literature. Section III describes the data and presents summary statistics. Section IV discusses the empirical strategy. Section V explores the impact of early marriage on a range of socio-economic outcomes among Kenyan youth. Section VI concludes.

II. Gender, Marriage, and Fertility in Rural Western Kenya

Our primary study area is Busia County, a densely-settled farming region of rural western Kenya bordering Lake Victoria. The administrative divisions in southern Busia County are home to a relatively ethnically homogenous population – individuals in our sample are primarily Luhya (89 percent; the area is also home to smaller numbers of Luo, 7 percent, and Teso, 3 percent). In this region, economic and social roles differ markedly by gender. Patrilocal exogamy is prevalent, and women have weak land rights. As in many parts of the developing world, women tend to marry (either formally or informally) at a young age. Men traditionally pay a bride price, so while women often marry shortly after leaving school (or leave school to marry), men typically work for several years between school and marriage, in part to accumulate resources to marry.

We focus on a survey of individuals who at the time of data collection were primarily in their mid-twenties. Women in our study area in this age group are substantially more likely to be married than their male counterparts (70 percent versus 56 percent). Furthermore, there is a large gender gap in age at first marriage. On average 13 percent (1 percent) of women (men) are married before age 18 and 47 percent (16 percent) are married by age 21. The average male spouse in our sample is 5 years older than his female partner, and approximately 97 percent of unions in our data entail a positive age difference between male and female spouses. Figure 2 plots the distribution of age of first marriage among married women in our sample.

As might be expected in a poor agrarian society, total fertility in rural western Kenya is high and is characterized by gender disparities in the timing of fertility over the life-cycle (Central Bureau of Statistics, 2004). Despite our sample's relative youth, the gender gap is already evident at this earlier age group. Females in our sample have had more pregnancies than partners of male respondents (2.0 versus 1.4). Since we focus on a group of individuals who have just begun to reach peak child-bearing years, total fertility in our sample is lower than the regional average, which exceeds 5.

Early marriage has been associated with earlier age at first birth, higher total fertility, lower utilization of maternal healthcare, and lower female education (Jensen and Thornton, 2003). However, rigorously identifying a relationship between early marriage and other adult outcomes as causal is difficult due to the presence of other (difficult to observe) omitted factors which likely affect both marriage timing and these other adult outcomes (e.g., parent socio-economic status or gender views). Following Field and Ambrus (2008), we employ an instrumental variables technique in order to identify a causal effect. While this earlier study primarily focused on the impact of early marriage on educational attainment of women in Bangladesh, we examine a broader range of outcomes in the context of rural western Kenya.

III. Data

We employ data from the Kenya Life Panel Survey (KLPS), an unusual longitudinal survey of rural Kenyan youth which has gathered information on a wide range of outcomes (including education, health, labor market, migration, marriage, fertility, and social attitudes) in three rounds of data collection between 2003 and 2014. Respondents of this panel data collection effort were involved in one of two school-based development programs which took place between 1998 and 2002. The Primary School Deworming Project (PSDP) provided deworming treatment to all eligible children in 75 primary schools in southern Busia County during 1998-2002, and the Girls' Scholarship Program (GSP) awarded merit-based scholarships to qualifying grade 6 girls in a separate set of primary schools in Busia County in 2001-2002.[4] Thus, KLPS respondents compose a

[4] Both of these programs used randomized methods to study program impacts. For more information on the PSDP, see Miguel and Kremer (2004). For more information on the GSP, see Kremer, Miguel, and Thornton (2009).

representative subset of individuals who attended primary school in southern Busia County at some point between 1998-2002.[5,6]

We utilize data collected during the third round of the KLPS (KLPS-3), which was conducted during 2011-2014. Attrition rates in the KLPS are quite low, especially for panel data collection efforts in less developed countries, and the effective tracking rate for KLPS-3 was 87 percent.[7] In our analysis, we focus on female KLPS-3 respondents who experienced menarche between the ages of 11 and 19 (88 percent of women interviewed[8]), for whom we have all necessary survey information, and who have ever been married (70 percent of women interviewed). This sample comprises 2,686 women who range in age from 19 to 36 at the time of data collection.[9]

Summary statistics for a range of key individual, household, marriage and fertility outcomes are presented in Table 1 for our full sample of KLPS-3 female respondents. The average age of KLPS women at the time of Round 3 interview was 26. The majority of these individuals (73 percent) come from the PSDP follow-up, which reflects the relative size of the follow-up subsample for that program in comparison to the GSP follow-up subsample. Nearly 50 percent of interviewees were in the PSDP treatment group – meaning they were enrolled in a school that received deworming treatment within the first two years of that program. Only 13 percent were part of the GSP treatment group, meaning they were enrolled in schools that were eligible to receive a scholarship. Twenty-three percent of interviewed women were additionally enrolled in the more recent Vocational Training Voucher Program (VTVP), and 11 percent actually received a voucher to attend a vocational training institution. Controls for all of these subsamples are included in the analysis presented in Section V.

The second panel of Table 1 focuses on parental and family characteristics of KLPS women. The average father of a young woman in our sample completed primary school and attended some

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[5] The 1998 Kenya Demographic and Health Survey reports that 85 percent of 8 to 18 year olds in western Kenya were enrolled in school at that time, indicating that our school-based sample is broadly representative of children in the region. Nevertheless, because we focus on a population of individuals who were enrolled in school, it is likely that we may be missing the poorest of the poor in the region, and perhaps some of the earliest marriages (girls who had already dropped out of school to marry). We discuss how this affects our analysis in our conclusion.

[6] Note that some KLPS respondents were also enrolled in a third, more recent program, known as the Vocational Training Voucher Program (VTVP). For more on this program, see Hicks *et al.* (2015).

[7] See Baird, Hicks, and Miguel (2008) for a description of the KLPS tracking strategy, and for an explanation of the effective tracking rate.

[8] The remaining women are their outliers in or are missing data on age of menarche.

[9] Our results are consistent when we instead focus on the sample of women who have ever either been married or pregnant (80.4 percent of the full sample).

secondary school. In contrast, mothers of young women in our sample generally dropped out of primary school well before completion. Information on father's education is missing for 15 percent of individuals, and information on mother's education is missing for 12 percent of individuals. Consistent with family size in this region, the average young woman interviewed in KLPS-3 has more than 5 siblings.

The bottom panel of Table 1 summarizes marriage and fertility characteristics of these women. Seventy percent of KLPS-3 female interviewees were married at the time of data collection, and 80 percent had ever been pregnant. The average age of first marriage and first pregnancy was 20. For the remainder of this paper, we focus on the subsample of women who have ever been married.

IV. Empirical Strategy - Menarche as an Instrumental Variable

Earlier physical maturation in women has been associated with earlier marriage and earlier fertility timing in previous studies (Field and Ambrus, 2008; Gorry, 2012). The use of menarche as an instrument for age of marriage relies on several assumptions.

