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JORDAN'S FERTILITY STALL AND RESUMED DECLINE: AN INVESTIGATION OF DEMOGRAPHIC FACTORS

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JORDAN'S FERTILITY STALL AND RESUMED DECLINE: AN INVESTIGATION OF DEMOGRAPHIC FACTORS[1]

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Abstract

From the late 1990s until 2010, the fertility transition in Jordan was stalled, with the total fertility rate (TFR) well above replacement level. In this paper, we present new evidence that fertility rates in Jordan have resumed declining, and examine the possible mechanisms behind this trend. Based on data from the Jordan Labor Market Panel Survey 2016, fertility has declined from a TFR of 3.8 in 2010 to 3.3 in 2016 among Jordanians. Despite challenging economic conditions, age at marriage has remained stable. Therefore nuptiality cannot be the main driver of the recent fertility decline. Although fertility rates have declined across parities and population groups, there is evidence of reduced fertility particularly among more educated women.

JEL Classifications: J12, J13

Keywords: Refugees, Marriage, Fertility, Jordan, Women's education.

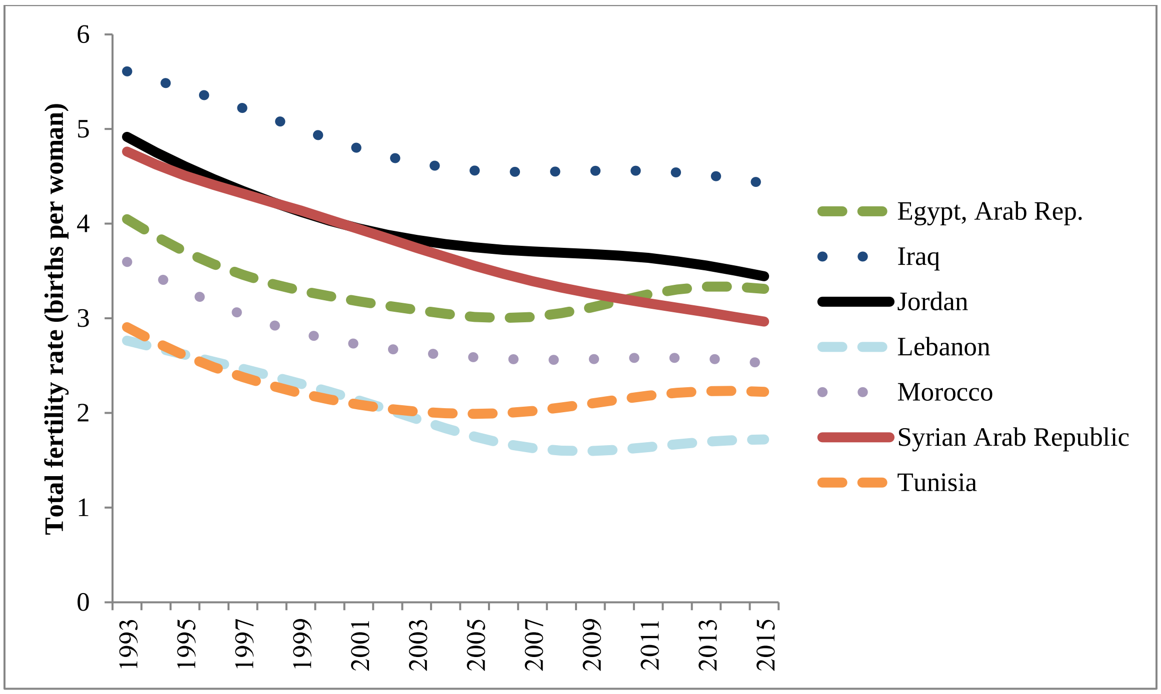
ملخص

منذ أواخر التسعينات حتى عام 2010، توقفت فترة تحول الخصوبة في الأردن، بوصول معدل الخصوبة الكلى إلى أعلى بكثير من مستوى الإحلال. في هذه الورقة، نقدم دليلاً جديدًا على أن معدلات الخصوبة في الأردن قد تم استئنافه، ونبحث الآليات المحتملة لهذا الاتجاه. استناداً إلى بيانات مسح الفريق لسوق العمل الأردني لعام 2016، فقد انخفضت الخصوبة من معدل الخصوبة الإجمالي البالغ 3.8 في عام 2010 إلى 3.3 في عام 2016 بين الأردنيين. وعلى الرغم من الظروف الاقتصادية الصعبة، ظل العمر عند الزواج ثابتًا. لذلك لا يمكن أن يكون الزواج هو المحرك الرئيسي لانحدار الخصوبة الأخير. ولكن بالرغم من أن معدلات الخصوبة قد سجلت انخفاضا في عدد مرات الانجاب وبين مجموعات سكانية، فهناك دليل على انخفاض الخصوبة خاصة بين النساء الأكثر تعليما.

1. Introduction

The fertility transition in many countries in the Middle East and North Africa (MENA) region appears to have stalled since the early 2000s at rates well above replacement level, and in several countries fertility rates have increased (Figure 1). Fertility stalls, or stalls in the decline of the total fertility rate in a country that has begun the fertility transition, have been documented in numerous developing countries (Bongaarts 2006). A substantial but inconclusive literature has examined the contribution of both the proximate determinants of fertility and underlying socioeconomic conditions in driving these stalls, focusing on countries in Sub-Saharan Africa. Stagnating socioeconomic development, and particularly stagnation in women's education levels (Goujon, Lutz, and Samir 2015; Shapiro and Gebreselassie 2013) and employment opportunities (Al Zalak and Goujon 2017), a leveling off of contraceptive use and the trend towards smaller desired family sizes (Bongaarts 2006), and the role of family planning programs (Bongaarts 2006; Spindler et al. 2017) have all been examined as possible contributors to fertility stalls. Yet the evidence regarding the importance of these factors in driving fertility stalls remains mixed and mostly associational.

Figure 1. Total fertility rate (TFR, births per woman) for selected MENA countries, 1993-2015



Source: World Bank World Development Indicators. http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators
Data for 2016 and 2017 not available.

In the Middle East and North Africa, there are opposing socioeconomic trends that may contribute to fertility stalls. Difficult economic conditions and high rates of youth unemployment have made it challenging for young men to fulfill the expectation of obtaining a housing unit to establish a nuclear family upon marriage, which has contributed to involuntary marriage delay and increasing ages at first marriage for both genders in many countries (Assaad, Krafft, and Rolando 2017; Dhillon, Dyer, and Yousef 2009). In a context where childbearing takes place almost exclusively within marriage and marriage is the only socially accepted route to family formation (Dhillon and Yousef 2009), we would expect these upward pressures on marriage age to lead to lower fertility rates.

Similarly, women's educational attainment has risen dramatically in the MENA region, which should put upward pressure on marriage ages because schooling and marriage are generally seen to be incompatible (Ali and Gurmu 2016). In addition, the negative relationship between women's educational attainment and fertility rates has been widely documented on a global level (Angeles, Guilkey, and Mroz 2005; Bongaarts 2003; Goujon, Lutz, and Samir 2015; Kim 2010; Osili and Long 2008; Bledsoe et al. 1999). On the other hand, a key determinant of fertility decisions in economic theory is the opportunity cost of women's time allocated to childrearing (Becker 1960). With economic development, this cost is usually assumed to increase as women's education increases, their economic opportunities expand, and gender norms shift away from traditional models of social roles and household division of labor (Hoorens et al. 2011). In MENA, the rapid expansion of women's education has not led to a corresponding increase in their labor force participation, which remains the lowest of any world region and in some countries has even declined for recent cohorts (Assaad et al. 2016). The lack of a strong relationship between women's education and employment in the region has even led some authors to question whether women's education could have been the driving force behind the fertility transition witnessed in much of the region through the 1990s (Ali and Gurmu 2016).

In Egypt, where literature on fertility stall is the most advanced within the MENA region, there has thus been considerable focus on the role of women's education in determining fertility rates and potentially in driving the fertility stall. Although increases in women's education have been demonstrated to reduce fertility among Egyptian women through the mechanism of increased ages at first birth (Ali and Gurmu 2016), analyses of Egypt's fertility trends have noted the convergence in fertility rates across wealth and women's education over time. The fertility stall began earlier among women with more education and in higher socioeconomic groups, which is highly correlated with women's education, such that the education gradient in fertility is no longer as strong as during the period of fertility decline (Al Zalak and Goujon 2017; Eltigani 2003; Vignoli 2006). Al Zalak and Goujon (2017) conclude that although the mean age at marriage and first birth among highly educated Egyptian women has declined, the proximate determinants cannot explain the fertility stall among this group. They concur with Krafft (2016) in arguing that low and declining economic opportunities for educated women due to the contraction of public sector employment, and thus a reduction in the opportunity cost of women's time spent in childbearing, may have contributed to the recent rise in fertility in Egypt. However, Krafft's (2016) analysis demonstrates that employment opportunities cannot explain all of Egypt's fertility trend.

As discussed below, while the existence of a fertility stall in Jordan has been well established by previous literature, there has been less detailed analysis of the factors contributing to the stall and particularly of the role of women's education. In this paper, we present new data on fertility rates in Jordan through 2016 that demonstrates a resumption of the fertility transition, with TFR falling from the stall rate of 3.9 (3.8 among Jordanians) in 2010 to 3.4 (3.3 among Jordanians) in 2016. We then explore the possible drivers of this resumed fertility decline, focusing in particular on the role of age at first marriage and women's education. We also explore the potential effects of the arrival of a large Syrian refugee population in Jordan since 2011 on Jordanians' marriage and fertility outcomes. As some of the first evidence of a MENA country coming out of a long-term fertility stall, understanding the dynamics of resumed fertility decline in Jordan has important implications for future demographic and socioeconomic trends in the country and broader region.

1.1 Marriage and fertility patterns in Jordan

Jordan has generally followed the regional trend of rising ages at first marriage, although to a lesser degree than some of the other countries in the region. Between cohorts born in the 1960s and 1980s, the median age at marriage for men remained close to 26. More importantly for our analyses of fertility rates, the median age at marriage for women increased somewhat from age 19 among those born in the 1960s, but remained quite low at age 22 for those born in the 1980s (Assaad, Krafft, and Rolando 2017). The relatively stable ages at first marriage in Jordan may be due in part to the fact that cost of marriage pressures are not at strong as in other contexts; Jordan has both a more active housing rental market that facilitates new couples obtaining housing (Assaad, Krafft, and Rolando 2017) and the real costs of marriage have declined over time (Salem 2012; Sieverding, Berri, and Abdulrahim 2018). There is thus no strong rationale for expecting that changes in nuptiality have driven overall fertility trends in Jordan, although several analyses have noted higher percentages of ever-married women in their late 20s specifically (Al Massarweh 2013; Cetorelli and Leone 2012).

Although median ages at marriage have remained quite stable on the aggregate, there are factors that accelerate or delay marriage on an individual level. As elsewhere in MENA, positive employment outcomes are associated with faster transitions to marriage among men (Assaad, Krafft, and Rolando 2017; Gebel and Heyne 2016; Krafft and Assaad 2017). Labor force participation among Jordanian women is very low, at 17% in 2016 (Assaad, Krafft, and Keo 2018), and the transition to marriage has been found to be faster among the majority of women who do not participate in the labor market (Gebel and Heyne 2016) although Krafft and Assaad (2017) find that once the endogeneity of the marriage and employment decisions is accounted for, women working in the public sector have faster transitions to marriage. Given the low labor force participation of women, education is a key factor in determining marriage timing among Jordanian women at the population level. Current enrollment in education reduces the likelihood of transitioning to marriage, yet Gebel and Heyne (2016) find that the overall increase in educational attainment among the Jordanian population only partially explains rising median ages at marriage among women (and does not explain change in age at marriage for men).

While median ages at marriage have been rising slowly in Jordan over time, fertility trends until 2012 can be divided into two distinct periods. The fertility transition in Jordan was fairly rapid during the 1980s and 1990s, declining from a total fertility rate (TFR) above 6 births per woman to just under 4 births per woman, at which point the fertility transition stalled (Cetorelli and Leone 2012). All four Demographic and Health Surveys (DHS) conducted in Jordan between 2002 and 2012 found a TFR between 3.8 and 3.5 (Department of Statistics (Jordan) and ICF International 2013). In a detailed analysis of the DHS data over time, Cetorelli and Leone (2012) conclude that Jordan's fertility stall was real and not due to data errors, and was in fact one of the longest fertility stalls on record at the time. The authors note that an inverted U-shaped relationship between education and fertility emerged in 2002 when the fertility stall began, whereas prior to 2002, women's education and fertility demonstrated the expected negative relationship. However, they do not find strong evidence of any specific factor as a driving cause behind the fertility stall (Cetorelli and Leone 2012). We are unaware of other studies that have examined the relationship between women's education and fertility rates in Jordan in greater detail.

In addition to changes in the prevalence of marriage, contraceptive use is a strong determinant of fertility trends. Contraceptive prevalence remained relatively unchanged in Jordan over the period from 2002-2012, with 41-42% of currently married women using a modern method and a small increase in the percentage using a traditional method from 15 to 19% (Department of Statistics (Jordan) and ICF International 2013). Although access to contraception in Jordan is very high, several studies have suggested that the fertility stall may be due in part to the limited contraceptive mix, including high rates of traditional method use, and high rates of discontinuation (Al

Massarweh 2013; Rashad and Zaky 2013; Spindler et al. 2017). However, the same studies also note that fertility ideals remain high in Jordan (Rashad and Zaky 2013; Spindler et al. 2017). Throughout the period of fertility stall, Jordanians' mean ideal number of children remained stable around four, which is close to the actual TFR during this period (Spindler et al. 2017).

1.2 The Syrian refugee influx

Another factor in recent public discussion of fertility levels in Jordan is the influx of refugees from Syria since 2011. Of the estimated 1.3 million Syrian refugees who have taken up residence in Jordan, over 80% live outside camps in Jordanian towns and cities, or "host communities" (Krafft et al. 2018). This constitutes a substantial demographic change in Jordan, which had a 2010 population of 7.2 million (United Nations Population Division 2017). In their situation analysis of Jordan's fertility stall, Spindler et al. (2017) note that the refugee influx was cited by some key informants as a reason for the national fertility stall, although this is implausible because the stall preceded the arrival of the Syrian refugees by a decade. Although the arrival of the refugee population cannot have driven Jordan's period of stall, the Syrian refugee population has higher fertility rates than the Jordanians population, at a TFR of 4.4 in 2016 (Sieverding, Berri, and Abdulrahim 2018). The arrival of the Syrian population has thus put upward pressure on Jordan's national TFR since 2011, which could contribute to the continuation of fertility stall.

On the other hand, the rapid population growth in Jordan due to the arrival of the refugees has placed pressure on both housing and labor markets. If the arrival of refugees has impacted Jordanian men's ability to afford housing to establish a new family unit, this may have led to marriage postponement and thus declining fertility rates. Under this scenario, we would expect to see a rising period mean age at first birth and a fertility schedule shifting towards older ages, resulting in lower overall period fertility rates. Existing evidence indicates that there was no causal impact of the refugee influx on employment outcomes among Jordanians, and at most a small negative impact on housing markets, which makes this scenario unlikely (Al-Hawarin, Assaad, and Elsayed 2018; Fallah, Krafft, and Wahba 2018). Nevertheless, we test empirically whether the refugee influx, operationalized through variation in the percentage of Syrian households in the locality, has affected marriage and fertility outcomes among the Jordanian population.

2. Data

2.1 Survey

Our primary data source is the Jordan Labor Market Panel Survey (JLMPS)[4] 2016, which provides a unique opportunity to assess recent trends in fertility and its determinants in Jordan.[5] JLMPS 2016 is the second wave of a longitudinal household survey initially fielded in 2010. The 2016 wave tracked 2010 households, and added a refresher sample that oversampled areas that were identified as having high proportions of non-Jordanians in the 2015 Census. After the application of sampling weights (used throughout our analyses), the data are nationally representative.

2.2 Outcomes and analysis sample

Our key outcome of interest is fertility. We also model the outcome of age at first marriage to understand marriage timing as a potential determinant of fertility. Fertility outcomes are derived from the full birth history module for married women aged 15-59 included in the JLMPS 2016, which allows us to analyze trends over time. Further, we focus our analyses only on the time period

[4] See Krafft & Assaad (2018) for more information on the JLMPS 2016 survey. The data will be publicly available in May 2018 from the Economic Research Forum's Open Access Microdata Initiative (www.erfdataportal.com).

[5] The most recent DHS survey in Jordan is the Jordan Population and Family Health Survey (JPFHS) conducted in 2012, which was early in the period of Syrian refugee arrivals.