First, age of menarche needs to be correlated with age of marriage. Figure 3 plots age of marriage as a function of menarcheal age for our sample of women in Busia, Kenya. As can be seen, later menarche is strongly associated with later marriage. This can also be seen in Figure 4, which plots the distribution of age of marriage after dividing the sample into girls who undergo menarche between ages 11 and 14 and girls who undergo menarche between ages 15 and 19. Later onset of menarche is strongly associated with delays in marriage timing. Table 2 presents the results of first stage regressions, which indicate a strong, positive relationship between age of menarche and age at first marriage. Each additional year that menarche is delayed is associated with 0.25 years later marriage, and this relationship is robust to the inclusion of a measure of earlier life health status (Column 2, height-for-age z-score at KLPS Round 1 interview, which we discuss in more detail below).

The context of our results differ from those of Field and Ambrus (2008) because in the case of Bangladesh, girls are frequently subject to arranged marriages and are often married as close as possible to the exact timing of menarche in order to preserve the bride's virginity. The authors find that over 70 percent of first marriages occur within 2 years of menarche. In our sample, 36 percent of women marry within 5 years and 62 percent within 10 years of menarche. Timing of menarche still clearly represents a firm lower bound on marriage, and an important marker for entry into the marriage market, but conveys a less stringent impetus for marriage in our setting.

A second assumption of this instrumental variables strategy is that the timing of menarche is exogenous, so that common factors do not influence both the timing of physical maturation and later life outcomes. Researchers have argued that in developed nations, variation in the timing of menarche is primarily attributable to genetic differences and not environmental factors (Parent *et al.*, 2003; Gorry, 2012). In developing countries, while economic and environmental factors have been linked to changes in the age of menarche, most of this evidence is correlative in nature. Among the most robust impacts have been seen from extreme malnutrition, including for instance, *in utero* and early life nutrition shocks which lead to stunting in preschool aged children - which has been correlated with significant increases in age at menarche (see for example; A. Ali *et al.*, 2011; Belachew *et al.*, 2011; Simondon *et al.*, 1998).

The general consensus among researchers is that the timing of menarche is quasi-random with shocks to health and nutrition and genetic factors influencing but not entirely determining outcomes. A check on the association between adolescent height (a measure of cumulative health, which we operationalize as the height-for-age z-score measured at KLPS Round 1 data collection) and age of menarche in the KLPS sample suggests that nutrition is not a primary concern in our setting, as the data reveals a weakly positive but not statistically significant coefficient (0.033, s.e. 0.043, not shown). Together, this suggests that menarche can be used as an instrument for age of marriage in this setting.

To alleviate any remaining influences of omitted variables correlated with menarche, we proxy for resource availability *in utero* and during early childhood, and ability to smooth shocks to health and nutrition, by using information on parent education. Furthermore, we follow the practice of Field and Ambrus (2008) and limit the analysis to individuals who report age of menarche within a specified band, owing to the association between environmental factors and chronic medical conditions with very early or very late menarche outcomes. Specifically, we restrict the sample to individuals who report age of menarche between 11 and 19 which encompasses 95 percent of all respondents who are not missing information on age of menarche.[10]

Another key assumption of our analysis is that age of menarche does not affect our outcomes of interest directly, but only through age of marriage. One concern is that menstruation

[10] Field and Ambrus (2008) restrict their analysis to those reporting age of menarche between 11 and 16, which they report covers 90 percent of the sample. Recent research has documented variation in the timing of menarche across countries and over time possibly owning to nutrition, stress, climactic and environmental conditions including weather and altitude, and exposure to endocrine disruptors (Parent *et al.*, 2003).

may directly affect school attendance of girls in this region. Anecdotal evidence supports the hypothesis that women in developing countries commonly lack access to sanitary products and thus may have worse school attendance when menstruating. However, recent research suggests that this concern is likely unfounded for our analysis. Oster and Thorton (2011), studying Nepal, show that while menstruation does reduce school attendance, the effect is extraordinarily small – on the order of less than one day per year in a 180 day school year. Similarly, in a randomized evaluation, they find that improved access to modern sanitary products has no significant impact on girl's school attendance.

An additional concern is that age of menarche could affect fertility outcomes. We confirm all of our findings using as additional measure, which we call "age at family formation", defined as being the minimum of age at which an individual first becomes pregnant or age at first marriage. As before for age at marriage, later onset of menarche is strongly associated with delays in the age of first family formation and the primary set of findings we obtain from the IV analysis are largely unchanged when using this alternative measure (results not shown).

A final concern is that the information we use on menarcheal age is based on interviewee recollection and thus subject to recall error. Menarche is a significant life event, and most research suggests that recall data on this topic is accurate. Nevertheless, as a check we compare our estimates with those from other research. A number of studies have examined the timing of menarche specifically among African populations, finding that mean age of menarche typically ranges from 12 and 16, with most studies of rural populations documenting mean ages of 14 or 15.[11] In Mumias and Asembo, two small towns in western Kenya located near the primary study area, Leenstra *et al.* (2005) document median menarcheal age ranging from 14.6 to 15.1. This is consistent with the results from our survey for Busia (approximate mean and median age of 15).

Formally, we undertake a 2SLS regression of the following form:

$$Age\_Marriage_i = \alpha_1 + \varphi(Age\_Menarche)_i + X_{1i}'\delta_1 + \omega_i \qquad (1)$$

$$Y_i = \alpha_2 + \beta(\hat{Age\_Marriage})_i + X_{2i}'\delta_2 + v_i \qquad (2)$$

where *i* indexes individuals. *Age_Marriage* is an individual's age at first marriage, and *Age_Menarche* is age at menarche. $\boldsymbol{X}_i$ represents a vector of individual-level controls, including age at survey, father's

[11] For a general overview see (Padez, 2003). Recent country specific studies include: Sudan (A. Ali *et al.*, 2011), Nigeria (Adebara and Munir'deen, 2013), Ethiopia (Zegeye, Megabiaw, and Mulu, 2009), Gambia (Prentice *et al.*, 2010), Senegal (Simondon, *et al.,* 1998) and Kenya (Leenstra *et al.,* 2005).

education, mother's education, and number of siblings. Since there is a reasonable amount of missing data on parent education (nearly 15 percent of the sample is missing information on father education, and approximately 11 percent on mother education), missing parent education data is replaced with mean values, and we include indicators of missing data in the control set. We additionally include indicators for months since KLPS-3 surveying began, as well as indicators for being included in the PSDP sample, for being treated by the PSDP or GSP programs, for being included in the VTVP, and for receiving a voucher.

As discussed before, Table 2 presents the first stage estimates obtained from equation (1). Column (1) employs our primary control set, while column (2) additionally includes a measure of adolescent health – height for age using KLPS-1 z-scores.[12] Both strategies reveal a highly significant and positive relationship between the timing of physical maturation and age of marriage and the coefficient estimates suggest that each additional year of delay in menarche is associated with a delay in age of marriage on the order of 0.25 years.