2000-2015,[6] which captures the period of Jordan's fertility stall as well as the more recent period in which fertility decline resumed. Since our outcomes are collected retrospectively in the JLMPS 2016, we structure our data for both outcomes such that an observation is a person-year. We further limit our analysis sample to women ages 15-49 in the (time-varying) year in question, who are of childbearing age.

Age at first marriage is operationalized from age 15 onward. It is potentially censored for women not (yet) married. Thus, as we discuss below, analyses of age at marriage require the use of discrete time survival analysis. For age at marriage, an individual is at risk of becoming married each year from age 15 until the year of marriage (or censoring at the survey year).

The fertility outcomes are slightly more complex; while we are interested in age at *first* marriage, a one-time event, women may have multiple births. This is a repeated event, in survival analysis or event history terms. We therefore measure the time from either marriage or the preceding birth, in years, until the next birth (or censoring if there is not a subsequent birth). The progression from marriage to first birth, second to third birth, etc., is referred to as *parity* (births to date). The *birth interval time* counts up from marriage or the preceding birth, starting at zero, until the next birth or censoring in years. When the next birth occurs, the interval resets to zero, but the parity counts up one. Since multiple births (twins, triplets) are not planned as such and would contribute problematic zero durations to the analysis, they are treated as a single birth (parity).[7]

2.3 Covariates

The rich JLMPS data allow us to conduct these analyses controlling for a host of individual, household, and community characteristics. We initially estimate our models with only the baseline hazards and time effects to show how fertility and age at marriage have been evolving over time. Subsequently, we control for governorate, residence (urban/rural), education level (operationalized in four levels: less than basic, basic, secondary, and higher education), and socio-economic background (parents' education and employment status). For age at marriage models, we also include controls for sibling pressures (younger or older siblings by sex) and being in school (which is time-varying). The baseline hazard is the age at the year in question.

For fertility models, a limitation of this analysis is that we do not have measures of women's contraceptive use, either at the time of the survey or between each birth as would be needed for this analysis. We therefore include controls for access to health care (at the time of the survey) as a proxy for women's ability to obtain contraception if they wish to do so. We measure access to healthcare in three ways: (1) travel mode to nearest health center (one of "by foot," "by transit or other means," or "by personal vehicle"), (2) travel time to nearest health center, and (3) whether the respondent has health insurance coverage. We also include some time varying controls in our fertility models, including whether the respondent already has a son, and age at the year in question (categorically in five-year age groups). The baseline hazard is the interaction of parity (births to date), and interval since last birth.

One additional covariate of interest in the analysis is the refugee influx. We operationalize this by measuring the percentage of households that are Syrian in the locality of residence. We derive this measure from locality-level data on 2015 Census populations by nationality, which can be used to assess which localities experienced a higher influx of refugees. We hypothesize that the intensity

[6] Fielding for JLMPS 2016 started in December 2016 and continued through April 2017. Thus, we omit the year 2016 since it is a partial year.
[7] Since the data are annualized, multiple births in one year, even if not listed as a twin or multiple, are treated as a single birth (parity).

of the refugee influx is likely to mediate impacts on host communities. For instance, communities with a relatively large refugee influx may have experienced tighter housing markets, such that Jordanians may have had greater difficulty acquiring housing and thus be more likely to experience delayed marriage.

3. Methods

3.1 Describing Fertility

There are a number of different ways to describe fertility, several of which we include in this paper. We first describe fertility across age profiles with age-specific fertility rates (ASFRs) (Ní Bhrolcháin 1992; Palmore and Gardner 1994). ASFRs are measured for age groups from age *x* to age *x* + *n* (typically n is 5, so for example ages 15-19). ASFRs are measured in terms of $B_{x,n,s}$, the number of (live) births that occurred within *s* years or months preceding the survey (typically three or five years are used) for women aged *x* to *x* + *n* at the time of the birth. The measure of births is relative to $P_{x,n,s}$, the number of woman-years lived in the age bracket from age *x* to age *x*+*n* in the *s* years or months preceding the survey. Thus, the ASFR is:

$$ASFR_{x,n,s} = \frac{B_{x,n,s}}{P_{x,n,s}} \quad (1)$$

This statistic is essentially an annual probability of child bearing in a specific age bracket (typically presented multiplied by one thousand).

ASFRs can be aggregated to calculate the total fertility rate (TFR), the cumulative lifetime fertility of a woman if she passed through her entire reproductive career at current ASFR rates (Palmore and Gardner 1994):

$$TFR = \sum_{x} ASFR_{x,s} \quad (2)$$

The TFR is the most common descriptive measure of fertility, and we therefore present ASFRs and TFRs for comparison with other surveys.

An alternative approach to measuring fertility is based on the probability of experiencing different parities (first birth, second birth, etc.). This approach is referred to as the parity progression ratio (PPR). Since fertility in Jordan is for all practical purposes conditional on marriage, we start with p_M for the probability of ever marrying. We then assess p_B, the probability, conditional on marriage, of progressing from marriage to first birth. We can then assess p_i as the (conditional) probability for progression from *i* to *i*+1 birth, the probability of birth *i*+1 after birth *i*. Multiplying out these conditional probabilities generates the TFR based on the PPR (TFR_{PPR}):

$$TFR_{PPR} = p_M p_B + p_M p_B p_1 + p_M p_B p_1 p_2 + \cdots \quad (3)$$

Since high parities become rare, an estimate of p_{x+} is used for births numbered *x* and higher.[8]

3.2 Survival analysis

Since our outcomes may be right-censored, in that individuals may never marry or may not have married yet or may not have an *x* birth or an *x* birth yet, survival analysis (also known as duration analysis or event history analysis) methods are required. Due to the discrete nature of recorded time, discrete time methods are required. We describe these methods first for the case of age at marriage, a one-time event, and then extend the methods to the case of childbearing, a repeated event.

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[8] We aggregate baseline hazards for parities above four with four. We also aggregate baseline hazards for all birth intervals that are longer than six years with six.

Denoting marriage at a specific age, t, as the event T_t. We initially describe age at marriage with the Kaplan-Meier failure function, F_t:

$$F_t = \Pr(T_t \leq t) \quad (4)$$

This characterizes the probability of being married by a certain age, for example, X% of women are married by age 22.

3.3 Multivariate hazard models for discrete time survival analysis

In addition to descriptive analyses, we estimate discrete time complementary log-log multivariate hazard models for age at marriage. These models are based on the hazard function, h_{it} (Jenkins 1995):

$$h_{it} = \Pr(T_t | T_t \geq t) \quad (5)$$

The hazard function describes the probability of marrying in a particular year if you have not yet been married. Complementary log-log and discrete-time logit models are both an option for discrete time survival analysis and tend to generate similar results (Jenkins 1995; Retherford et al. 2010). The complementary log-log model is slightly easier to interpret as a proportional hazards model, where a covariate proportionately raises (or lowers) the hazard of marriage. Discrete time models allow not only the outcome to have a time dimension, but also the covariates, X_{it}, to vary with time. For example, we can control for whether a young person is in school each year and the relationship with being in school and the hazard of marriage. The complementary log-log model with covariates is specified as (Jenkins 1995):

$$h_{it} = 1 - \exp\{-\exp[\theta(t) - \beta X_{it}]\} \quad (6)$$

or

$$\log\big(-\log(1 - h_{it})\big) = \theta(t) + \beta X_{it} \quad (7)$$

The term $\theta(t)$ denotes the baseline hazard, the probability of marrying at each age for the reference individual.[9] We estimate some models with just this baseline hazard to describe the hazard of marriage at each age for the population. The estimated coefficients can be exponentiated and interpreted as hazard ratios, which characterize how the hazard changes with a one-unit increase in the covariate. A key research question is how these hazards are shifting over (calendar) time. In a number of specifications we categorize single years into groups of years based on empirical testing of whether coefficients are equal. Note that calendar time, e.g. 2013, is distinct from the baseline hazard time, t.

Our multivariate models of fertility are discrete time (complementary log-log) models with baseline hazards based on time from preceding birth (birth interval time) fully interacted with parity. Essentially, $\theta(t)$, the interval since the preceding birth or marriage in years, is interacted with a X_{it} variable denoting parity. These models are thus akin to descriptives using a PPR approach, except that we do not model the probability of marriage within the models (that is taken care of by our age at marriage models).

4. Evidence of resumed fertility decline

We now turn to presenting our results. This section (section 4) presents evidence on changes in fertility over time, demonstrating the resumption of fertility decline in Jordan. Section 5 examines the potential role of marriage timing in changing patterns of fertility. Sections 6 and 7 investigate

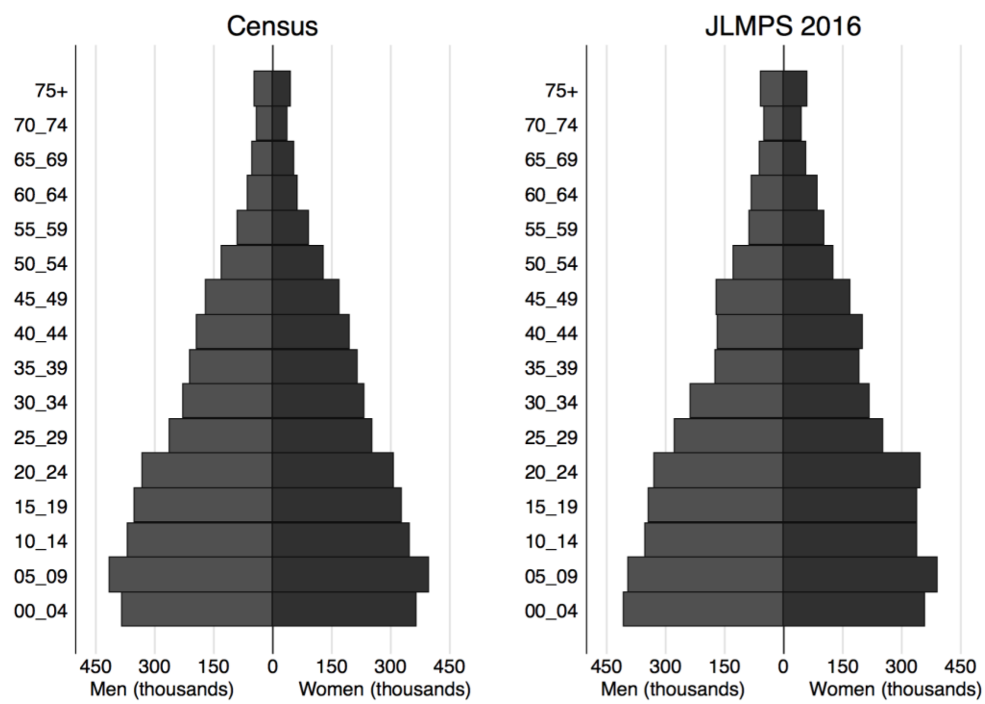
[9] We aggregate those aged less than 18 and 32 and older together in estimating the baseline hazard.

additional factors potentially related to the fertility decline, specifically the refugee influx and women's education.

4.1 Population structure over time

Corresponding with the period of fertility stall, the population pyramid of Jordanians derived from the JLMPS 2016 indicates that Jordan had been experiencing a quickly growing population of children and youth (Figure 2). Yet we also see indications in the pyramid of a potential resumption in fertility decline, indicated by a smaller population of children aged 0-4 as of 2016. This result is not an artifact of the JLMPS 2016 data—it is confirmed in the Census of 2015 as well. There has been a substantial inversion from increasing cohort sizes to, in the youngest children, a decrease in cohort size. Data on the population of Jordanians by year of age from the Census of 2015 shows that the largest single-year cohort was age 5, those born in 2010, with consistently smaller cohorts among younger ages (ages 0-4) (Department of Statistics (Jordan) 2015).

Figure 2. Population pyramids of Jordanians in Jordan, Census 2015 and JLMPS 2016

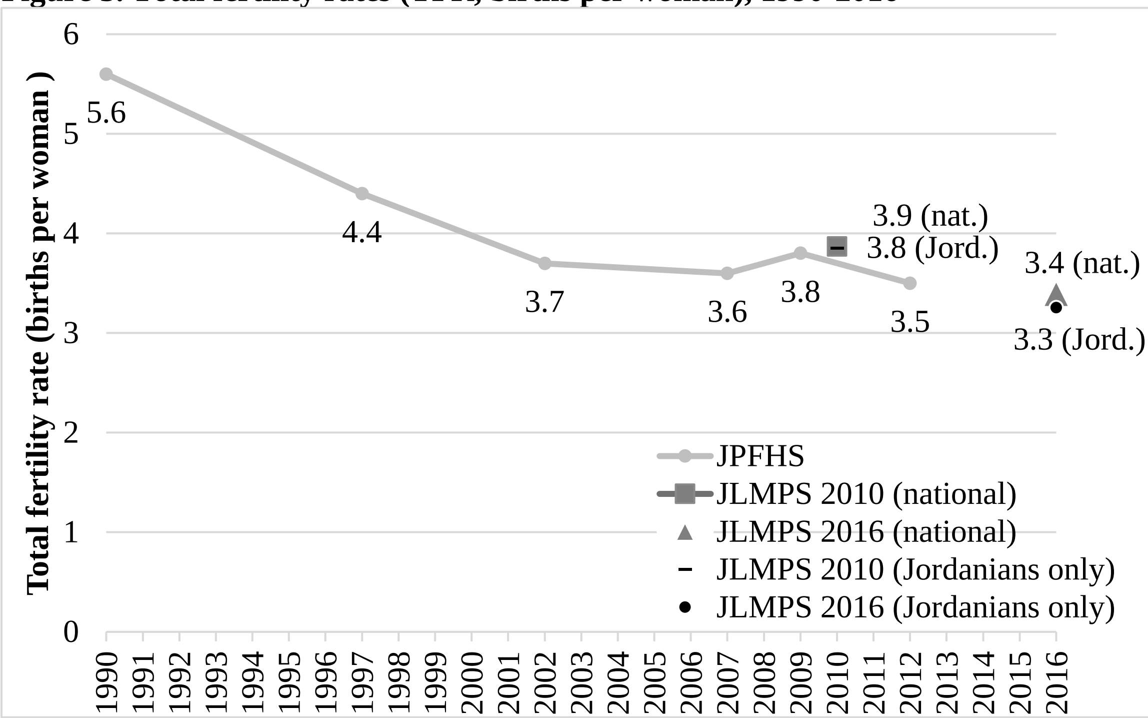


Source: Authors' calculations based on JLMPS 2016 and Jordan Population Census 2015
(Department of Statistics (Jordan) 2015)

4.2 Total fertility rates over time

Figure 3 shows the long-term trend in fertility in Jordan from the Jordan Population and Family Health Surveys (JPFHSs), which are part of the global Demographic and Health Survey (DHS) program (Department of Statistics (Jordan) and ICF International 2013). Since the JPFHSs report national TFR, we present two statistics from the JLMPS 2016: the national TFR and the TFR for Jordanians only. We further present the TFRs derived from the JLMPS 2010 to demonstrate that the JLMPS 2010 was in line with past trends from the JPFHS. There was a recent decline in TFR among the Jordanian population, at 3.3 (Jordanian, 3.4 national) during the three-year period prior to the JLMPS 2016 survey as compared to 3.8 in the 2009 JPFHS and 3.8 (Jordanian, 3.9 national) in the 2010 JLMPS. The TFR of 3.5 from the 2012 JPFHS is consistent with a resumed fertility decline starting in the early 2010s. Jordan had been stuck in a prolonged fertility stall, but now appears to be continuing its fertility transition. In section 4.4 we demonstrate the statistical significance of this shift.

Figure 3. Total fertility rates (TFR, births per woman), 1990-2016

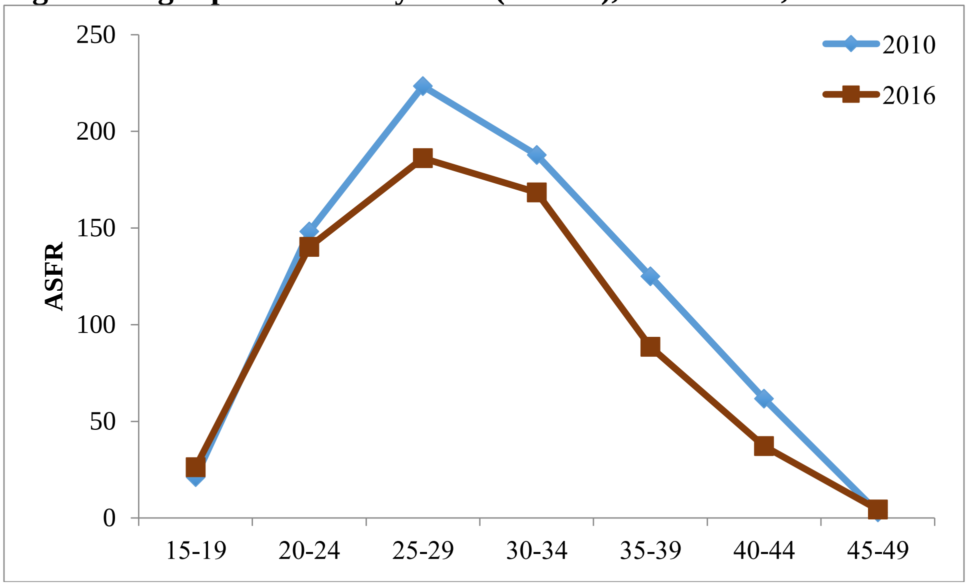


Source: JLMPS 2010 and 2016 based on authors' calculations, JPFHS statistics (Department of Statistics (Jordan) and ICF International 2013; Department of Statistics and ICF Macro 2010)

4.3 Among whom has fertility declined?

In the subsequent analyses we focus on the fertility rate observed among Jordanians only, as the arrival of the Syrian refugee population since 2011 is a confounding factor in terms of understanding longer-term fertility trends. Figure 4 shows ASFRs over time from the JLMPS surveys for Jordanians. The data from 2010 shows ASFRs rising to peak at age 25-29 with an ASFR of 223 (a 0.223 probability per year of child-bearing in this age range). However, the JLMPS 2016 shows a distinct drop in ASFR at all ages. The decline is particularly notable at age 25-29 (ASFR of 186). There is some evidence of a shift of the age structure of childbearing, in that the ASFR for age 30-34 in 2016 remains close to that of 2010. It is thus possible that Jordanian women are postponing births until later ages, which would result in a temporary dip in the TFR. We investigate this possibility further in the multivariate models, which rely on PPR and in which we can disentangle postponement.

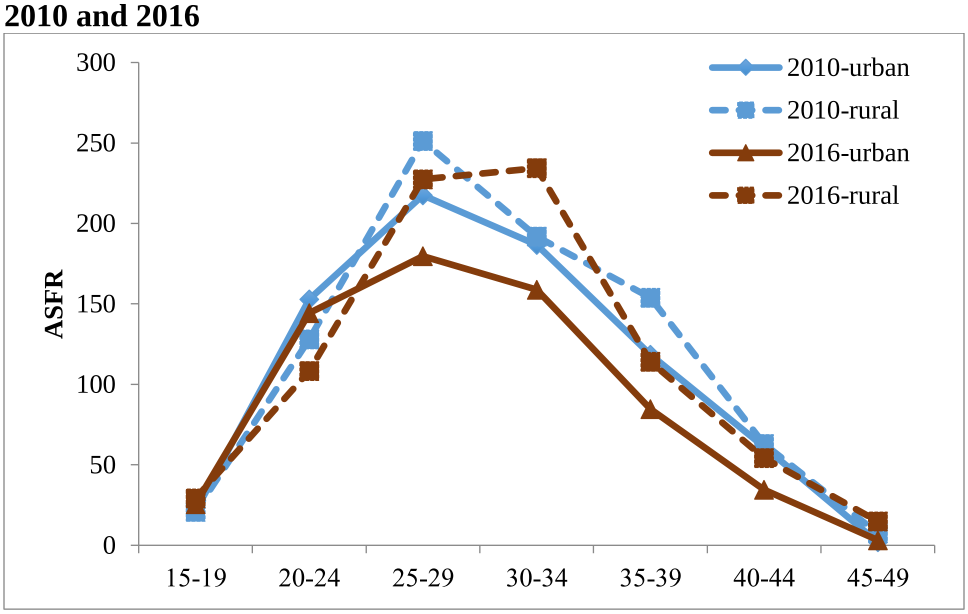
Figure 4. Age-specific fertility rates (ASFRs), Jordanians, 2010 and 2016



Source: JLMPS 2016 and JLMPS 2010 based on authors' calculations.

Before turning to the multivariate models, we present, descriptively, additional evidence on the population groups that have experienced the most fertility decline since 2010. Figure 5 presents ASFRs by residence and over time. Jordan is a majority urban country (87% of Jordanians lived in urban areas as of 2016), and the ASFR shift nationally is quite comparable to the shift in urban areas. Rural areas appear to have experienced primarily birth postponement. While in 2010 rural fertility peaked at ages 25-29 at an ASFR of 251, in 2016 the ASFR for this age group was down to 227. As of 2016, the highest ASFR in rural areas was 234 for ages 30-34, up from 191 in 2010.

Figure 5. Age-specific fertility rates (ASFRs) by residence, Jordanians, 2010 and 2016



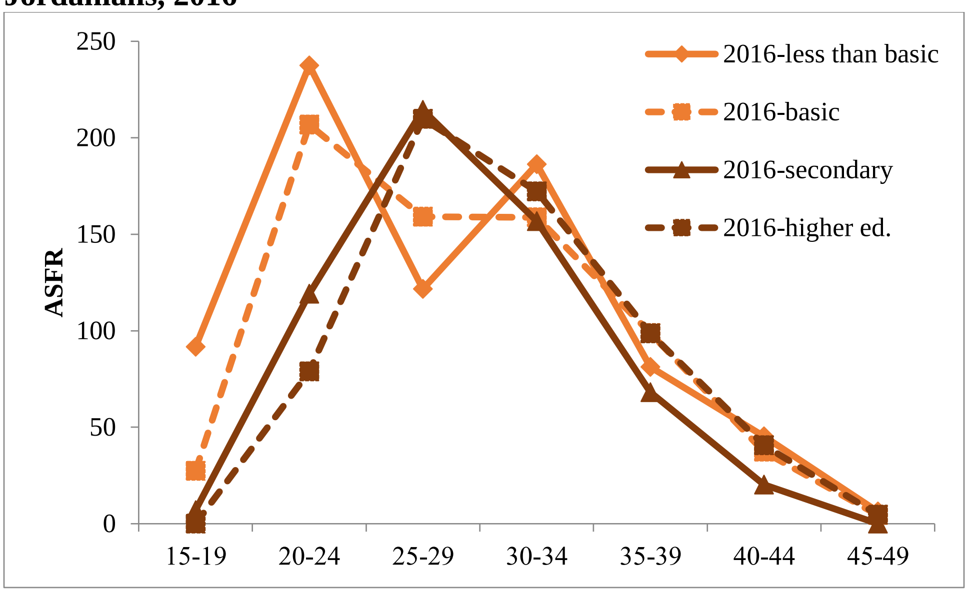
Source: JLMPS 2016 and JLMPS 2010 based on authors' calculations.

There are disparate patterns and different shifts in fertility by education. Jordan notably did *not* have a linear relationship between fertility and education up through the early 2010s. The 2009

JPFHS (Department of Statistics and ICF Macro 2010) found an inverted U. The 2010 JLMPS found the highest TFR (4.4) for those with basic education, but the lowest TFR among those with secondary education (3.4) rather than higher education (3.8). The JLMPS 2016 suggests a substantial shift in this structure and the return to a more linear relationship. The TFR for those with no education was 3.8, that for those with basic was 3.5, that for those with secondary 2.9, and higher education 3.0.

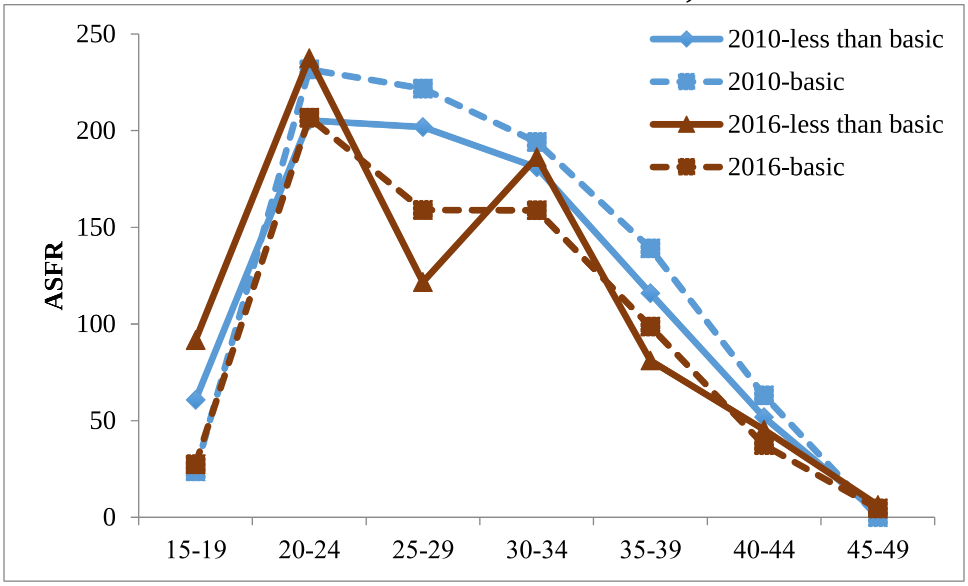
Figure 6 compares ASFRs by education level in 2016, while Figure 7 examines the change in ASFRs over time for Jordanians with a basic or less than basic education and Figure 8 the change over time for Jordanians with a secondary or higher education. Fertility patterns are fairly similar for those with less than a basic or a basic education. In 2016, fertility for this group was highest at ages 20-24, and declined slowly over subsequent age groups. Compared to 2010, there has not been much of a shift at younger ages in ASFRs in 2016. However, there has been a large dip in ASFR among the less educated ages 25-29, and some declines for older age groups. Among the more educated, fertility peaks sharply in the 25-29 age group and declines more rapidly among older age groups than for less educated women. Between 2010 and 2016 there was a general downward shifting of the fertility schedule for the more educated groups, particularly for ages 25+ for those with higher education and those 35-39 and 40-44 for those with a secondary education.

Figure 6. Age-specific fertility rates (ASFRs) by education, Jordanians, 2016



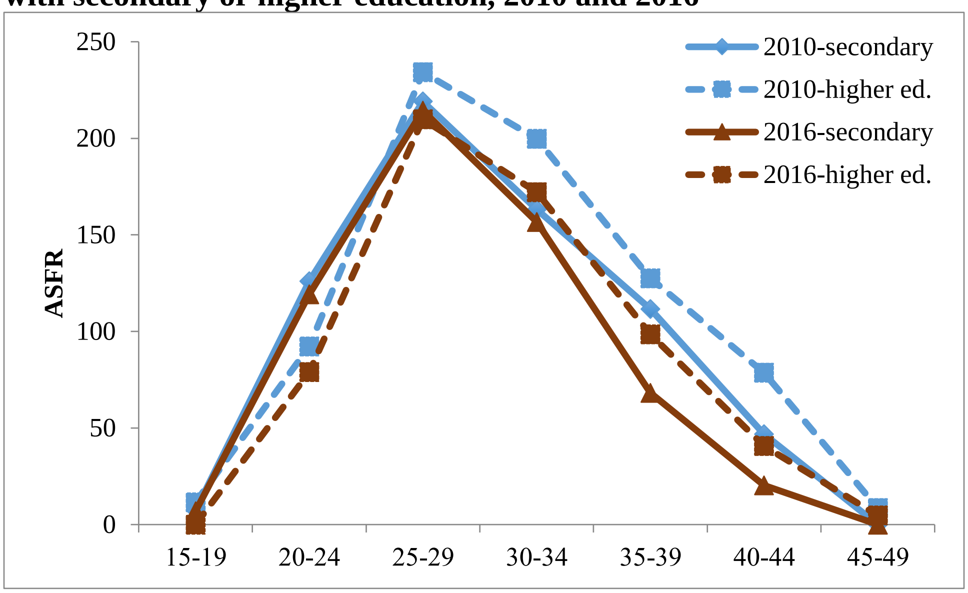
Source: JLMPS 2016 and JLMPS 2010 based on authors' calculations.

Figure 7. Age-specific fertility rates (ASFRs) by education, Jordanians with basic or less than basic education, 2010 and 2016



Source: JLMPS 2016 and JLMPS 2010 based on authors' calculations.

Figure 8. Age-specific fertility rates (ASFRs) by education, Jordanians with secondary or higher education, 2010 and 2016



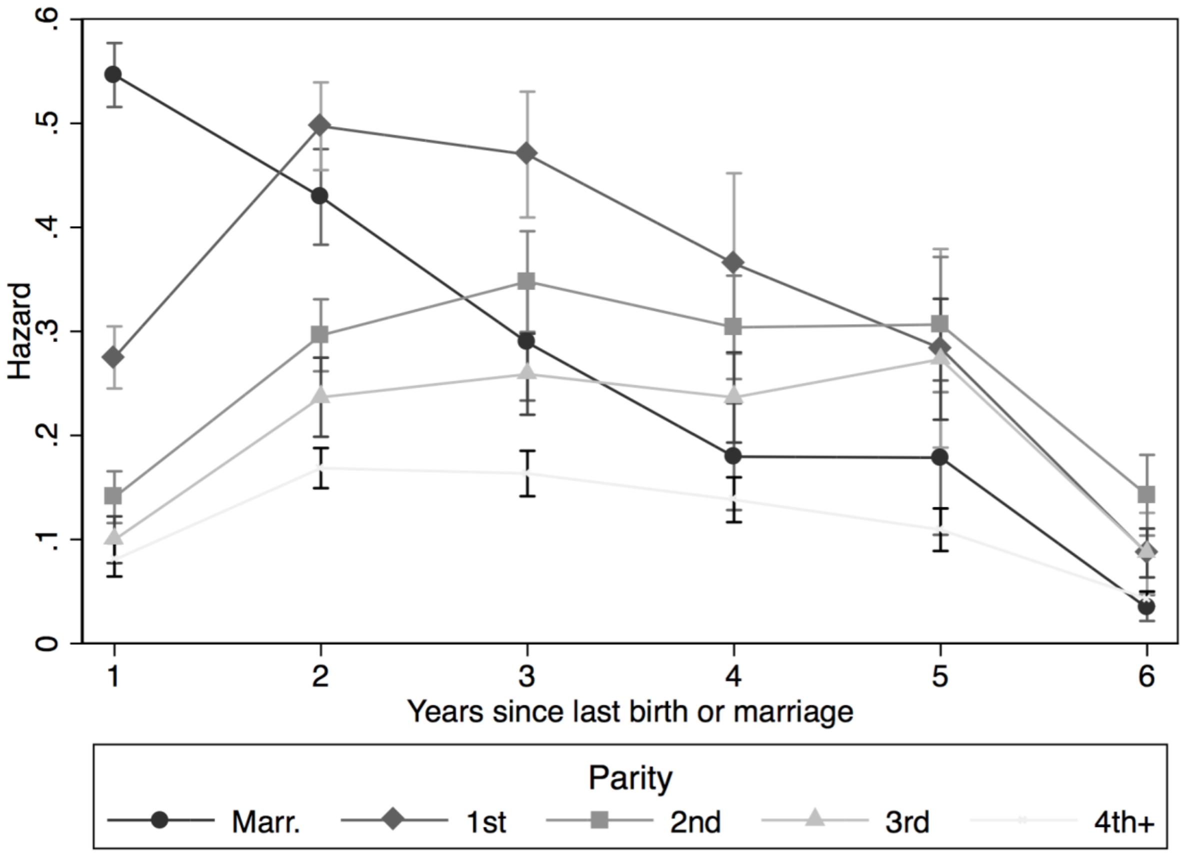
Source: JLMPS 2016 and JLMPS 2010 based on authors' calculations.

4.4 Changes in parity progression

Although the ASFRs and TFRs are informative of fertility changes happening in Jordan over time, they may be driven by timing (tempo) rather that final childbearing (quantum) effects. Since the TFR is a period measure, if many women postpone births that they then recover later there can be a temporary drop in the TFR without an overall decline in women's completed fertility. To separate out some of these tempo and quantum effects, we turn to our fertility discrete time hazard models without controls, which are essentially estimating descriptive parity progression ratios. In Figure 9, we present the baseline hazards for each parity by years since last birth or marriage. Recall that this baseline hazard is the probability of having a birth of a particular parity at a particular interval, conditional on not yet having done so. Thus, these are conditional probabilities and would have to be multiplied out by the group at risk to estimate parity progression ratios.

Childbearing immediately after marriage is the norm in Jordan; the hazard at one year after marriage is more than 0.5 and declines thereafter. The hazard of a second child (for women who are first parity) two years after the first is also high, near 0.5. The hazard declines gradually thereafter, but remains high. From the second to fourth (and higher) parity, the hazard is lower and hump-shaped, with a relatively similar probability across years 2-5 before dropping in the sixth (and higher) year.