V. Results

The second stage results from our instrumental variables strategy are presented in Tables 3 through 8.[13] In addition to the conventional presentation of regression coefficients, standard errors, and stars to indicate standard levels of statistical significance, we also account for testing multiple outcomes by presenting the false discovery rate (FDR) adjusted q-values (in square brackets) which limit the expected proportion of rejections within a set of hypotheses that are Type I errors (Benjamini, Krieger, and Yekutieli, 2006; Anderson, 2008).[14]

Table 3 focuses on educational outcomes, with educational attainment outcomes in Panel A and testing outcomes in Panel B. Results suggest that each additional year of delay in marriage is associated with an increase in educational attainment of 0.48 years. The remaining columns of Panel A include binary outcome variables, and these coefficients can be interpreted as percentage point

[12] Note that only a subset of individuals interviewed in KLPS Round 3 were also interviewed in KLPS Round 1, which accounts for the reduced sample size in Table 2, column 2 as compared to column 1.

[13] Appendix Tables 1 through 6 present these same regressions, but also including an earlier life height measure (KLPS-1 height-for-age z-score, among those in our sample who were also interviewed in KLPS Round 1). The inclusion of this control cuts the sample dramatically, so we elect to present results without the control as the main tables and present those with the control as appendix tables as a robustness check in order to account for a measure of early life health. In the discussion we note instances where the two sets of results agree or disagree.

[14] FDR adjusted q-values are calculated within each family of outcomes, as defined by the set of outcomes included in a given table.

increases in the likelihood of completion or attendance respectively. Moving across the table, we can see that each year of delayed marriage is associated with a higher probability of completing primary school (13.3 percentage points), attending secondary school (5.6 percentage points), completing secondary school (3.9 percentage points), and attending college (2.2 percentage points). All of these results are statistically significant at high levels of confidence, even after adjusting for multiple inference.[15]

Panel B explores indicators of academic performance. The reading and math tests were administered during KLPS Round 3 data collection (which means that exam scores are standardized within the entire KLPS-3 interview sample). Although we do not see gains in reading test scores as a result of delayed marriage, the results indicate that each year of delayed marriage is associated with a 0.22 standard deviations gain in math test scores, a highly significant finding that is robust to FDR adjustment.

Next, we study two key examinations in the Kenyan educational system - the Kenyan Certificate of Primary Education (KCPE) and Kenyan Certificate of Secondary Education (KCSE). Both exams are administered by the Ministry of Education, Science, and Technology, and results are used for admission into secondary school or to university level education, respectively.[16] Columns (5) - (8) examine the probability that girls sit for the KCPE and KCSE. Here we observe strong effects of delayed marriage the probability of sitting for each exam. For example, the estimates in column (6) suggest that each additional year in age at first marriage is associated with a 13.9 percent point increase in the likelihood of taking the KCPE test. The KCSE results are slightly weaker, but consistent with those for the primary school exams - delayed marriage and fertility yield improved educational outcomes for these women.[17] These educational findings are consistent with those of Field and Ambrus (2008) who document that delayed marriage is associated with increased educational attainment and higher literacy rates for women

Tables 4 through 8 extend this analysis of the impacts of early marriage beyond educational outcomes. Table 4 focuses on marriage market outcomes. Surprisingly, delayed marriage does not have much of an effect across a range of outcomes. Although most of the coefficients are signed in

[15] The results for primary school attainment are robust to additionally controlling for KLPS-1 height-for-age z-score, using the sample of individuals who were interviewed in both rounds.
[16] See Ozier (2014) for a comprehensive discussion of the KCPE and KCSE.
[17] The results for took secondary school entrance exam are robust to additionally controlling for KLPS-1 height-for-age z-score, using the sample of individuals who were interviewed in both rounds.

the direction we might expect, we find no statistically significant evidence that delayed marriage affects whether the women lives with her husband's family, the age difference between herself and her spouse, the difference in education level between herself and her spouse, whether she felt ready to marry at the time of marriage, whether her marriage is informal (i.e., not performed by a government, religious, or traditional officiant), or whether she is part of a polygamous relationship. Only the coefficient on the indicator for whether a bride price was paid is statistically significant (suggesting that bride price is less likely to be paid when age of marriage is later), but this finding does not hold up to the FDR correction.[18]

Table 5 focuses on child and own health outcomes. There is no evidence in Panel A to suggest that delayed marriage is associated with better child health outcomes, including an indicator for antenatal care (although on average more than 96 percent of ever-pregnant women have sought such care, so prevalence in the area is already high), an indicator that the eldest child slept under a bednet the night preceding interview, or an indicator for good health of the eldest child. Panel B focuses on health outcomes of the adult female. Although we do not detect any improvement in objective measures of current health (hemoglobin level or body weight), results suggest substantial improvements in self-reported health, both measured by a scale of self-reported general health (where 5=very good and 1=very poor) and an index of symptoms and diseases reported in the four weeks preceding the interview (including a wide range of symptoms and illnesses, from fever, persistent cough, and lethargy, to yellow fever, cholera and diabetes).[19]

Tables 6 and 7 explore the impacts of delayed marriage on a variety of labor outcomes. Table 6 finds no impact of delayed marriage on labor provided, overall or by sector (including agriculture for the home, household chores, wage labor or self-employment), either on the extensive (Panel A) or intensive (Panel B) margin. Table 7 suggests that delayed marriage does not impact the likelihood of unemployment, full time work, farming a cash crop, or selling crops in the market (Panel A), nor does it appear to impact total or non-agricultural earnings (Panel B).

Table 8 explores the relationship between delayed marriage and a range of social attitudes, and once again finds limited evidence of an effect. Surprisingly, there is no detected relationship between delayed marriage and progressive gender attitudes, including questions such as whether

[18] The results for brideprice paid are robust to additionally controlling for KLPS-1 height-for-age z-score, using the sample of individuals who were interviewed in both rounds.

[19] The results for self-reported symptoms and illnesses are robust to additionally controlling for KLPS-1 height-for-age z-score, using the sample of individuals who were interviewed in both rounds.

women should have equal rights with men, physical violence is never justified, men should help out around the house if their wives work, women should take part in family decisions, and women can make good politicians (Panel A). Similarly, there is at best limited evidence of a relationship detected between delayed marriage and a range of other social attitudes, including ethnic or religious identification, trust or democratic attitudes (with the latter two results not holding up to FDR adjustment).

Our results suggest that later marriage causally increases female educational attainment and improves some dimensions of academic test scores as well as yields gains in self-reported health. Surprisingly, we find little evidence of an impact of delayed marriage across a range of other labor market, child health, and social attitude outcomes in this setting.

As a caveat for the interpretation of these findings, it is worth highlighting that our sample is selected in two ways as discussed in Section II. First, at the time of data collection, 30 percent of female KLPS-3 respondents were not yet married. These individuals have different characteristics along many dimensions and the estimated impact of age of marriage, if they do choose to marry, may be different for this group of individuals. Second, our sample is based on individuals who attended primary school at least through grade 2. It is possible that, the poorest of the poor in the region may have already dropped out of school prior to the study, and this group may have had some of the earliest marriages and different marital outcomes. The results we identify thus represent the impact of age of marriage among the population studied, and are not perfectly representative of the entire population in the region.