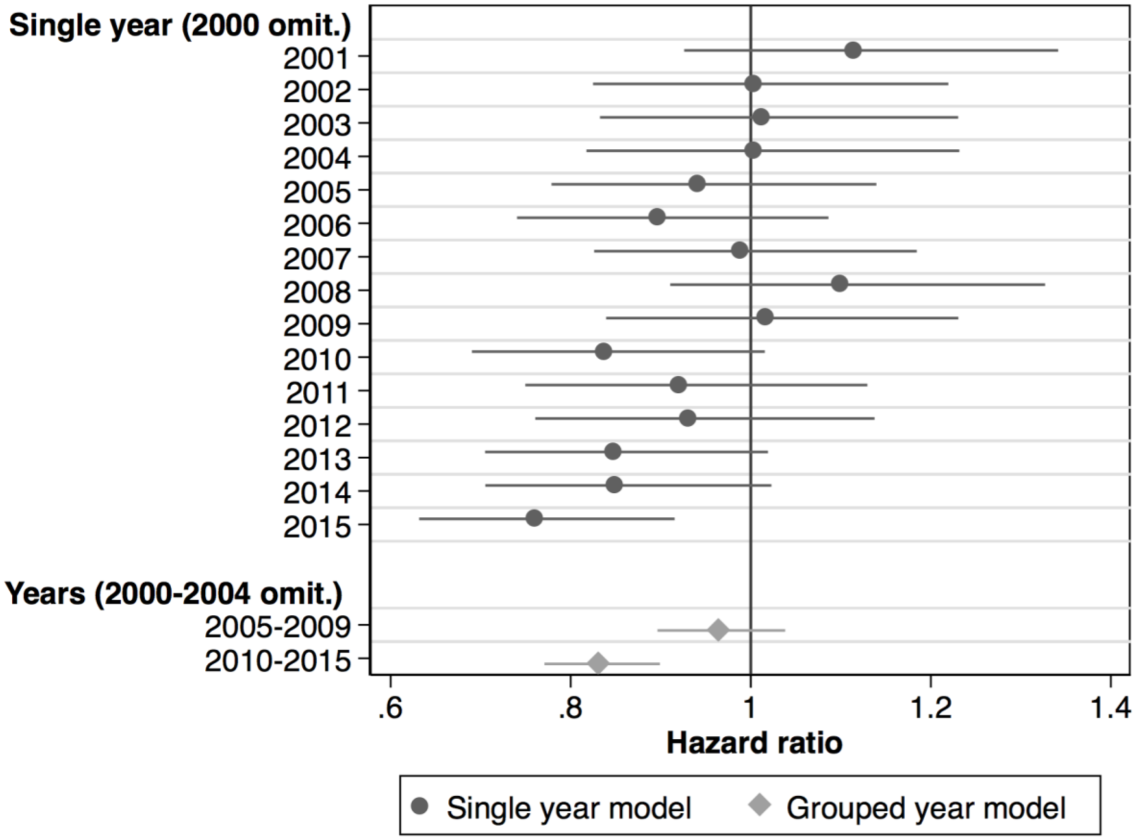
Figure 9. Baseline hazards of next birth by parity and years since last birth or marriage



Source: Authors' calculations based on JLMPS 2016
Notes: 95% confidence intervals shown for each parity and interval combination.

To understand how childbearing has been changing over time, we estimate a model adding in single year dummies in Table 1, specification 1. Figure 10 presents how the hazard has been changing over time with a single effect for each year, as well as aggregating years. None of the hazard ratios for 2001-2009 are significantly different from 2000 (not significantly different from a hazard ratio of 1) nor do they show any clear pattern, even in their insignificance. However, starting in 2010, the hazards do appear to dip lower, decreasing particularly by 2015. Since the single year effects are somewhat noisy, we then tested for significant differences between the years and created aggregations (grouped years) of 2000-2004 (reference period), 2005-2009, and 2010-2015. The aggregated coefficients (Table 1, specification 2 and Figure 10) show an insignificant difference in the 2005-2009 hazard as compared to 2000-2004. There is a significantly lower hazard (hazard ratio of 0.832) for 2010-2015, meaning that the hazard of giving birth—averaged across parities and intervals—was significantly lower (16.8% lower) during this period as compared to 2000-2004. Thus, resulting fertility would be lower. The hazard ratio for the 2010-2015 period is also significantly different from 2005-2009, confirming the resumption of Jordan's fertility decline seen in the analysis of TFR. Note that the model is only controlling for the main effect of time and the interacted parity and birth, so a variety of causes could underlie this shift.

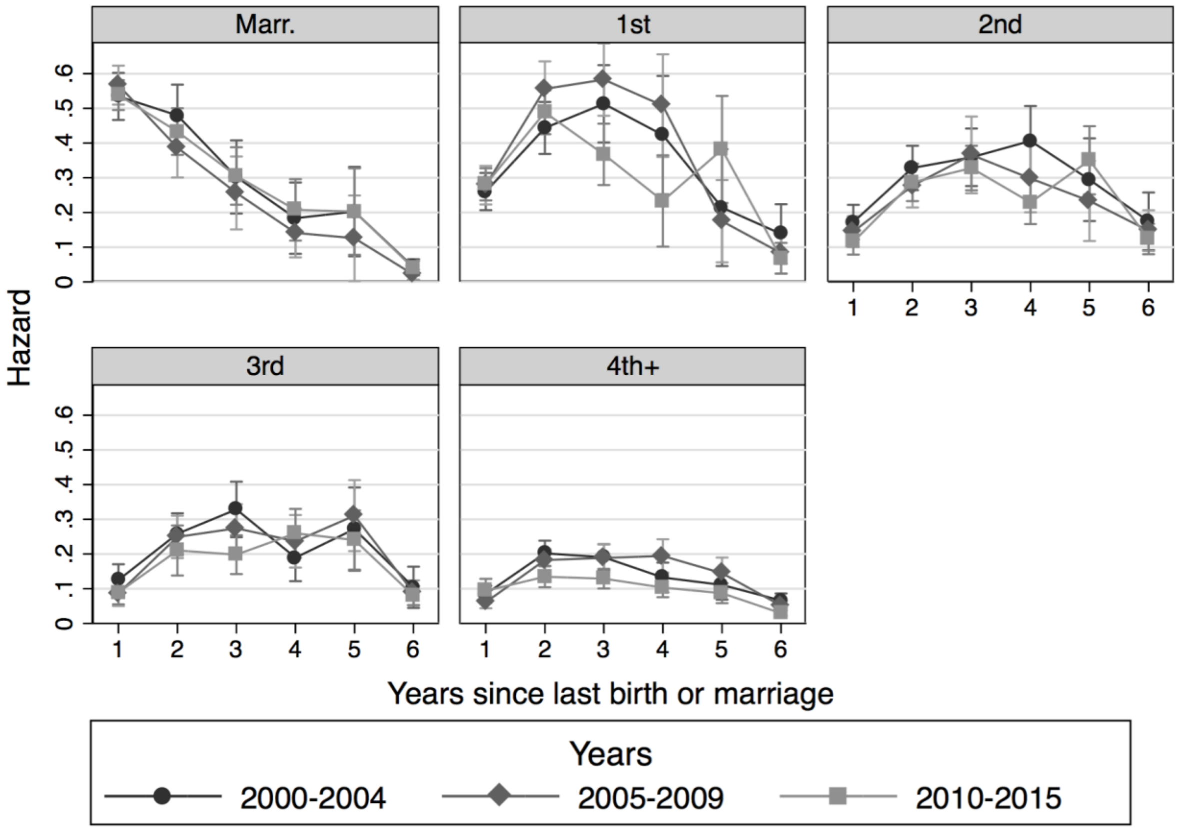
Figure 10. Hazard ratios for single year model and grouped years model of fertility



Source: Authors' calculations based on JLMPS 2016
Notes: 95% confidence intervals shown for each year. Underlying models in Table 1, spec. 1 and 2

While the preceding results showed a clear and statistically significant decrease in fertility on average across parities and intervals, it is unlikely that shifts over time are occurring equally at all parities and intervals. Therefore, in Table 1, specification 3, we estimate a model that fully interacts (grouped) calendar time, birth interval, and parity. This allows us to identify any patterns of postponement versus stopping, in seeing whether hazards are reducing for earlier intervals and rising for later intervals (postponement) versus dropping across the board (which may indicate stopping). The joint test of the time effects (main effects and interactions) is insignificant for 2005-2009 but significant for 2010-2015, confirming the fertility stall over 2000-2009 and the resumption of fertility decline in 2010-2015. Figure 11 presents the results of this model graphically, as predicted hazards. There is potential evidence of postponement, with slightly reduced initial hazards of going from marriage to the first birth and higher later hazards in the 2010-2015 period. There is also slight evidence of postponement and five year birth spacing moving from the first to second and second to third births, but overall the hazards are generally lower over time. They are particularly reduced for the 4th and higher order births. These results suggest that the observed fertility decline may be a mix of tempo and quantum effects.

Figure 11. Hazards of next birth by parity and years since last birth or marriage, differences over time



Source: Authors' calculations based on JLMPS 2016
Notes: 95% confidence intervals shown for each year. No controls. Underlying models in Table 1, spec. 3.

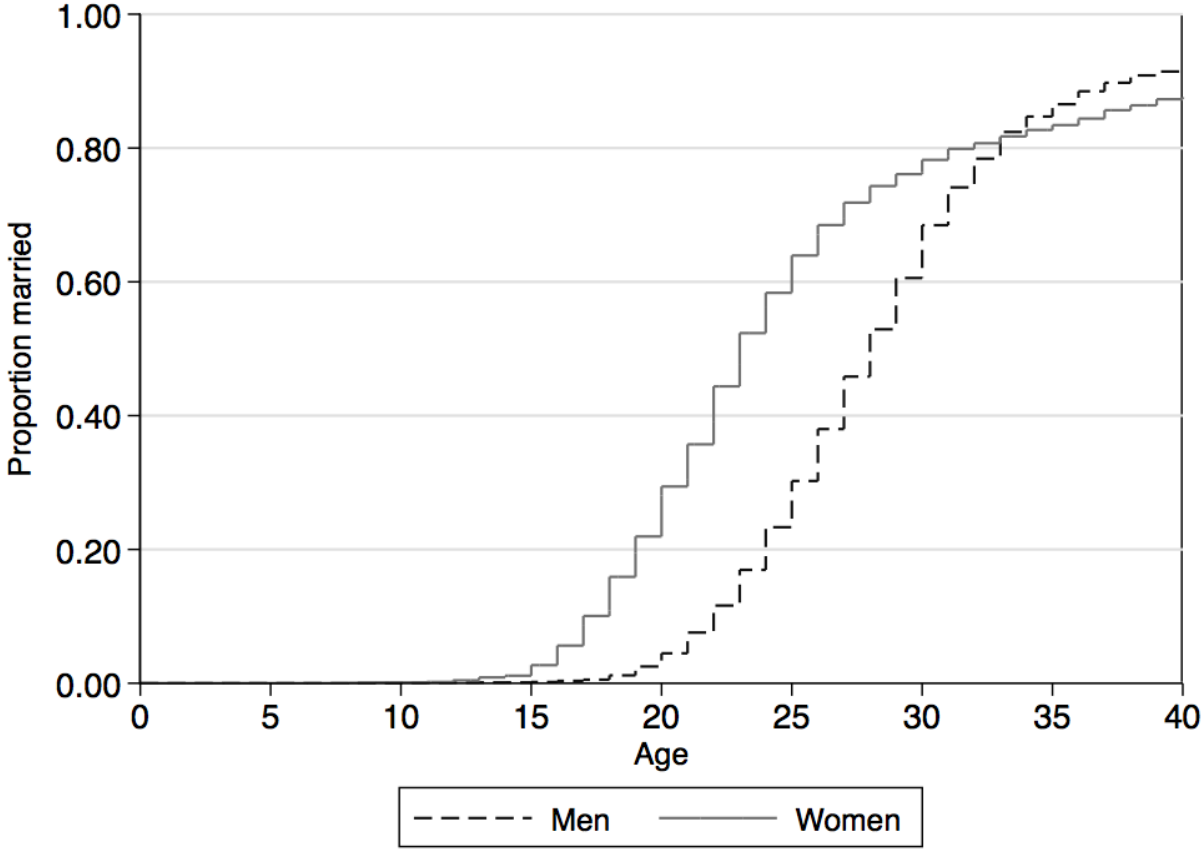
5. The role of marriage timing

One of the key proximate determinants of fertility in MENA is marriage timing. Before turning to our multivariate models, we examine descriptive evidence of whether changes in age at marriage may be driving in the recent decline in fertility among the Jordanian population.

5.1 Marriage transitions

Figure 12 presents the Kaplan-Meier failure function for age at marriage. The median age of marriage for Jordanian women is 23 and for men 28, based on the sample aged 15-49 in 2016. The timing of marriage is somewhat more dispersed for women. While Jordanian women have a 25th percentile of age 20 and a 75th percentile of age 29, half of men marry between age 25 (25th percentile) and 32 (75th percentile). Marriage is close to universal, with 92% of men married by age 40 and 88% of women.

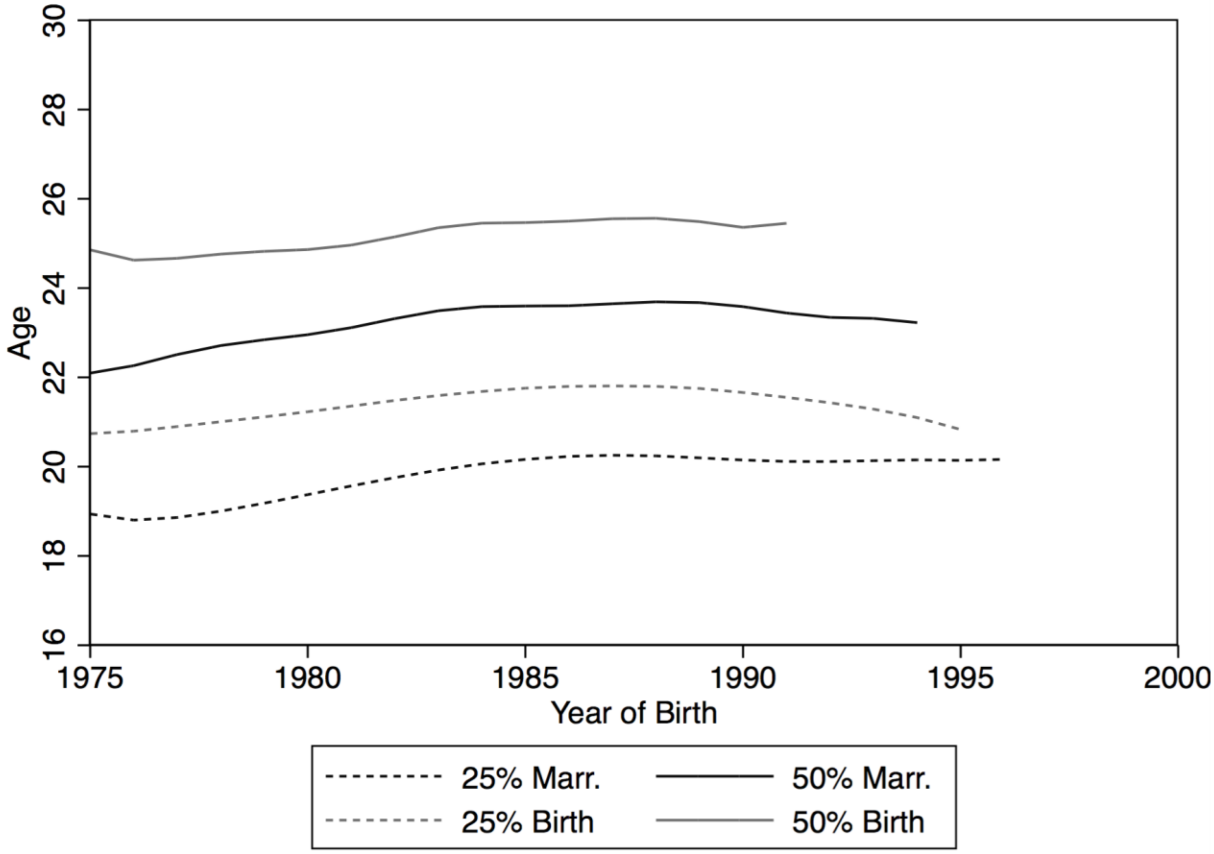
Figure 12. Proportion married, Jordanians, by sex and age, 2016



Source: Authors' calculations based on JLMPS 2016
Notes: Showing through age 40 based on sample 15-49 in 2016. Based on Kaplan-Meier failure estimate.

In countries such as Jordan in which childbearing occurs almost exclusively in the context of marriage, marriage timing is an important factor that may contribute to shifts in observed fertility trends. However, Figure 13 shows there has not been a substantial shift in marriage timing among Jordanian women. For cohorts born between 1975 and 1995, the trends of age at marriage and first birth have run essentially in parallel. The 25th percentile of age at marriage has risen from around 19 towards 20, and the 25th percentile for age at first birth has risen from 20 to 21 over the cohorts born from 1975 to 1995. Likewise, the median age at marriage has risen from 22 to 23, and median age at first birth from 24 to 25, indicating a very slow increase in median age at marriage and birth over these cohorts. Consistently, marriage and birth are spaced approximately two years apart over time.

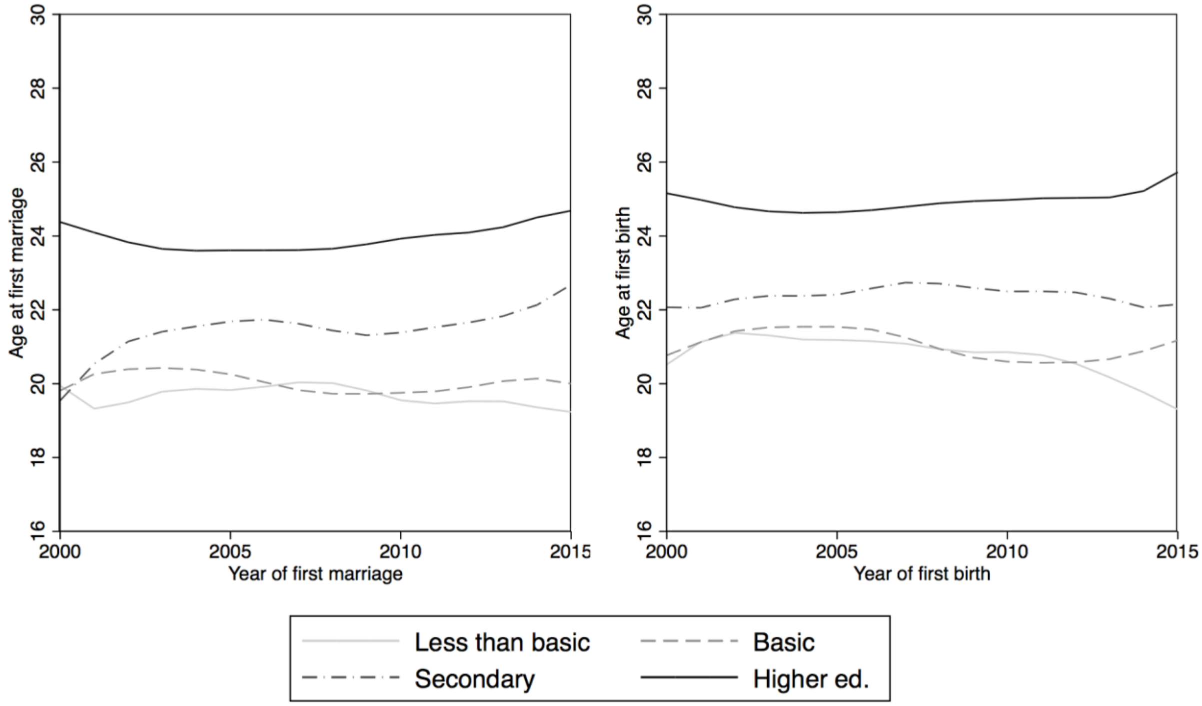
Figure 13. 25th and 50th percentiles for marriage and first birth, Jordanian women, by birth year, 1975-2000



Source: Authors' calculations based on JLMPS 2016
Notes: Smoothed with lowess, bandwidth 2.

Whereas Figure 13 examines age at marriage over cohorts, Figure 14 examines the period median age at first marriage and first birth, breaking down the results by education. Although results are smoothed, finite sample sizes in each education group must be kept in mind as a driver of fluctuations. Overall, the results suggest fairly flat patterns of timing for first marriages and first births across education groups, except for a slight upward trend in median age at first marriage among women with secondary education. Thus, the timing of starting family formation does not seem to be the main driver for the shift in fertility patterns by education.

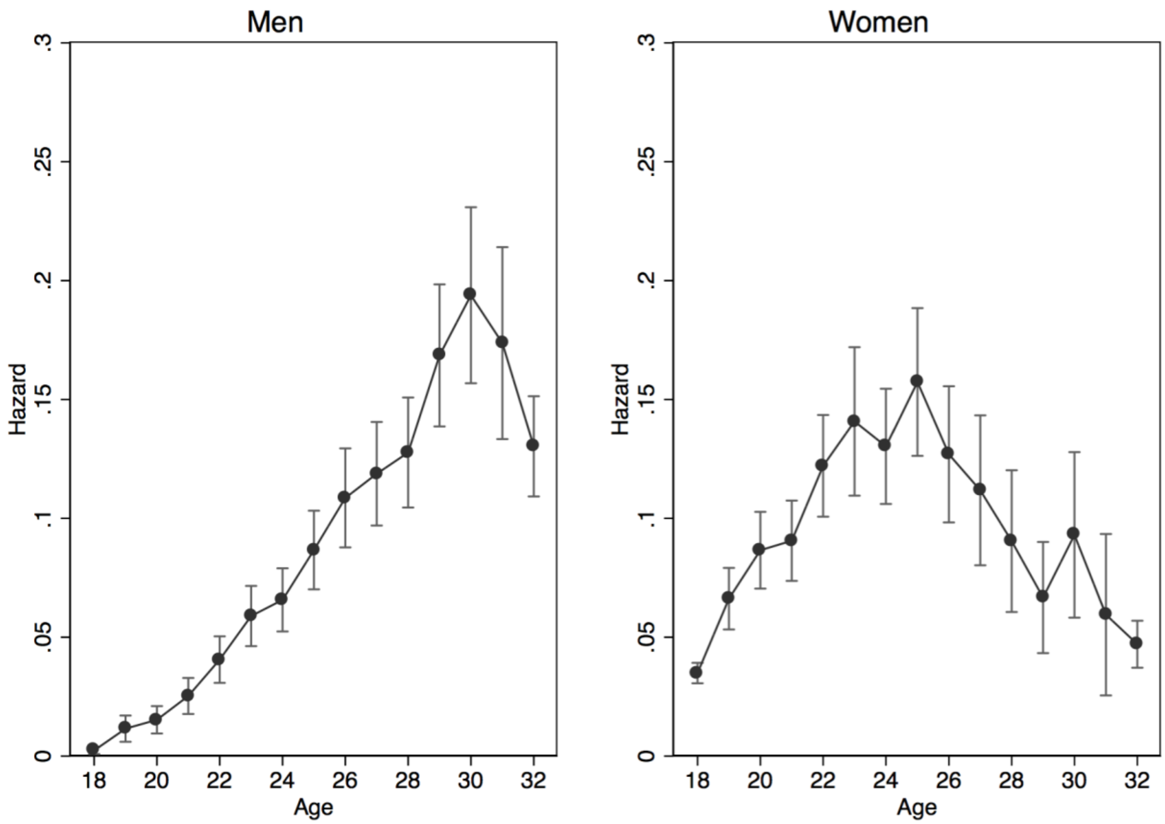
Figure 14. Median age at first marriage by year of first marriage and education, median age at first birth by year of first birth and education, Jordanian women, 2000-2015



Source: Authors' calculations based on JLMPS 2016
Notes: Smoothed with lowess, bandwidth 2.

From these descriptive results, we did not identify any major structural changes in age at marriage in Jordan. Underlying structural changes could, however, be masked by changes in the other characteristics of the population. Identifying whether structural changes are occurring therefore requires multivariate models controlling for other characteristics. Before presenting the models controlling for other characteristics, in Figure 15 we show the baseline hazards by age from the multivariate model (as well as 95% confidence intervals). These are quite comparable to the pattern we observed earlier in the descriptives, although we are now focusing on the years 2000-2015 only. The hazard peaks around age 30 for Jordanian men and around age 25 for Jordanian women.

Figure 15. Baseline hazards of marriage at each age by sex, Jordanians

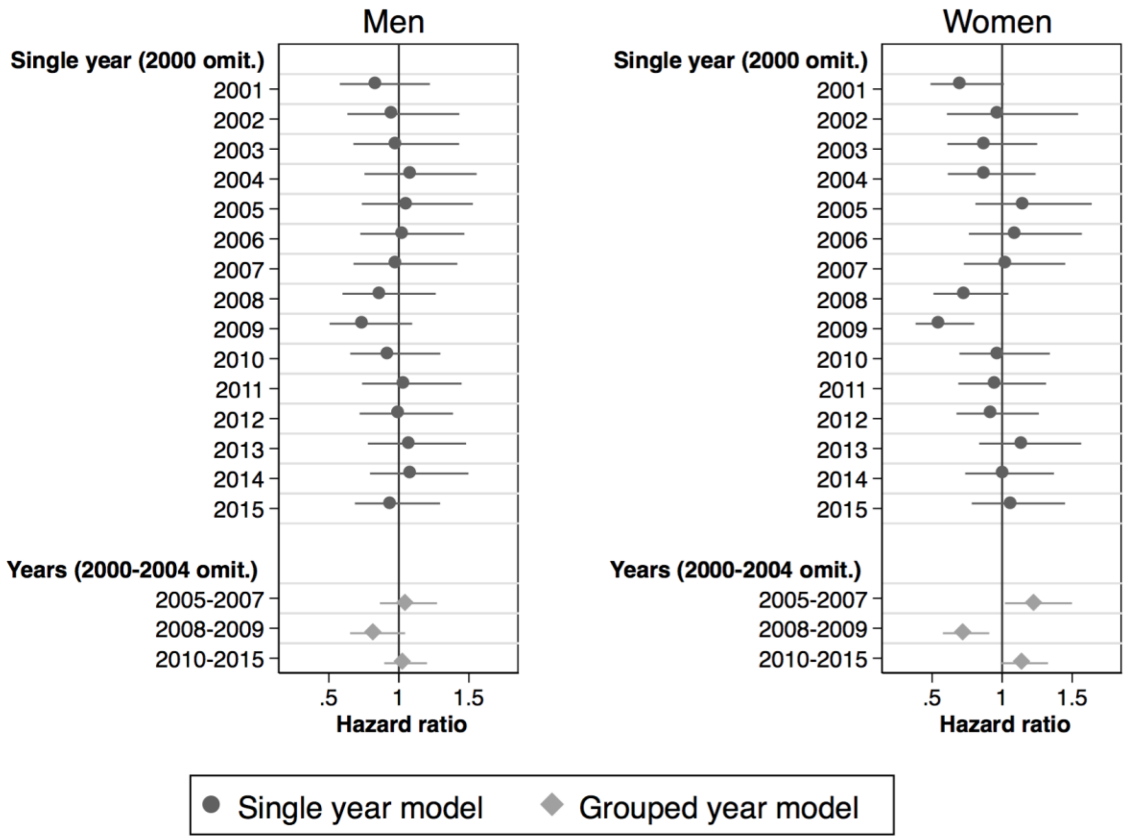


Source: Authors' calculations based on JLMPS 2016
Notes: 95% confidence intervals shown for each age.

5.2 Marriage models: differences over time

Figure 16 investigates how ages at marriage have been changing over time. In a model with no other covariates (only the baseline hazard) we estimate the hazard ratios for each year. The underlying models are in tables in the appendix (Table 2, specification 1). For men, the hazard appears to have been undulating over time. A similar pattern occurs for women, who have experienced essentially fluctuating ages at marriage, with the exception of the 2008-2009 period. The 2009 hazard ratio for women is the only significant one in the single year model, although 2008 is low as well. Both are low for men but not significant. We therefore aggregated the years into four periods: 2000-2004, 2005-2007, 2008-2009, and 2010-2015, in which the coefficients were statistically equivalent. For men, there are no significant differences across the aggregated periods. For women, there are significant differences between 2008-2009 and the reference 2000-2004 period. Table 2, specification 2 presents estimates from the model using these aggregated periods. For men, none are significant, but for women, hazards are higher (ratio of 1.236) in 2005-2007 as compared to 2008-2009 and lower in 2008-2009 (0.724) as compared to the reference 2000-2004 period.

Figure 16. Hazard ratios for single year model and grouped years model of age at marriage

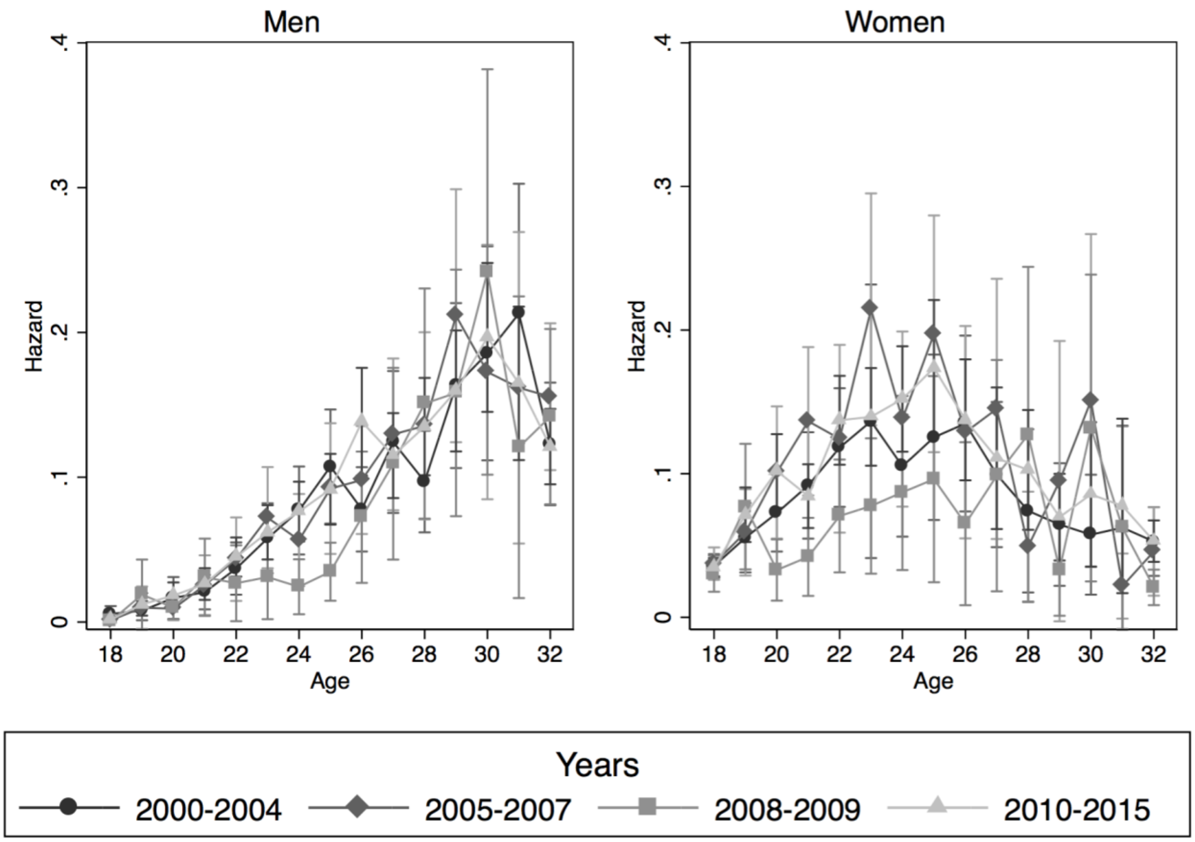


Source: Authors' calculations based on JLMPS 2016
Notes: 95% confidence intervals. Underlying models Table 2, Spec. 1, Spec. 2.

The changes over time may have affected the timing of marriage differentially across ages. Figure 17 shows a model with complete interactions between age in year and the year categories (see also Table 2, specification 3). The interactions and main effects for 2008-2009 are jointly significant for both men and women, while those for other periods are not. The figure has been transformed from hazard ratios into predicted hazards. The reductions in the 2008-2009 period appear to have particularly affected younger ages for men, while the decrease in 2008-2009 for women was throughout their 20s.[10]

[10] The overall time trends persist in models of marriage controlling for other characteristics (Table 3, specification 4). Other coefficients in the model are either as expected or insignificant. Although not shown, the main effects and interactions with calendar time are again jointly significant only for 2008-2009. The results after controlling for characteristics remain essentially as in Figure 17.

Figure 17. Hazards of marriage, by sex, differences over time



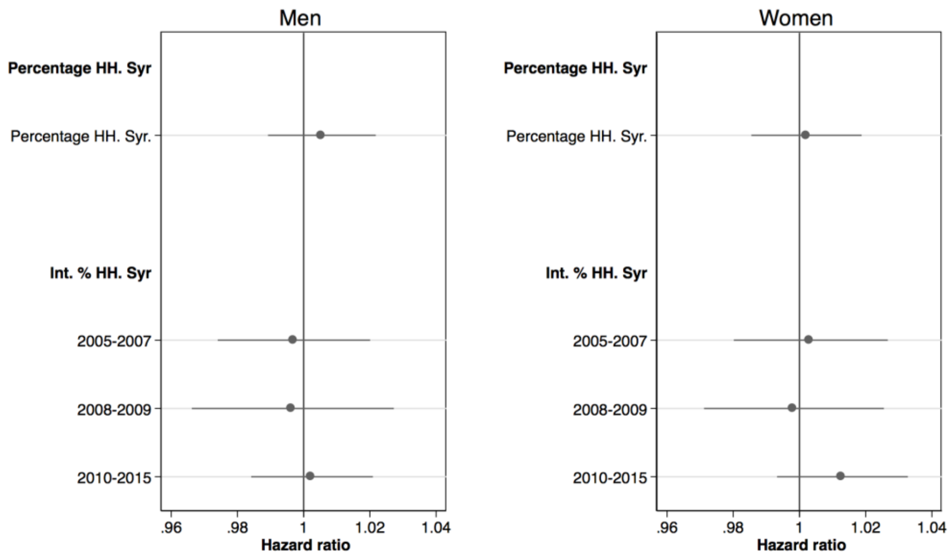
Source: Authors' calculations based on JLMPS 2016
Notes: 95% confidence intervals. Underlying models Table 2, Spec. 3.