VI. Conclusion

Our analysis makes several contributions. First, this paper extends the literature exploring the influence of social institutions and norms on female development outcomes, adding to this work by causally identifying the effect of age of marriage across a wide range of outcomes using a rich longitudinal dataset of young adults in a rural area of western Kenya. We show that delayed marriage not only increases educational attainment and certain dimensions of academic test scores, but it also appears to improve self-reported health outcomes. At the same time, we find no clear relationship between age at first marriage and a wide range of other adult outcomes such as labor market participation, earnings, child health, and social attitudes.

Second, these results are informative for policy. In the case of Kenya, legal changes are already occurring which could reduce the prevalence of early marriage. The government recently

enacted a law of banning marriage for those under age 18 (National Council for Law Reporting, 2014), although enforcement is questionable as many marriages in Kenya—like much of the developing world—are informal (UNICEF, 2005). Our results suggest that policies and social changes which successfully restrict adolescent marriage and incentivize later marriage for women could yield improvements in these educational and health outcomes, but they are not likely to prove a panacea for closing the gender gap more broadly.

Third, our findings provide a demonstration of external validity for previous research on the impact of early marriage in Bangladesh (Field and Ambrus, 2008), where adolescent and arranged marriage are more prevalent. While social norms have less extreme implications for marriage ages in Kenya, the fact that similar costs to early marriage are evident in Kenya, a region characterized by a different set of religious and ethnic customs, lends credence to the study in Bangladesh. Specifically, the strength of our observed association between marriage and education suggests that the essential empirical finding of Field and Ambrus (2008) is likely to generalize more widely.

Finally, the results of this study suggest that existing trends in which age of marriage is increasing in many parts of the developing world are likely to reinforce progress towards closing the gender gap in education, effectively in a virtuous cycle. Even in societies where arranged marriage is uncommon and age of marriage is not unusually low, there may still be gains from a reduction in adolescent marriage.

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Figure 1: Schooling Attainment by Age of Menarche

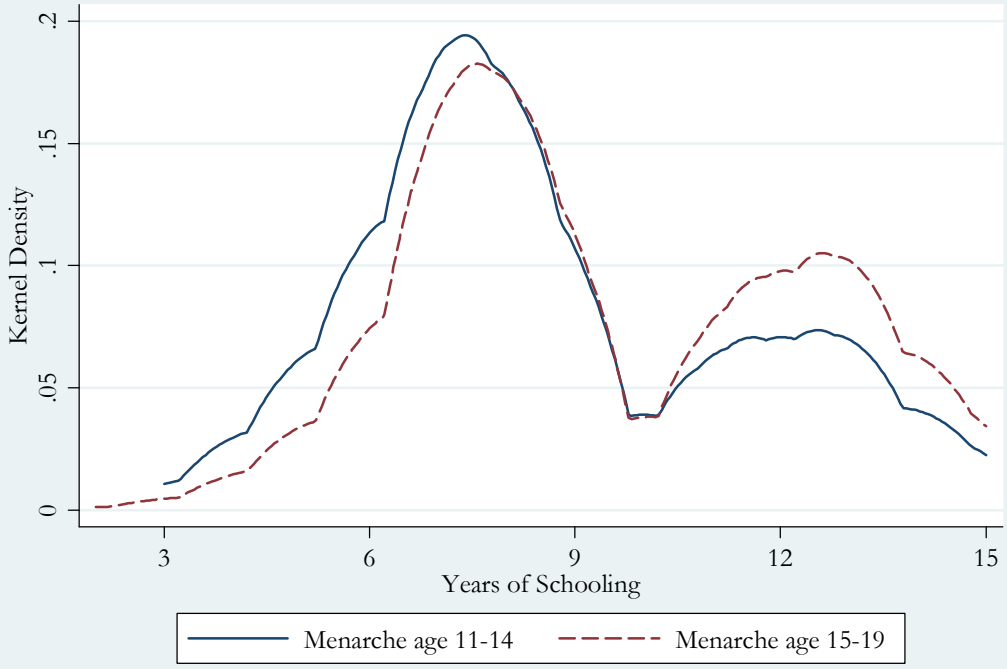

Figure 2: Age of Marriage

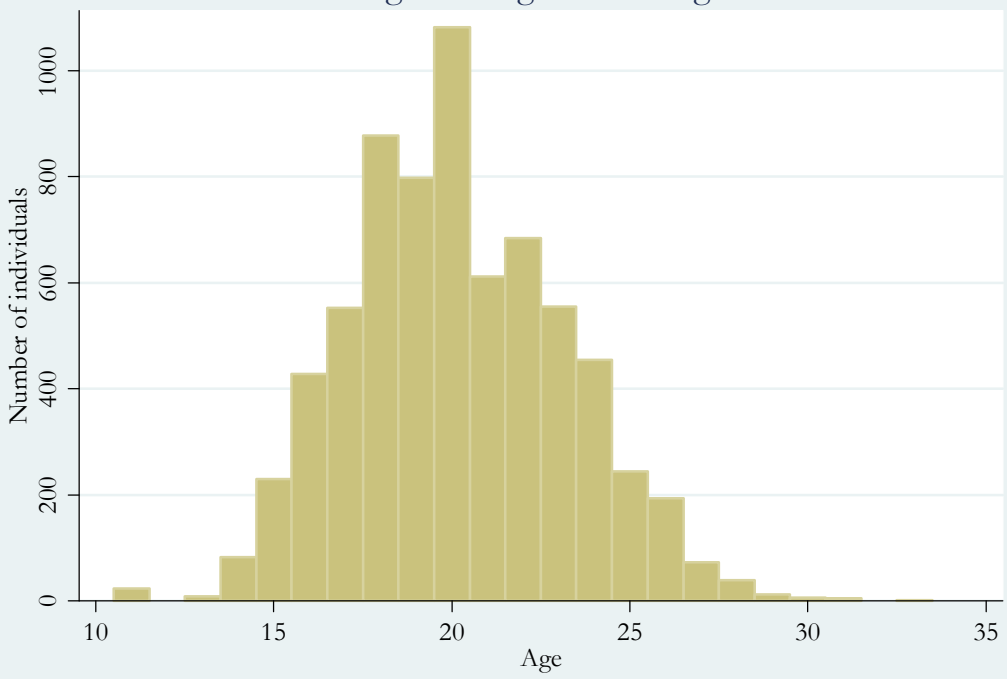

Figure 3: Age of First Marriage and Age of Menarche

Figure 4: Distribution of Age of Marriage by Age of Menarche

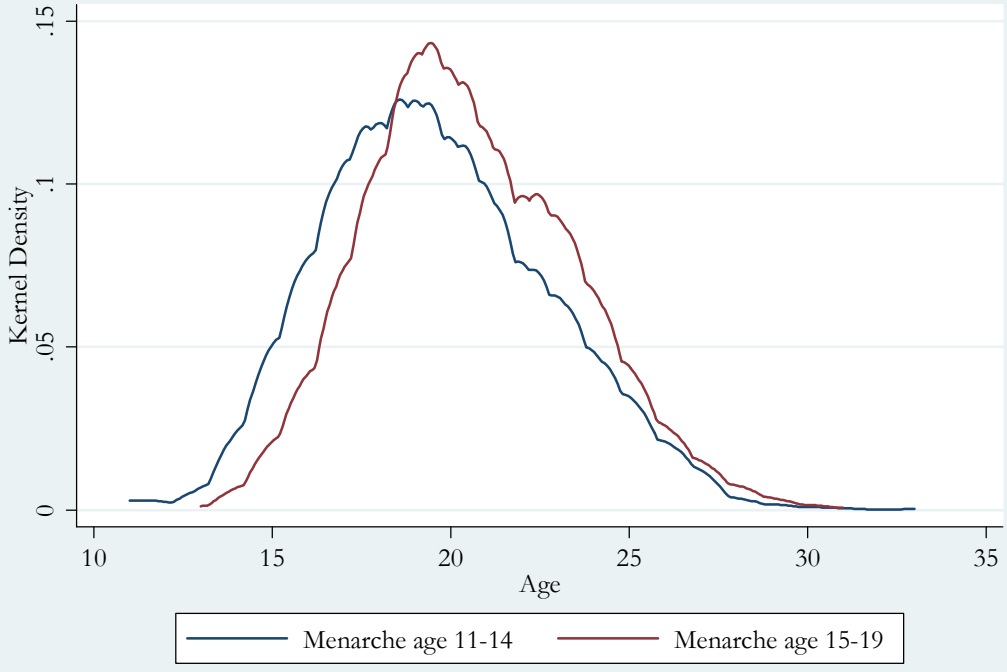

Table 1: Summary Statistics

Variable	Obs	Mean	Standard Deviation
Individual Characteristics			
Age of Menarche (years)	4,045	14.90	(1.86)
Height Z-Score at KLPS-1 Survey	2,901	0.02	(1.01)
Indic for Part of PSDP Sample	4,045	0.73	(0.44)
Indic for Part of PSDP Treatment Group	4,045	0.49	(0.50)
Indic for Part of GSP Treatment Group	4,045	0.13	(0.34)
Indic for Part of Vocational Training Sample	4,045	0.23	(0.42)
Indic for Part of Vocational Training Voucher Treatment Group	4,045	0.11	(0.31)
Age at KLPS-3 Survey (years)	4,045	25.94	(2.69)
Household Characteristics			
Father's Education (years)	3,494	8.14	(4.00)
Indic for Father's Education Missing	4,045	0.15	(0.36)
Mother's Education (years)	3,614	5.97	(3.72)
Indic for Mother's Education Missing	4,045	0.12	(0.32)
Number of Siblings	4,045	5.45	(2.84)
Marriage and Fertility Outcomes			
Indic for Ever Married	4,045	0.70	(0.46)
Age of First Marriage	2,686	20.12	(3.02)
Indic for Ever Pregnant	4,045	0.80	(0.40)
Age of First Pregnancy	3,062	20.07	(2.76)

Notes: The sample described in this table includes all females surveyed in KLPS Round 3 with information on regression controls who experienced menarche between the ages of 11 and 19. Results are weighted to maintain initital population proportions.

Table 2: Age of Menarche as an Instrument

	Age at First Marriage	
	(1)	(2)
Age of menarche	0.245***	0.245***
	(0.047)	(0.045)
Years of schooling completed by father	0.066**	0.081**
	(0.026)	(0.031)
Years of schooling completed by mother	0.046*	0.036
	(0.024)	(0.026)
Number of siblings	0.006	0.025
	(0.027)	(0.030)
Height for age z-score, KLPS-1		0.055
		(0.089)
Number of Observations	2,686	1,862
R2	0.060	0.061

Notes: The sample includes all females surveyed in KLPS Round 3 who experienced menarche between the ages of 11 and 19, and for whom information on all regression controls exists. Additional covariates include indicators for participation in the PSDP and VTVP; indicators for assigment to the treatment group for the PSDP, GSP, and VTVP; age at KLPS-3 survey; indicators for missing information on father and mother education; and indicators for number of months since KLPS-3 data collection began. Missing information on parent education is replaced with mean values. Regressions are weighted to maintain initial population proportions. Robust standard errors in parenthesis. *** P-value<0.01, ** P-value<0.05, * P-value<0.1.

Table 3: IV Regressions for Educational Attainment and Exam Outcomes

Panel A: Attainment	Years of education attained[1]	Indic for completed primary	Indic for attended secondary	Indic for completed secondary	Indic for attended college
Age at Marriage	0.484***	0.133***	0.056**	0.039**	0.022*
	(0.138)	(0.033)	(0.022)	(0.018)	(0.012)
	[0.002]	[0.001]	[0.014]	[0.024]	[0.050]
Kleibergen-Paap F-Statistic	27.1	27.1	27.1	27.1	27.1
Mean (std dev) of depvar	9.120	0.700	0.407	0.295	0.047
	(2.789)	(0.458)	(0.491)	(0.456)	(0.213)

Panel B: Exam Outcomes	Reading test score[2]	Math test score[2]	Indic for took secondary school entrance exam	Indic for passed secondary school entrance exam[3]	Indic for took post-secondary entrance exam
Age at Marriage	0.022	0.215***	0.139***	0.039	0.031*
	(0.067)	(0.064)	(0.030)	(0.083)	(0.018)
	[0.174]	[0.002]	[0.001]	[0.166]	[0.050]
Kleibergen-Paap F-Statistic	22.2	22.0	26.8	4.8	26.8
Mean (std dev) of depvar	-0.027	-0.157	0.652	0.710	0.281
	(1.007)	(0.954)	(0.476)	(0.454)	(0.450)

Notes: Regression results presented are from the second stage of 2SLS regressions, where the instrumented variable is age of marriage. Dependent variables are listed across the top of each panel. See Table 2 Notes for a description of the sample and a list of covariates included in the regressions. Sample size varies by specification and ranges from 1,599 to 2,656 (the lowest numbers are for "passed post-secondary entrance exam", which is among those who took the exam). Regressions are weighted to maintain initial population proportions. Robust standard errors in parenthesis, and false discovery rate adjusted q-values in brackets for regression results. *** P-value<0.01, ** P-value<0.05, * P-value<0.1. [1]Years of education does not include vocational training. [2]Reading and Math Test Scores are standardized within the entire KLPS-3 interview sample. [3]Passed secondary school entrance exam is among those who took the exam.