Overall, the stable trends of age at marriage and first birth cannot explain the rapid resumption of fertility decline in Jordan at the population level, and although the hazard of marriage declined in 2008-2009, it had recovered by 2010 when fertility decline resumed. We therefore turn to the multivariate determinants of fertility in an attempt to identify other factors that may be driving the fertility trend.

6. The role of the refugee influx

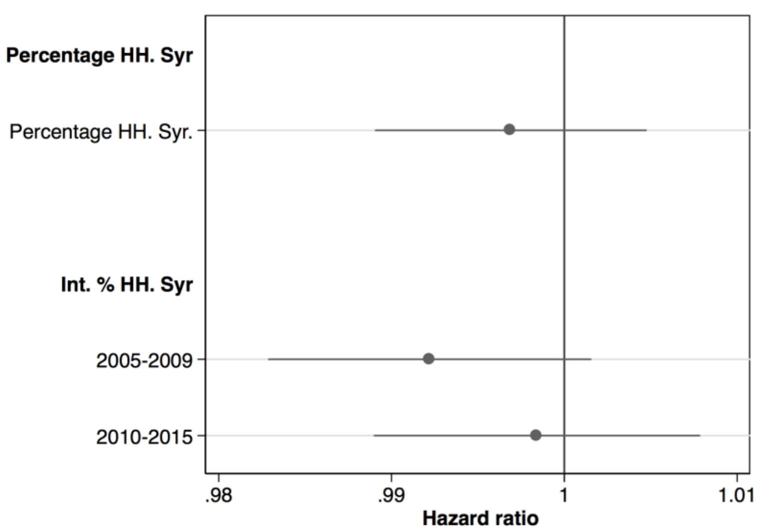
The refugee influx, resulting from the conflict starting in 2011 in Syria, may have created a variety of demographic pressures. Using our multivariate models, we tested for the effect of the refugee influx on marriage timing (Table 3, specification 5). Figure 18 presents the results of a difference-in-difference model interacting the locality percentage of households that were Syrian (as of the 2015 Census) and time. There are no significant results. Table 4, specification 6 undertakes a similar exercise for fertility. The results are also displayed in Figure 19. Here, again, there is not a significant relationship with the refugee influx. Thus, although Jordan has experienced a major demographic change with the refugee influx, this influx has no relationship with the shift in fertility patterns among Jordanians.

Figure 18. Hazard ratios for the effects of refugees on age at marriage



Source: Authors' calculations based on JLMPS 2016
Notes: 95% confidence intervals. Underlying models Table 3, Spec. 4

Figure 19. Hazard ratios for effect of refugees on fertility



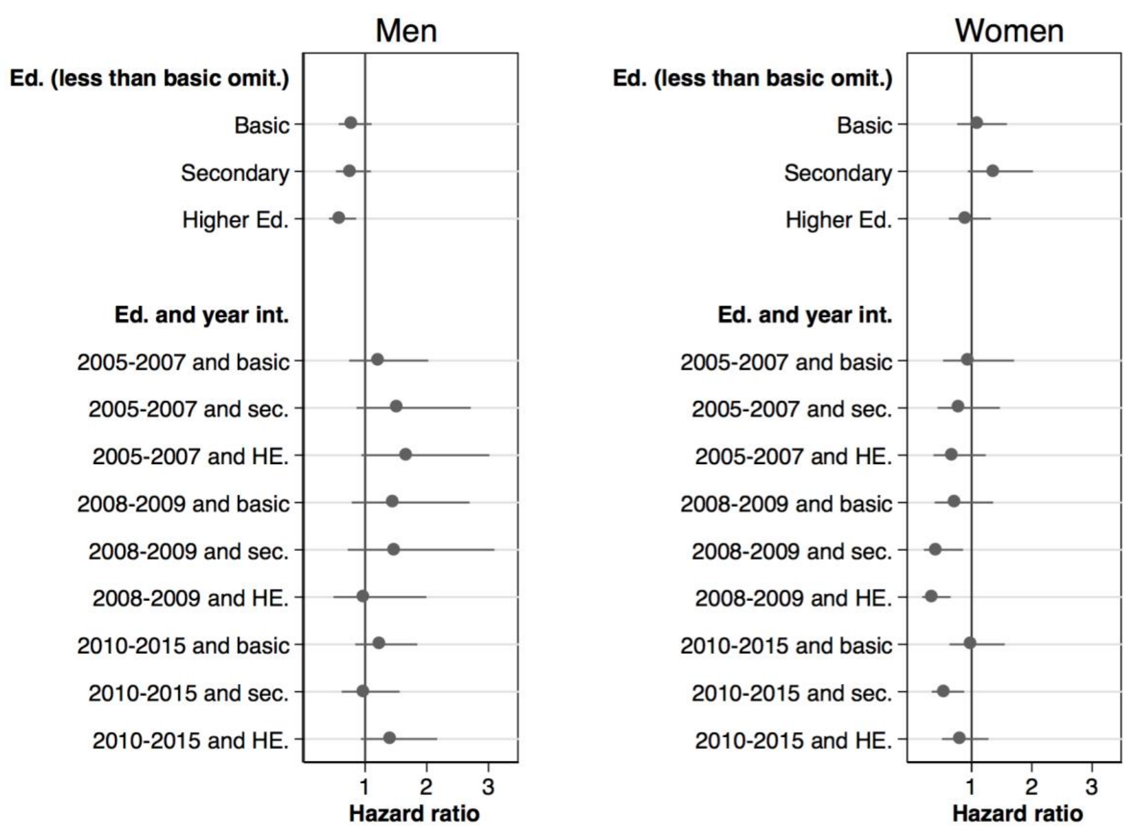
Source: Authors' calculations based on JLMPS 2016
Notes: 95% confidence intervals. Underlying models in Table 4, spec. 5

7. The role of education

Descriptively, we saw the relationship between fertility and education shifting from an upside-down-U to a more standard linear relationship between 2010 and 2016. We therefore turn to modeling the relationship between marriage and education over time, then fertility and education. Table 3, specification 6 presents the results of a model interacting education and time for age at marriage. The main effects, which now represent the 2000-2004 reference period, show only men with higher education with significantly lower hazards of marriage as compared to those with less than basic education. None of the interactions for 2005-2007 is significant.

The main effects (reference period of 2000-2004) are not significant for women. However, the interactions for 2008-2009 are significant, indicating that it was particularly for secondary and higher educated women that there were delays in marriage in this period. There is also a significant interaction for secondary education, although lesser in magnitude, for 2010-2015. Thus, one of the contributing factors to the start of the fertility decline may have been delays in marriage for more educated women.

Figure 20. Hazard ratios for education and interactions with time, multivariate models of age at marriage

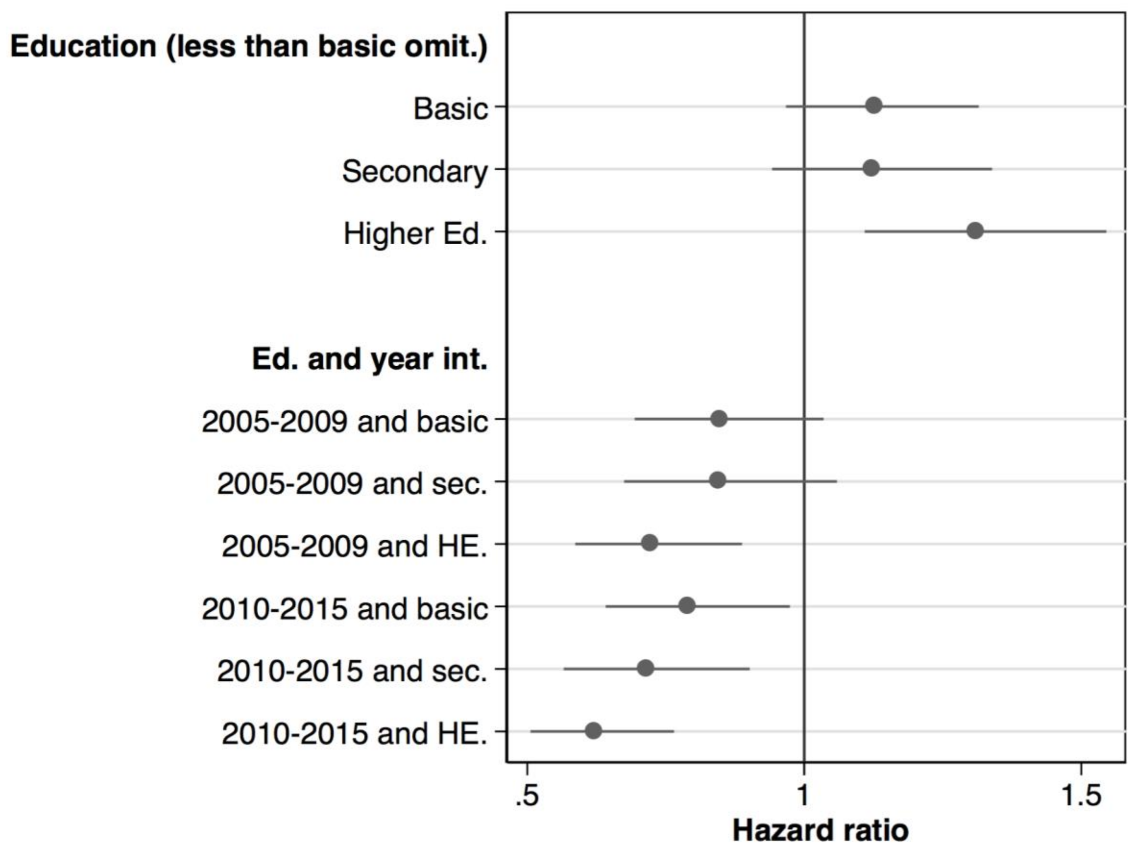


Source: Authors' calculations based on JLMPS 2016
Notes: 95% confidence intervals. Underlying models Table 3, Spec. 6.

Returning to fertility, Table 4, specification 6 presents a model with interactions between time and education, the key hazard ratios from which are in Figure 21. The main effects now refer to the period 2000-2004 and the interactions are (in underlying coefficient terms) additive. For the 2000-2004 period, there was a positive fertility hazard-education relationship, with those with higher education having significantly higher hazards than those with less than basic, after accounting for other characteristics. The significantly lower hazard ratio for those with higher education in 2005-2009 nets out with the main effect so that overall there is no difference in hazards between education groups in 2005-2009.

The interactions in 2010-2015 are all significant and show the expected linear relationship between education and fertility, with the hazard of childbearing diminishing with education. The test of the added effects of the basic main effect and interaction is not significantly different than zero, meaning that those with a basic education in 2010-2015 have similar hazards to those with less than basic. However, for secondary and higher education, the tests of the added main effect (higher hazard ratios) and the interaction (lower hazard ratios) are significant. The hazard of childbearing for these groups is now lower than for less educated groups. We cannot reject the equivalence of the secondary and higher education differences in the 2010-2015 period, which is in line with the descriptive results. Fertility in 2010-2015 is distinctly lower for those with secondary and higher education than those with basic or less than basic.

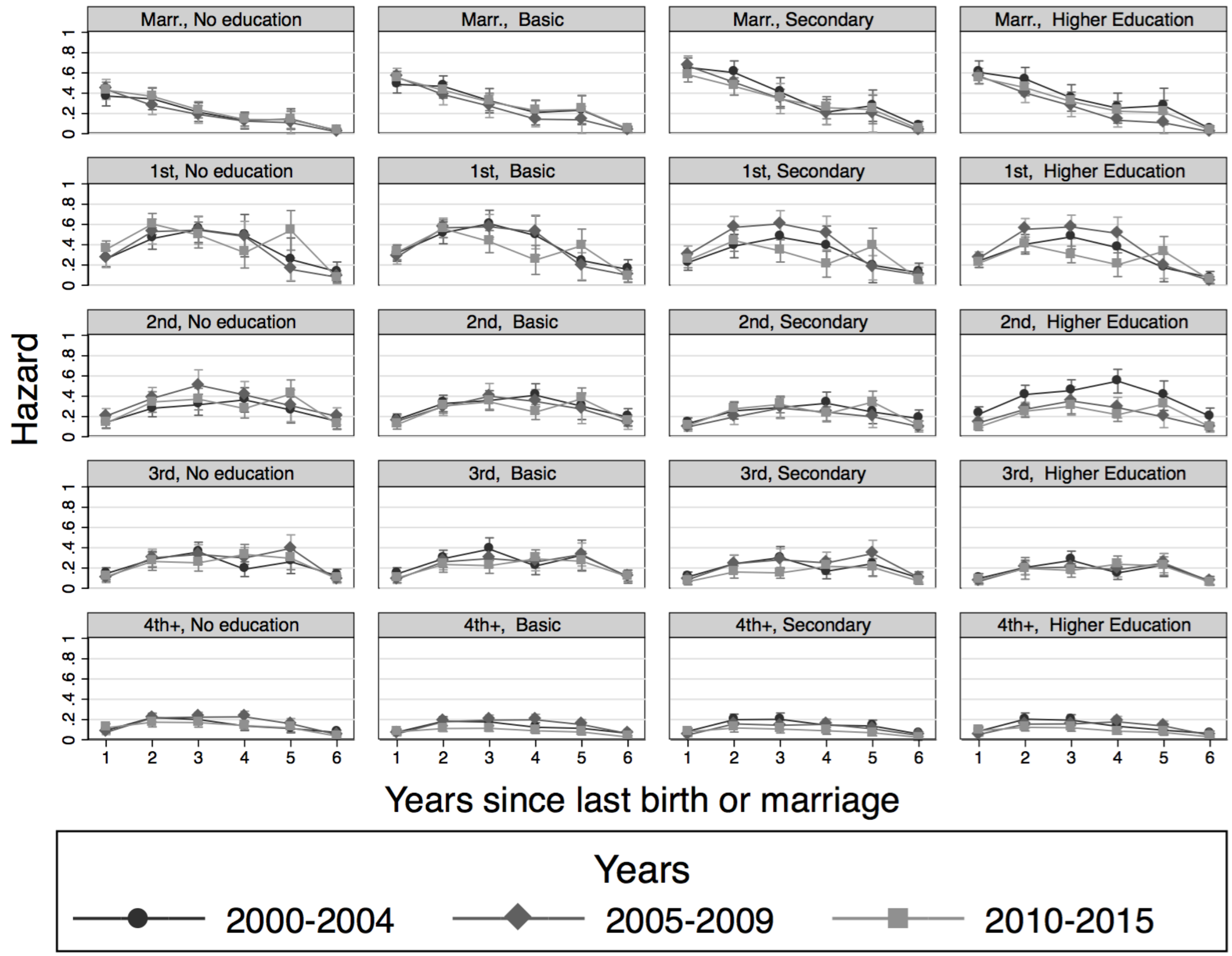
Figure 21. Hazard ratios for education interactions with time, multivariate model of fertility



Source: Authors' calculations based on JLMPS 2016
Notes: 95% confidence intervals. Underlying models in Table 4, spec. 6

Although there are clear shifts over time in fertility by education, it is unlikely that these are affecting all parities equally. In Table 4, specification 7 and Figure 22 we show a model that interacts education, time, and parity (although not birth interval). These effects are jointly significant in testing the interactions between education, time, and birth order. Here too we can see that the fertility decline is particularly concentrated among the educated. Some postponement and decline occur among all groups, but it is those with secondary and especially higher education who are postponing the first birth after marriage. The reduction in the hazard of going from first to second birth increases with education. Declines in going from the second to third birth are notable among the highly educated (although starting in 2005-2009). At the same time, every level has an appreciable decline at 4th and higher parities.

Figure 22. Hazards of next birth by parity and years since last birth or marriage, differences over time and by (parity and time interacted) education, controlling for individual, household, and community characteristics



Source: Authors' calculations based on JLMPS 2016
Notes: 95% confidence intervals. Underlying models in Table 4, spec. 7

8. Discussion and Conclusions

After a long period of stall, fertility rates in Jordan have resumed declining since 2010, reaching a TFR of 3.3 in 2016 among Jordanians and 3.4 nationally. Fertility rates in 2010-2015 as derived from the Jordan Labor Market Panel Survey 2016 were significantly lower than those in 2005-2009, providing some of the first evidence of a MENA country coming out of a fertility stall. The lower TFR found in the JLMPS is consistent with the population pyramid derived from the 2015 Jordanian Census and the emerging trend seen in the 2012 JPFHS. Another recent study also cited internal USAID calculations, based on birth registries for Jordanians, that found a TFR of 3.1 in 2014 (Spindler et al. 2017). The finding of resumed fertility decline in Jordan thus seems to be robust to the data source used to calculate TFR.

The more pressing question for population policy in the MENA region is what led to fertility stall and resumed decline in the Jordanian case. In terms of the proximate determinants, we do find evidence of a temporary dip in the hazard of marriage in 2008-2009. These were years immediately following the global economic crisis, so changing macroeconomic conditions over these years may have affected Jordanians' ability to form households in the short-term. Yet although this temporary dip in marriages around 2008-2009, particularly to more highly educated women, may have contributed to the decline in TFR observed starting in 2010, there has been no major structural shift in age at marriage in recent years, either during or after the stall. Changes in nuptiality therefore do not seem to be the driving factor behind the changes in fertility rates. Unfortunately, the JLMPS data does not allow us to assess the role of contraceptive use in the resumed fertility decline.

The global literature on fertility stall and women's education has focused on stalling educational attainment and the persistence of higher fertility rates among less educated women (Bongaarts 2003; Goujon, Lutz, and Samir 2015). Yet our findings are consistent with literature from Egypt in suggesting that the fertility behavior of highly educated women is key to the dynamics of fertility stall in the MENA region (Al Zalak and Goujon 2017; Vignoli 2006). Whereas an inverted U-shaped relationship between women's education and fertility rates was seen during the stall period, and even a positive relationship from 2000-2004 in the multivariate models, during the period since 2010 the expected inverse relationship between women's education and fertility has resumed. In the post-stall period, the fertility decline has been greatest among those with secondary and higher education.

It is important to note that our results also suggest that the resumption of fertility decline in Jordan may be a combination of tempo and quantum effects. There appears to be increasing postponement of the first birth after marriage, particularly among women with higher education. This could be a tempo effect indicating some shifting of births to later ages, in which case the cohort completed fertility of women may not be different than it would have been at an earlier fertility schedule. If this is the case, the recent fertility decline may be a temporary phenomenon. Nevertheless, there has been a general downward shift in the fertility schedule across parities, and particularly in births of parity four and higher. Further investigations into the determinants and durability of the recent shift in fertility in Jordan will be critical to understanding demographic shifts in Jordan and may shed light on regional and global fertility stalls as well.

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Appendix: Tables

Table 1. Proportional hazard models of fertility timing, baseline hazards and time

	Spec. 1	Spec. 2	Spec. 3
Parity (first birth omit.)			
Marr.	2.461***	2.462***	2.537***
	(0.205)	(0.208)	(0.416)
2nd	0.468***	0.469***	0.627*
	(0.056)	(0.056)	(0.133)
3rd	0.323***	0.324***	0.443***
	(0.044)	(0.044)	(0.103)
4th+	0.257***	0.258***	0.294***
	(0.033)	(0.034)	(0.057)
Time since last birth or marr. (1 yr. omit.)			
Two years	2.132***	2.129***	1.945***
	(0.195)	(0.197)	(0.332)
Three years	1.970***	1.978***	2.388***
	(0.218)	(0.219)	(0.482)
Four years	1.426*	1.423*	1.824*
	(0.238)	(0.238)	(0.542)
Five years	1.035	1.039	0.799
	(0.224)	(0.225)	(0.380)
Six or more years	0.284***	0.285***	0.493
	(0.071)	(0.071)	(0.179)
Parity and time int.			
Marr. # Two years	0.332***	0.333***	0.439***
	(0.042)	(0.043)	(0.104)
Marr. # Three years	0.219***	0.218***	0.197***
	(0.036)	(0.036)	(0.060)
Marr. # Four years	0.175***	0.175***	0.145***
	(0.041)	(0.041)	(0.067)
Marr. # Five years	0.235***	0.238***	0.370
	(0.079)	(0.079)	(0.224)
Marr. # Six or more years	0.154***	0.154***	0.114***
	(0.049)	(0.049)	(0.053)
2nd # Two years	1.084	1.090	1.083
	(0.169)	(0.170)	(0.281)
2nd # Three years	1.427*	1.428*	0.985
	(0.250)	(0.249)	(0.307)
2nd # Four years	1.682*	1.684*	1.512
	(0.377)	(0.377)	(0.585)
2nd # Five years	2.355**	2.336**	2.310
	(0.651)	(0.646)	(1.301)
2nd # Six or more years	3.605***	3.588***	2.059
	(1.126)	(1.119)	(0.995)
3rd # Two years	1.208	1.207	1.150
	(0.207)	(0.207)	(0.340)
3rd # Three years	1.455*	1.448*	1.247
	(0.272)	(0.271)	(0.395)
3rd # Four years	1.820**	1.820**	0.862
	(0.417)	(0.416)	(0.348)
3rd # Five years	2.973***	2.945***	2.971
	(0.827)	(0.819)	(1.715)
3rd # Six or more years	3.103***	3.095***	1.667

	Spec. 1	Spec. 2	Spec. 3
	(0.972)	(0.970)	(0.866)
4th+ # Two years	1.039	1.040	1.309
	(0.180)	(0.182)	(0.335)
4th+ # Three years	1.091	1.087	0.998
	(0.196)	(0.197)	(0.274)
4th+ # Four years	1.258	1.263	0.878
	(0.270)	(0.272)	(0.327)
4th+ # Five years	1.355	1.352	1.659
	(0.351)	(0.353)	(0.896)
4th+ # Six or more years	1.890*	1.878*	1.559
	(0.545)	(0.543)	(0.666)
Year (2000 omit.)			
2001	1.115		
	(0.105)		
2002	1.003		
	(0.100)		
2003	1.012		
	(0.101)		
2004	1.003		
	(0.105)		
2005	0.942		
	(0.091)		
2006	0.897		
	(0.088)		
2007	0.989		
	(0.091)		
2008	1.099		
	(0.106)		
2009	1.016		
	(0.099)		
2010	0.837		
	(0.082)		
2011	0.920		
	(0.096)		
2012	0.930		
	(0.095)		
2013	0.848		
	(0.080)		
2014	0.849		
	(0.081)		
2015	0.760**		
	(0.072)		
Years (2000-2004 omit.)			
2005-2009		0.965	1.083
		(0.036)	(0.186)
2010-2015		0.832***	1.095
		(0.033)	(0.173)
Parity and years int.			
Marr. # 2005-2009			1.011
			(0.211)
Marr. # 2010-2015			0.923
			(0.185)
2nd # 2005-2009			0.764
			(0.223)

	Spec. 1	Spec. 2	Spec. 3
2nd # 2010-2015			0.592
			(0.175)
3rd # 2005-2009			0.626
			(0.214)
3rd # 2010-2015			0.641
			(0.210)
4th+ # 2005-2009			0.658
			(0.182)
4th+ # 2010-2015			1.018
			(0.303)
Time since last birth or marr. and years int.			
Two years # 2005-2009			1.279
			(0.309)
Two years # 2010-2015			1.045
			(0.227)
Three years # 2005-2009			1.122
			(0.317)
Three years # 2010-2015			0.581*
			(0.157)
Four years # 2005-2009			1.191
			(0.461)
Four years # 2010-2015			0.441
			(0.203)
Five years # 2005-2009			0.737
			(0.462)
Five years # 2010-2015			1.823
			(1.009)
Six or more years # 2005-2009			0.538
			(0.274)
Six or more years # 2010-2015			0.433
			(0.199)
Parity and time since last birth or marr. and years int.			
Marr. # Two years # 2005-2009			0.534
			(0.176)
Marr. # Two years # 2010-2015			0.823
			(0.243)
Marr. # Three years # 2005-2009			0.669
			(0.302)
Marr. # Three years # 2010-2015			1.721
			(0.690)
Marr. # Four years # 2005-2009			0.576
			(0.343)
Marr. # Four years # 2010-2015			2.572
			(1.635)
Marr. # Five years # 2005-2009			0.736
			(0.653)
Marr. # Five years # 2010-2015			0.543
			(0.412)
Marr. # Six or more years # 2005-2009			0.829
			(0.582)
Marr. # Six or more years # 2010-2015			2.127
			(1.256)
2nd # Two years # 2005-2009			0.770
			(0.286)

	Spec. 1	Spec. 2	Spec. 3
2nd # Two years # 2010-2015			1.253
			(0.458)
2nd # Three years # 2005-2009			1.104
			(0.493)
2nd # Three years # 2010-2015			2.371*
			(1.004)
2nd # Four years # 2005-2009			0.689
			(0.357)
2nd # Four years # 2010-2015			1.743
			(0.985)
2nd # Five years # 2005-2009			1.250
			(0.938)
2nd # Five years # 2010-2015			1.046
			(0.714)
2nd # Six or more years # 2005-2009			1.869
			(1.161)
2nd # Six or more years # 2010-2015			2.443
			(1.496)
3rd # Two years # 2005-2009			1.105
			(0.467)
3rd # Two years # 2010-2015			1.077
			(0.470)
3rd # Three years # 2005-2009			1.057
			(0.489)
3rd # Three years # 2010-2015			1.360
			(0.613)
3rd # Four years # 2005-2009			1.592
			(0.886)
3rd # Four years # 2010-2015			4.628*
			(2.789)
3rd # Five years # 2005-2009			2.346
			(1.802)
3rd # Five years # 2010-2015			0.678
			(0.473)
3rd # Six or more years # 2005-2009			2.316
			(1.567)
3rd # Six or more years # 2010-2015			2.494
			(1.615)
4th+ # Two years # 2005-2009			0.979
			(0.353)
4th+ # Two years # 2010-2015			0.550
			(0.210)
4th+ # Three years # 2005-2009			1.237
			(0.491)
4th+ # Three years # 2010-2015			1.009
			(0.420)
4th+ # Four years # 2005-2009			1.794
			(0.878)
4th+ # Four years # 2010-2015			1.563
			(0.898)
4th+ # Five years # 2005-2009			2.533
			(1.832)
4th+ # Five years # 2010-2015			0.382
			(0.259)

	Spec. 1	Spec. 2	Spec. 3
4th+ # Six or more years # 2005-2009			2.019
			(1.202)
4th+ # Six or more years # 2010-2015			0.906
			(0.518)
N obs.	45221	45221	45221
N individuals	8826	8826	8826

Coefficients are hazard ratios
Standard errors in parentheses (clustered at individual level)
*p<0.05; **p<0.01; ***p<0.001

Table 2. Proportional hazards models of marriage timing, baseline hazards and time

	Men Spec. 1	Women Spec. 1	Men Spec. 2	Women Spec. 2	Men Spec. 3	Women Spec. 3
Age in yr. 18 or less omit						
19	4.850***	1.914***	4.851***	1.915***	1.409	1.568
	(1.986)	(0.232)	(1.985)	(0.232)	(0.929)	(0.400)
20	6.421***	2.519***	6.430***	2.534***	2.995	2.073**
	(2.438)	(0.298)	(2.442)	(0.300)	(2.012)	(0.473)
21	10.668***	2.665***	10.689***	2.662***	3.728*	2.648***
	(3.858)	(0.315)	(3.865)	(0.314)	(2.167)	(0.655)
22	17.254***	3.650***	17.278***	3.655***	6.732***	3.458***
	(6.045)	(0.421)	(6.042)	(0.419)	(3.772)	(0.778)
23	25.282***	4.303***	25.372***	4.316***	10.653***	4.034***
	(8.737)	(0.590)	(8.763)	(0.595)	(5.814)	(1.621)
24	28.452***	3.927***	28.462***	3.921***	14.335***	3.055***
	(9.743)	(0.467)	(9.766)	(0.468)	(7.766)	(0.852)
25	38.105***	4.772***	38.055***	4.784***	20.315***	3.681***
	(13.035)	(0.607)	(12.998)	(0.608)	(10.920)	(1.024)
26	48.331***	3.827***	48.226***	3.812***	14.485***	3.984***
	(16.593)	(0.530)	(16.526)	(0.527)	(7.789)	(1.102)
27	53.010***	3.310***	52.891***	3.311***	23.742***	2.878***
	(18.075)	(0.548)	(18.058)	(0.548)	(12.914)	(0.860)
28	57.036***	2.665***	57.157***	2.689***	18.250***	2.118
	(19.438)	(0.501)	(19.516)	(0.504)	(9.783)	(0.898)
29	77.093***	1.963***	76.974***	1.971***	31.881***	1.836
	(26.370)	(0.384)	(26.294)	(0.385)	(17.097)	(0.677)
30	89.459***	2.705***	89.298***	2.717***	36.707***	1.629
	(30.918)	(0.571)	(30.779)	(0.572)	(20.123)	(0.651)
31	79.033***	1.697	79.257***	1.695	42.835***	1.772
	(27.849)	(0.522)	(27.911)	(0.522)	(23.794)	(1.084)
32+	58.126***	1.353*	58.279***	1.353*	23.469***	1.491
	(19.663)	(0.173)	(19.695)	(0.173)	(12.526)	(0.397)
Year (2000 omit.)						
2001	0.841	0.703				
	(0.160)	(0.131)				
2002	0.952	0.967				
	(0.198)	(0.230)				
2003	0.983	0.873				
	(0.188)	(0.160)				
2004	1.083	0.871				
	(0.200)	(0.157)				
2005	1.060	1.152				
	(0.198)	(0.207)				
2006	1.031	1.094				

	Men Spec. 1	Women Spec. 1	Men Spec. 2	Women Spec. 2	Men Spec. 3	Women Spec. 3
	(0.186)	(0.201)				
2007	0.979	1.027				
	(0.185)	(0.181)				
2008	0.869	0.730				
	(0.166)	(0.134)				
2009	0.744	0.553**				
	(0.147)	(0.104)				
2010	0.920	0.965				
	(0.161)	(0.162)				
2011	1.033	0.950				
	(0.178)	(0.157)				
2012	0.999	0.923				
	(0.167)	(0.148)				
2013	1.074	1.144				
	(0.176)	(0.183)				
2014	1.090	1.004				
	(0.176)	(0.159)				
2015	0.942	1.065				
	(0.153)	(0.167)				
Years (2000-2003 omit.)						
2005-2007			1.049	1.236*	0.201*	1.047
			(0.104)	(0.121)	(0.155)	(0.209)
2008-2009			0.825	0.724**	0.097*	0.848
			(0.099)	(0.084)	(0.108)	(0.209)
2010-2015			1.037	1.146	0.280*	0.977
			(0.078)	(0.086)	(0.176)	(0.150)
Age and years int.						
19 # 2005-2007					6.259	1.020
					(7.278)	(0.411)
19 # 2008-2009					25.068*	1.658
					(34.267)	(0.745)
19 # 2010-2015					5.557*	1.330
					(4.604)	(0.407)
20 # 2005-2007					2.739	1.346
					(2.729)	(0.500)
20 # 2008-2009					6.172	0.524
					(7.860)	(0.241)
20 # 2010-2015					3.937	1.460
					(3.203)	(0.413)
21 # 2005-2007					6.149*	1.455
					(5.686)	(0.526)
21 # 2008-2009					15.559*	0.526

	Men Spec. 1	Women Spec. 1	Men Spec. 2	Women Spec. 2	Men Spec. 3	Women Spec. 3
					(19.299)	(0.248)
21 # 2010-2015					4.555*	0.937
					(3.315)	(0.281)
22 # 2005-2007					5.858*	1.008
					(5.154)	(0.399)
22 # 2008-2009					7.453	0.686
					(9.338)	(0.295)
22 # 2010-2015					4.357*	1.201
					(3.030)	(0.328)
23 # 2005-2007					6.237*	1.570
					(5.240)	(0.758)
23 # 2008-2009					5.469	0.648
					(6.771)	(0.363)
23 # 2010-2015					3.833*	1.049
					(2.624)	(0.455)
24 # 2005-2007					3.611	1.276
					(3.073)	(0.515)
24 # 2008-2009					3.174	0.966
					(3.832)	(0.471)
24 # 2010-2015					3.534	1.519
					(2.396)	(0.492)
25 # 2005-2007					4.229	1.568
					(3.539)	(0.626)
25 # 2008-2009					3.213	0.890
					(3.776)	(0.474)
25 # 2010-2015					3.023	1.459
					(2.039)	(0.487)
26 # 2005-2007					6.332*	0.909
					(5.197)	(0.407)
26 # 2008-2009					9.578	0.548
					(11.332)	(0.317)
26 # 2010-2015					6.563**	1.045
					(4.428)	(0.356)
27 # 2005-2007					5.194*	1.430
					(4.307)	(0.691)
27 # 2008-2009					9.005	1.169
					(10.668)	(0.670)
27 # 2010-2015					3.284	1.148
					(2.230)	(0.454)
28 # 2005-2007					7.088*	0.626
					(5.925)	(0.381)
28 # 2008-2009					16.550*	2.084