Table 4: IV Regressions for Marital Outcomes

Panel A	Indic for patrilocal exogamy	Age of spouse at marriage	Own age at marriage - spouse age at marriage	Education level of spouse (years)	Own yrs education - spouse yrs education
Age at Marriage	-0.004	0.460	0.540	0.186	-0.186
	(0.012)	(0.333)	(0.333)	(0.241)	(0.241)
	[0.651]	[0.353]	[0.326]	[1.000]	[1.000]
Kleibergen-Paap F-Statistic	26.7	23.8	23.8	18.9	18.9
Mean (std dev) of depvar	0.058	25.21	5.07	8.89	-0.66
	(0.233)	(5.33)	(4.99)	(3.29)	(3.00)

Panel B	Indic for felt ready to marry at marriage	Indic for brideprice was paid	Indic for marriage is informal	Indic for has a cowife
Age at Marriage	0.024	-0.051**	0.039	-0.006
	(0.027)	(0.025)	(0.030)	(0.026)
	[0.505]	[0.208]	[0.353]	[0.651]
Kleibergen-Paap F-Statistic	26.7	27.0	26.8	27.5
Mean (std dev) of depvar	0.352	0.240	0.623	0.222
	(0.478)	(0.427)	(0.485)	(0.415)

Notes: Regression results presented are from the second stage of 2SLS regressions, where the instrumented variable is age of marriage. Dependent variables are listed across the top of each panel. See Table 2 Notes for a description of the sample and a list of covariates included in the regressions. "Education level of spouse" and "Own yrs education - spouse yrs education" additional control for own education. Sample size varies by specification and ranges from 2,606 to 2,684. Regressions are weighted to maintain initial population proportions. Robust standard errors in parenthesis, and false discovery rate adjusted q-values in brackets for regression results. *** P-value<0.01, ** P-value<0.05, * P-value<0.1.

Table 5: IV Regressions for Child and Own Health Outcomes

Panel A: Child Health	Indic for sought antenatal care	Indic for first child slept under bednet last night	Indic for first child has good health (self-report)
Age at Marriage	0.014	0.005	0.006
	(0.013)	(0.019)	(0.023)
	[0.383]	[0.814]	[0.814]
Kleibergen-Paap F-Statistic	28.5	27.2	29.2
Mean (std dev) of dependent variable	0.961	0.867	0.752
	(0.194)	(0.339)	(0.432)

Panel B: Own Health	Scale of self-reported general health[1]	Hemoglobin Level	Body weight	Fraction of 22 symptoms and illness reported[2]
Age at Marriage	0.124**	-0.089	-0.271	-0.020***
	(0.056)	(0.159)	(0.507)	(0.007)
	[0.042]	[0.735]	[0.735]	[0.014]
Kleibergen-Paap F-Statistic	26.8	20.0	25.0	26.8
Mean (std dev) of dependent variable	4.13	12.17	59.71	0.124
	(0.99)	(1.93)	(9.15)	(0.106)

Notes: Regression results presented are from the second stage of 2SLS regressions, where the instrumented variable is age of marriage. Dependent variables are listed across the top of each panel. See Table 2 Notes for a description of the sample and a list of covariates included in the regressions. Sample size varies by specification and ranges from 2,509 to 2,632. Regressions are weighted to maintain initial population proportions. Robust standard errors in parenthesis, and false discovery rate adjusted q-values in brackets for regression results. *** P-value<0.01, ** P-value<0.05, * P-value<0.1. [1]Scale of self-reported general health ranges from 5 (very good) to 1 (very poor). 2Symptoms and illnesses included in the index are: fever, persistent cough, always feeling tired, stomach pain, worms, blood in stool, rapid weight loss, frequent diarrhea, skin rash/irritation, open sores/boils, difficulty swallowing, serious wound or injury, malaria, typhoid, tuberculosis, sores or ulcers on the genitals, cholera, yellow fever, asthma / breathlessness at night, frequest and excessive urination, constant thirst / increased drinking of fluids, and diabetes.

Table 6: IV Regressions for Labor Sector and Hours Worked

Panel A: Sector of Work	Indic for worked pos hours in any sector	Indic for worked pos hours in agriculture for home	Indic for worked pos hours in self employment	Indic for worked pos hours in wage employment	Indic for worked pos hours in household chores
Age at Marriage	0.006	-0.027	-0.032	0.004	0.009*
	(0.005)	(0.027)	(0.022)	(0.020)	(0.005)
	[1.000]	[1.000]	[1.000]	[1.000]	[1.000]
Kleibergen-Paap F-Statistic	26.8	27.6	26.8	26.8	26.8
Mean (std dev) of dependent variable	0.989	0.511	0.189	0.220	0.987
	(0.103)	(0.500)	(0.392)	(0.414)	(0.115)
Panel B: Hours Worked	Total hours worked in any sector	Hours worked in agriculture for home	Hours worked in self employment	Hours worked in wage employment	Hours worked in household chores
Age at Marriage	-1.687	-1.226	-0.292	0.284	-0.437
	(1.877)	(0.856)	(0.910)	(1.062)	(0.898)
	[1.000]	[1.000]	[1.000]	[1.000]	[1.000]
Kleibergen-Paap F-Statistic	26.8	27.3	26.8	26.8	26.8
Mean (std dev) of dependent variable	51.45	9.05	5.98	9.71	27.06
	(28.30)	(13.08)	(15.73)	(21.04)	(15.24)

Notes: Regression results presented are from the second stage of 2SLS regressions, where the instrumented variable is age of marriage. Dependent variables are listed across the top of each panel. See Table 2 Notes for a description of the sample and a list of covariates included in the regressions. Sample size varies by specification and ranges from 2,657 to 2,686. Regressions are weighted to maintain initial population proportions. Robust standard errors in parenthesis, and false discovery rate adjusted q-values in brackets for regression results. *** P-value<0.01, ** P-value<0.05, * P-value<0.1.

Table 7: IV Regressions for Other Agriculture and Labor Market Outcomes

Panel A: Other Labor Outcomes	Indic for unemployed	Indic for has a full time job	Indic for household farms a cash crop	Indic for household sells crops
Age at Marriage	-0.020	0.007	-0.003	-0.028
	(0.025)	(0.030)	(0.008)	(0.028)
	[1.000]	[1.000]	[1.000]	[1.000]
Kleibergen-Paap F-Statistic	26.8	26.8	26.8	26.8
Mean (std dev) of dependent variable	0.355	0.293	0.027	0.281
	(0.478)	(0.455)	(0.163)	(0.449)

Panel B: Earnings	Total earnings, trimmed	Ln(Total earnings, trimmed)	Nonagric earnings, trimmed	Lg(Nonagric earnings, trimmed)
Age at Marriage	-139	-0.131**	-44	-0.021
	(147)	(0.060)	(149)	(0.100)
	[1.000]	[0.314]	[1.000]	[1.000]
Kleibergen-Paap F-Statistic	27.5	37.0	26.8	14.0
Mean (std dev) of dependent variable	3,578	7.27	1,503	7.60
	(2,101)	(1.302)	(3,533)	(1.31)

Notes: Regression results presented are from the second stage of 2SLS regressions, where the instrumented variable is age of marriage. Dependent variables are listed across the top of each panel. See Table 2 Notes for a description of the sample and a list of covariates included in the regressions. Sample size varies by specification and ranges from 1,004 to 2,686. Regressions are weighted to maintain initial population proportions. Robust standard errors in parenthesis, and false discovery rate adjusted q-values in brackets for regression results. *** P-value<0.01, ** P-value<0.05, * P-value<0.1.

Table 8: IV Regressions for Attitudes Toward Gender, Politics, and Society

Panel A: Gender Attitudes	Indic for women should have equal rights	Indic for no one should use physical violence	Indic for husband should do chores if wife works	Indic for family decisions not best made by men	Indic for women can make good politicians
Age at Marriage	-0.019	-0.014	0.009	0.035	0.003
	(0.017)	(0.026)	(0.023)	(0.025)	(0.024)
	[1.000]	[1.000]	[1.000]	[0.737]	[1.000]
Kleibergen-Paap F-Statistic	26.8	26.8	26.8	26.9	26.8
Mean (std dev) of dependent variable	0.911	0.837	0.791	0.338	0.886
	(0.285)	(0.370)	(0.407)	(0.473)	(0.318)
Panel B: Other Attitudes	Indic for ethnic identity is not very important	Indic for religious identity is not very important	Indic for supports open & honest elections	Indic for prefers a democratic government	Indic for believes most people can be trusted
Age at Marriage	0.009	-0.002	-0.005	0.052*	-0.032**
	(0.013)	(0.009)	(0.013)	(0.028)	(0.013)
	[1.000]	[1.000]	[1.000]	[0.416]	[0.169]
Kleibergen-Paap F-Statistic	26.8	25.8	27.0	26.7	26.8
Mean (std dev) of dependent variable	0.079	0.030	0.972	0.561	0.052
	(0.270)	(0.172)	(0.164)	(0.496)	(0.222)

Notes: Regression results presented are from the second stage of 2SLS regressions, where the instrumented variable is age of marriage. Dependent variables are listed across the top of each panel. See Table 2 Notes for a description of the sample and a list of covariates included in the regressions. Sample size varies by specification and ranges from 2,673 to 2,686. Regressions are weighted to maintain initial population proportions. Robust standard errors in parenthesis, and false discovery rate adjusted q-values in brackets for regression results. *** P-value<0.01, ** P-value<0.05, * P-value<0.1.

Appendix Table 1: IV Regressions for Educational Attainment and Exam Outcomes

Panel A: Attainment	Years of Education Attained[1]	Indic for Completed Primary	Indic for Attended Secondary	Indic for Completed Secondary	Indic for Attended College
Age at Marriage	0.194	0.079**	0.029	0.010	0.005
	(0.136)	(0.031)	(0.026)	(0.019)	(0.010)
	[0.271]	[0.055]	[0.386]	[0.513]	[0.513]
Kleibergen-Paap F-Statistic	28.4	28.4	28.4	28.4	28.4
Mean (std dev) of dependent variable	9.357	0.741	0.444	0.327	0.053
	(2.741)	(0.438)	(0.497)	(0.469)	(0.224)

Panel B: Exam Outcomes	Reading Test Score[2]	Math Test Score[2]	Indic for Took Secondary School Entrance Exam	Indic for Passed Secondary School Entrance Exam[3]	Indic for Took Post-Secondary Entrance Exam
Age at Marriage	-0.115*	0.101*	0.087***	0.042	0.006
	(0.067)	(0.058)	(0.030)	(0.052)	(0.019)
	[0.206]	[0.206]	[0.039]	[0.455]	[0.616]
Kleibergen-Paap F-Statistic	21.1	23.3	28.2	10.2	28.2
Mean (std dev) of dependent variable	0.042	-0.076	0.701	0.734	0.312
	(0.997)	(0.952)	(0.458)	(0.442)	(0.463)

Notes: Regression results presented are from the second stage of 2SLS regressions, where the instrumented variable is age of marriage. Dependent variables are listed across the top of each panel. The sample includes all females surveyed in KLPS Round 3 and KLPS Round 1, who experienced menarche between the ages of 11 and 19, and for whom information on all regression controls exists. See Table 2 Notes for list of covariates included in the regressions. Regressions also control for KLPS Round 1 height z-score. Sample size varies by specification and ranges from 1,186 to 1,862 (the lowest numbers are for "passed post-secondary entrance exam", which is among those who took the exam). Regressions are weighted to maintain initital population proportions. Robust standard errors in parenthesis, and false discovery rate adjusted q-values in brackets for regression results. *** P-value<0.01, ** P-value<0.05, * P-value<0.1. [1]Years of education does not contain vocational training. [2]Reading and Math Test Scores are standardized within the entire KLPS-3 interview sample. [3]Passed secondary school entrance exam is among those who took the exam.

Appendix Table 2: IV Regressions for Marital Outcomes

Panel A	Indic for patrilocal exogamy	Age of spouse at marriage	Own age at marriage - spouse age at marriage	Education level of spouse (years)	Own yrs education - spouse yrs education
Age at Marriage	0.010	0.290	0.710**	-0.085	0.085
	(0.016)	(0.285)	(0.285)	(0.246)	(0.246)
	[0.697]	[0.697]	[0.131]	[0.950]	[0.950]
Kleibergen-Paap F-Statistic	28.5	25.2	25.2	26.2	26.2
Mean (std dev) of dependent variable	0.061	25.18	-4.89	9.11	-0.67
	(0.239)	(5.05)	(4.70)	(3.23)	(2.98)

Panel B	Indic for felt ready to marry at marriage	Indic for brideprice was paid	Indic for marriage is informal	Indic for has a cowife
Age at Marriage	0.025	-0.052*	0.069**	-0.020
	(0.035)	(0.027)	(0.035)	(0.023)
	[0.697]	[0.182]	[0.182]	[0.697]
Kleibergen-Paap F-Statistic	27.8	28.4	28.2	29.4
Mean (std dev) of dependent variable	0.361	0.228	0.625	0.217
	(0.481)	(0.420)	(0.484)	(0.412)

Notes: Regression results presented are from the second stage of 2SLS regressions, where the instrumented variable is age of marriage. Dependent variables are listed across the top of each panel. See Appendix Table 1 Notes for a description of the sample and a list of covariates included in the regressions. "Education level of spouse" and "Own yrs education - spouse yrs education" additional control for own years of education. Sample size varies by specification and ranges from 1,813 to 1,862. Regressions are weighted to maintain initial population proportions. Robust standard errors in parenthesis, and false discovery rate adjusted q-values in brackets for regression results. *** P-value<0.01, ** P-value<0.05, * P-value<0.1.

Appendix Table 3: IV Regressions for Child and Own Health Outcomes

Panel A: Child Health	Indic for sought antenatal care	Indic for first child slept under bednet last night	Indic for first child has good health (self-report)
Age at Marriage or Family Formation	0.012	0.025	-0.023
	(0.012)	(0.023)	(0.028)
	[0.453]	[0.453]	[0.496]
Kleibergen-Paap F-Statistic	29.5	28.4	30.8
Mean (std dev) of dependent variable	0.966	0.868	0.744
	(0.181)	(0.339)	(0.437)

Panel B: Own Health	Scale of self-reported general health	Hemoglobin Level	Body weight	Fraction of 22 symptoms of illness reported
Age at Marriage or Family Formation	0.013	-0.259	-0.095	-0.013*
	(0.066)	(0.179)	(0.664)	(0.008)
	[0.878]	[0.305]	[0.878]	[0.222]
Kleibergen-Paap F-Statistic	28.2	22.9	23.9	28.2
Mean (std dev) of dependent variable	4.16	12.13	59.60	0.122
	(0.98)	(1.93)	(9.02)	(0.103)

Notes: Regression results presented are from the second stage of 2SLS regressions, where the instrumented variable is age of marriage. Dependent variables are listed across the top of each panel. See Appendix Table 1 Notes for a description of the sample and a list of covariates included in the regressions. Sample size varies by specification and ranges from 1,734 to 1,862. Regressions are weighted to maintain initial population proportions. Robust standard errors in parenthesis, and false discovery rate adjusted q-values in brackets for regression results. *** P-value<0.01, ** P-value<0.05, * P-value<0.1.

Appendix Table 4: IV Regressions for Labor Sector and Hours Worked

Panel A: Sector of Work	Indic for worked pos hours in any sector	Indic for worked pos hours in agriculture for home	Indic for worked pos hours in self employment	Indic for worked pos hours in wage employment	Indic for worked pos hours in household chores
Age at Marriage	0.002	-0.032	-0.025	0.012	0.004
	(0.004)	(0.026)	(0.024)	(0.022)	(0.005)
	[1.000]	[1.000]	[1.000]	[1.000]	[1.000]
Kleibergen-Paap F-Statistic	28.0	30.6	28.0	28.0	28.0
Mean (std dev) of dependent variable	0.991	0.508	0.171	0.219	0.987
	(0.096)	(0.500)	(0.377)	(0.413)	(0.112)
Panel B: Hours Worked	Total hours worked in any sector	Hours worked in agriculture for home	Hours worked in self employment	Hours worked in wage employment	Hours worked in household chores
Age at Marriage	-0.144	-0.787	0.250	0.734	-0.390
	(2.400)	(0.899)	(1.077)	(1.268)	(1.184)
	[1.000]	[1.000]	[1.000]	[1.000]	[1.000]
Kleibergen-Paap F-Statistic	28.0	30.0	28.2	28.2	28.0
Mean (std dev) of dependent variable	49.60	8.42	5.27	9.83	26.51
	(28.03)	(12.49)	(14.94)	(21.39)	(15.13)

Notes: Regression results presented are from the second stage of 2SLS regressions, where the instrumented variable is age of marriage. Dependent variables are listed across the top of each panel. See Appendix Table 1 Notes for a description of the sample and a list of covariates included in the regressions. Sample size varies by specification and ranges from 1,841 to 1,862. Regressions are weighted to maintain initial population proportions. Robust standard errors in parenthesis, and false discovery rate adjusted q-values in brackets for regression results. *** P-value<0.01, ** P-value<0.05, * P-value<0.1.

Appendix Table 5: IV Regressions for Other Agriculture and Labor Market Outcomes

Panel A: Other Labor Outcomes	Indic for unemployed	Indic for has a full time job	Indic for household farms a cash crop	Indic for household sells crops
Age at Marriage	-0.033	0.033	-0.010	-0.023
	(0.029)	(0.032)	(0.009)	(0.028)
	[1.000]	[1.000]	[1.000]	[1.000]
Kleibergen-Paap F-Statistic	28.0	28.0	28.2	28.2
Mean (std dev) of dependent variable	0.358	0.276	0.027	0.275
	(0.479)	(0.447)	(0.162)	(0.447)

Panel B: Earnings	Total earnings, trimmed	Ln(Total earnings, trimmed)	Nonagric earnings, trimmed	Lg(Nonagric earnings, trimmed)
Age at Marriage	-22	-0.048	25	-0.046
	(163)	(0.076)	(168)	(0.115)
	[1.000]	[1.000]	[1.000]	[1.000]
Kleibergen-Paap F-Statistic	30.4	30.8	26.5	12.4
Mean (std dev) of dependent variable	2,006	7.19	1,460	7.62
	(3,564)	(1.35)	(3,517)	(1.31)

Notes: Regression results presented are from the second stage of 2SLS regressions, where the instrumented variable is age of marriage. Dependent variables are listed across the top of each panel. See Appendix Table 1 Notes for a description of the sample and a list of covariates included in the regressions. Sample size varies by specification and ranges from 676 to 1,862. Regressions are weighted to maintain initial population proportions. Robust standard errors in parenthesis, and false discovery rate adjusted q-values in brackets for regression results. *** P-value<0.01, ** P-value<0.05, * P-value<0.1.

Appendix Table 6: IV Regressions for Attitudes Toward Gender, Politics, and Society

Panel A: Gender Attitudes	Indic for women should have equal rights	Indic for no one should use physical violence	Indic for husband should do chores if wife works	Indic for family decisions not best made by men	Indic for women can make good politicians
Age at Marriage	-0.016	-0.048	-0.018	0.006	-0.042
	(0.023)	(0.031)	(0.024)	(0.028)	(0.042)
	[1.000]	[1.000]	[1.000]	[1.000]	[1.000]
Kleibergen-Paap F-Statistic	28.2	28.2	28.2	28.4	28.2
Mean (std dev) of dependent variable	0.907	0.835	0.796	0.346	0.884
	(0.290)	(0.371)	(0.403)	(0.476)	(0.320)
Panel B: Other Attitudes	Indic for ethnic identity is not very important	Indic for religious identity is not very important	Indic for supports open & honest elections	Indic for prefers a democratic government	Indic for believes most people can be trusted
Age at Marriage	0.000	-0.005	-0.011	-0.008	-0.034*
	(0.015)	(0.011)	(0.019)	(0.033)	(0.018)
	[1.000]	[1.000]	[1.000]	[1.000]	[1.000]
Kleibergen-Paap F-Statistic	28.2	26.8	28.4	28.1	28.2
Mean (std dev) of dependent variable	0.081	0.032	0.973	0.563	0.053
	(0.273)	(0.175)	(0.163)	(0.496)	(0.224)

Notes: Regression results presented are from the second stage of 2SLS regressions, where the instrumented variables is age of marriage. Dependent variables are listed across the top of each panel. See Appendix Table 1 Notes for a description of the sample and a list of covariates included in the regressions. Sample size varies by specification and ranges from 1,851 to 1,862. Regressions are weighted to maintain initial population proportions. Robust standard errors in parenthesis, and false discovery rate adjusted q-values in brackets for regression results. *** P-value<0.01, ** P-value<0.05, * P-value<0.1.