	Men Spec. 1	Women Spec. 1	Men Spec. 2	Women Spec. 2	Men Spec. 3	Women Spec. 3
					(19.393)	(1.439)
28 # 2010-2015					5.073*	1.440
					(3.412)	(0.704)
29 # 2005-2007					6.624*	1.424
					(5.489)	(0.972)
29 # 2008-2009					9.977	0.594
					(11.711)	(0.391)
29 # 2010-2015					3.483	1.108
					(2.347)	(0.497)
30 # 2005-2007					4.587	2.635
					(3.906)	(1.596)
30 # 2008-2009					13.922*	2.812
					(16.572)	(1.786)
30 # 2010-2015					3.807	1.547
					(2.606)	(0.802)
31 # 2005-2007					3.660	0.326
					(3.251)	(0.270)
31 # 2008-2009					5.546	1.178
					(6.859)	(1.038)
31 # 2010-2015					2.685	1.282
					(1.873)	(0.955)
32+ # 2005-2007					6.404*	0.826
					(5.183)	(0.411)
32+ # 2008-2009					12.037*	0.458
					(13.888)	(0.207)
32+ # 2010-2015					3.513	1.029
					(2.341)	(0.323)
N obs.	50727	40650	50727	40650	50727	40650
N individuals	2565	2751	2565	2751	2565	2751

Coefficients are hazard ratios
Standard errors in parentheses (clustered at individual level)
*p<0.05; **p<0.01; ***p<0.001

Table 3. Proportional hazards models of marriage timing, controls

	Men Spec. 4	Women Spec. 4	Men Spec. 5	Women Spec. 5	Men Spec. 6	Women Spec. 6
In school	0.427***	0.279***	0.424***	0.278***	0.437***	0.290***
	(0.088)	(0.036)	(0.090)	(0.036)	(0.089)	(0.037)
Education (none omit.)						
Basic	0.945	1.055	0.938	1.033	0.793	1.099
	(0.084)	(0.100)	(0.085)	(0.102)	(0.134)	(0.206)
Secondary	0.849	0.922	0.828	0.898	0.758	1.376
	(0.087)	(0.107)	(0.086)	(0.108)	(0.141)	(0.269)
Higher Education	0.777*	0.696***	0.758**	0.674***	0.594**	0.907
	(0.078)	(0.067)	(0.078)	(0.068)	(0.110)	(0.174)
Mother's education (less than basic omit.)						
Basic	1.014	0.961	1.019	0.932	1.017	0.965
	(0.099)	(0.092)	(0.102)	(0.091)	(0.099)	(0.092)
Secondary	0.909	1.257*	0.947	1.223	0.907	1.266*
	(0.120)	(0.141)	(0.126)	(0.140)	(0.120)	(0.141)
Higher Education	0.587**	0.808	0.559**	0.829	0.587**	0.818
	(0.112)	(0.169)	(0.110)	(0.175)	(0.112)	(0.172)
Father's education (less than basic omit.)						
Basic	1.040	0.982	1.044	0.995	1.039	0.977
	(0.099)	(0.081)	(0.100)	(0.084)	(0.099)	(0.080)
Secondary	1.053	1.094	1.097	1.092	1.056	1.096
	(0.137)	(0.118)	(0.141)	(0.119)	(0.137)	(0.116)
Higher Education	0.939	0.718**	0.979	0.725**	0.941	0.712**
	(0.106)	(0.085)	(0.115)	(0.089)	(0.107)	(0.084)
Father's emp. stat. (wage omit.)						
Employer	1.366*	0.749*	1.427*	0.747*	1.365*	0.756
	(0.191)	(0.110)	(0.199)	(0.111)	(0.193)	(0.111)
Self-Employed	0.925	0.902	0.941	0.886	0.920	0.905
	(0.084)	(0.077)	(0.085)	(0.078)	(0.083)	(0.077)
Not employed/missing	0.672***	0.640***	0.664***	0.626***	0.670***	0.645***
	(0.054)	(0.046)	(0.054)	(0.046)	(0.054)	(0.047)
Mother's emp. stat. (wage omit.)						
Employer or self-employed	0.980	1.197	0.877	1.081	0.995	1.121
	(0.218)	(0.544)	(0.211)	(0.489)	(0.220)	(0.505)
Not employed/missing	0.699*	1.043	0.647**	1.077	0.699*	1.017
	(0.110)	(0.176)	(0.103)	(0.190)	(0.110)	(0.168)
Gov (Amman omit.)						
Balqa	1.118	0.788*	1.153	0.824	1.124	0.792
	(0.137)	(0.095)	(0.149)	(0.103)	(0.138)	(0.096)
Zarqa	1.249*	1.263*	1.249*	1.274*	1.255*	1.245*
	(0.136)	(0.126)	(0.139)	(0.133)	(0.138)	(0.123)
Madaba	0.897	0.831	0.971	0.803	0.894	0.821
	(0.168)	(0.152)	(0.181)	(0.148)	(0.169)	(0.150)
Irbid	0.868	0.887	0.853	0.857	0.869	0.888
	(0.084)	(0.084)	(0.084)	(0.085)	(0.084)	(0.084)
Mafraq	1.187	0.968	1.117	0.866	1.186	0.971
	(0.143)	(0.120)	(0.149)	(0.119)	(0.142)	(0.121)
Jarash	0.904	0.908	0.942	0.959	0.900	0.904
	(0.119)	(0.106)	(0.126)	(0.115)	(0.118)	(0.106)
Ajloun	0.734	0.858	0.758	0.882	0.746	0.851
	(0.148)	(0.164)	(0.156)	(0.172)	(0.150)	(0.164)
Karak	1.239	0.796	1.295*	0.837	1.229	0.798

	Men Spec. 4	Women Spec. 4	Men Spec. 5	Women Spec. 5	Men Spec. 6	Women Spec. 6
	(0.155)	(0.100)	(0.169)	(0.108)	(0.153)	(0.100)
Tafileh	1.161	0.951	1.224	1.017	1.176	0.953
	(0.216)	(0.137)	(0.237)	(0.152)	(0.217)	(0.137)
Ma'an	1.075	0.635**	1.135	0.634**	1.081	0.631**
	(0.155)	(0.104)	(0.164)	(0.106)	(0.156)	(0.103)
Aqaba	0.884	0.618	0.915	0.669	0.885	0.614
	(0.168)	(0.178)	(0.176)	(0.187)	(0.167)	(0.174)
Location (urban omit.)						
Rural	0.763	0.394***	0.802	0.411***	0.758	0.400***
	(0.222)	(0.093)	(0.235)	(0.098)	(0.220)	(0.095)
Gov. and loc. int.						
Balqa # Rural	1.063	2.295**	1.037	2.344**	1.069	2.234*
	(0.368)	(0.711)	(0.361)	(0.727)	(0.371)	(0.697)
Zarqa # Rural	1.243	1.779	1.232	1.749	1.227	1.756
	(0.500)	(0.572)	(0.493)	(0.566)	(0.492)	(0.571)
Madaba # Rural	2.003	2.770**	1.886	2.822**	1.958	2.728**
	(0.755)	(0.991)	(0.711)	(1.018)	(0.745)	(0.978)
Irbid # Rural	1.769	2.968***	1.946	2.933***	1.760	2.965***
	(0.631)	(0.929)	(0.691)	(0.917)	(0.627)	(0.937)
Mafraq # Rural	1.504	2.806***	1.466	2.927***	1.518	2.787***
	(0.511)	(0.800)	(0.504)	(0.848)	(0.516)	(0.799)
Jarash # Rural	1.307	2.546**	1.262	2.426**	1.338	2.553**
	(0.486)	(0.774)	(0.473)	(0.740)	(0.494)	(0.780)
Ajloun # Rural	1.380	1.796	1.309	1.733	1.355	1.780
	(0.528)	(0.625)	(0.502)	(0.608)	(0.518)	(0.621)
Karak # Rural	1.244	2.209**	1.187	2.195**	1.255	2.181**
	(0.431)	(0.660)	(0.412)	(0.657)	(0.435)	(0.655)
Tafileh # Rural	0.975	1.532	0.950	1.483	0.981	1.507
	(0.430)	(0.601)	(0.420)	(0.582)	(0.433)	(0.594)
Ma'an # Rural	0.949	2.306*	0.880	2.331*	0.941	2.259*
	(0.362)	(0.778)	(0.338)	(0.791)	(0.358)	(0.769)
Aqaba # Rural	1.899	4.343***	1.775	3.886***	1.914	4.325***
	(0.729)	(1.752)	(0.690)	(1.548)	(0.733)	(1.746)
Older brothers	1.072***	1.017	1.070***	1.022	1.071***	1.018
	(0.017)	(0.016)	(0.018)	(0.016)	(0.017)	(0.016)
Older sisters	1.065***	1.068***	1.065***	1.068***	1.065***	1.067***
	(0.015)	(0.017)	(0.016)	(0.017)	(0.016)	(0.017)
Younger sisters	1.049**	1.073***	1.044*	1.078***	1.050**	1.072***
	(0.018)	(0.019)	(0.018)	(0.020)	(0.018)	(0.019)
Younger brothers	1.003	1.022	1.009	1.022	1.003	1.023
	(0.020)	(0.020)	(0.021)	(0.021)	(0.020)	(0.020)
Percentage HH. Syr.			1.005	1.002		
			(0.008)	(0.008)		
Years and perc. Syr. int.						
2005-2007 # Perc. HH Syr.			0.997	1.003		
			(0.012)	(0.012)		
2008-2009 # Perc. HH Syr.			0.996	0.998		
			(0.016)	(0.014)		
2010-2015 # Perc. HH Syr.			1.002	1.013		
			(0.009)	(0.010)		
Years and ed. int.						
2005-2007 # Basic					1.223	0.946
					(0.314)	(0.285)

	Men Spec. 4	Women Spec. 4	Men Spec. 5	Women Spec. 5	Men Spec. 6	Women Spec. 6
2005-2007 # Secondary					1.526	0.799
					(0.448)	(0.248)
2005-2007 # Higher Education					1.682	0.673
					(0.501)	(0.209)
2008-2009 # Basic					1.451	0.725
					(0.458)	(0.232)
2008-2009 # Secondary					1.490	0.422*
					(0.556)	(0.153)
2008-2009 # Higher Education					0.983	0.343**
					(0.355)	(0.112)
2010-2015 # Basic					1.244	0.990
					(0.250)	(0.226)
2010-2015 # Secondary					0.982	0.545*
					(0.232)	(0.133)
2010-2015 # Higher Education					1.420	0.807
					(0.307)	(0.190)
Baseline hazard and int.	Yes	Yes	Yes	Yes	Yes	Yes
N obs.	50651	40539	49708	39766	50651	40539
N individuals	2559	2745	2505	2696	2559	2745

Coefficients are hazard ratios
Standard errors in parentheses (clustered at individual level)
*p<0.05; **p<0.01; ***p<0.001

Table 4. Proportional hazard models of fertility timing, controls

	Spec. 4	Spec. 5	Spec. 6	Spec. 7
Age group (25-29 omit.)				
<20	0.834	0.828	0.824	0.906
	(0.091)	(0.091)	(0.090)	(0.100)
20-24	1.149**	1.149**	1.152**	1.135*
	(0.057)	(0.058)	(0.057)	(0.057)
30-34	0.885*	0.872*	0.881*	0.897*
	(0.047)	(0.047)	(0.047)	(0.048)
35-39	0.618***	0.620***	0.614***	0.629***
	(0.039)	(0.040)	(0.039)	(0.040)
40-44	0.277***	0.283***	0.276***	0.280***
	(0.027)	(0.029)	(0.027)	(0.027)
45-49	0.041***	0.043***	0.041***	0.041***
	(0.010)	(0.011)	(0.010)	(0.010)
Ed. cat. (less than basic omit.)				
Basic	0.988	1.000	1.128	1.274
	(0.048)	(0.049)	(0.088)	(0.237)
Secondary	0.944	0.944	1.123	0.921
	(0.053)	(0.054)	(0.101)	(0.208)
Higher Education	0.985	0.988	1.309**	1.028
	(0.054)	(0.055)	(0.111)	(0.198)
Has health insurance (none omit.)	1.019	1.023	1.026	1.021
	(0.043)	(0.044)	(0.044)	(0.043)
Transit mode (by foot omit.)				
By transit or other means	0.899**	0.896**	0.902**	0.899**
	(0.035)	(0.035)	(0.035)	(0.035)
By personal vehicle	0.970	0.964	0.972	0.962
	(0.046)	(0.046)	(0.046)	(0.046)
Transit time (minutes)	1.001	1.001	1.001	1.001
	(0.002)	(0.002)	(0.002)	(0.002)
Mother ed. cat. (less than basic omit.)				
Basic	0.901	0.907	0.900	0.909
	(0.053)	(0.051)	(0.052)	(0.054)
Secondary	0.935	0.928	0.946	0.947
	(0.079)	(0.079)	(0.081)	(0.081)
Higher Education	1.242	1.205	1.257	1.222
	(0.289)	(0.292)	(0.298)	(0.280)
Father ed. cat. (less than basic omit.)				
Basic	0.986	1.012	0.984	0.975
	(0.049)	(0.049)	(0.048)	(0.049)
Secondary	0.977	0.999	0.976	0.975
	(0.057)	(0.058)	(0.057)	(0.059)
Higher Education	0.978	1.011	0.978	0.989
	(0.069)	(0.071)	(0.069)	(0.070)
Father emp. (wage omit.)				
Employer	0.932	0.926	0.931	0.931
	(0.061)	(0.060)	(0.060)	(0.060)
Self-Employed	1.086	1.108*	1.090	1.087
	(0.051)	(0.052)	(0.051)	(0.051)
Not employed/missing	0.934	0.943	0.933	0.936
	(0.043)	(0.043)	(0.043)	(0.043)
Mother emp. (wage omit.)				
Employer or self-employed	1.695*	1.619*	1.692*	1.672*

	Spec. 4	Spec. 5	Spec. 6	Spec. 7
	(0.359)	(0.374)	(0.361)	(0.354)
Not employed/missing	1.253	1.213	1.264	1.263
	(0.258)	(0.264)	(0.262)	(0.256)
Gov (Amman omit.)				
Balqa	0.990	0.966	0.990	0.991
	(0.073)	(0.073)	(0.073)	(0.075)
Zarqa	1.130*	1.137*	1.130*	1.146*
	(0.065)	(0.068)	(0.065)	(0.066)
Madaba	1.000	0.995	1.005	0.990
	(0.094)	(0.100)	(0.096)	(0.094)
Irbid	1.062	1.095	1.065	1.070
	(0.059)	(0.064)	(0.059)	(0.059)
Mafraq	1.295**	1.391***	1.301***	1.287**
	(0.103)	(0.121)	(0.104)	(0.101)
Jarash	1.267**	1.233**	1.260**	1.265**
	(0.098)	(0.097)	(0.097)	(0.098)
Ajloun	1.262**	1.235**	1.277**	1.299**
	(0.100)	(0.099)	(0.102)	(0.106)
Karak	1.152	1.118	1.155	1.144
	(0.094)	(0.093)	(0.095)	(0.094)
Tafileh	1.251*	1.184	1.255*	1.229*
	(0.121)	(0.120)	(0.124)	(0.123)
Ma'an	1.228*	1.226*	1.236*	1.229*
	(0.116)	(0.116)	(0.117)	(0.119)
Aqaba	1.080	1.028	1.077	1.087
	(0.122)	(0.119)	(0.123)	(0.119)
Location (urban omit.)				
Rural	1.217	1.197	1.206	1.182
	(0.151)	(0.149)	(0.152)	(0.143)
Gov. and loc. int.				
Balqa # Rural	0.787	0.785	0.798	0.825
	(0.146)	(0.145)	(0.149)	(0.149)
Zarqa # Rural	0.852	0.864	0.858	0.870
	(0.136)	(0.140)	(0.138)	(0.136)
Madaba # Rural	0.767	0.765	0.775	0.784
	(0.168)	(0.167)	(0.172)	(0.172)
Irbid # Rural	0.886	0.882	0.894	0.943
	(0.158)	(0.159)	(0.161)	(0.166)
Mafraq # Rural	0.844	0.809	0.857	0.873
	(0.132)	(0.127)	(0.136)	(0.135)
Jarash # Rural	0.927	0.934	0.955	0.939
	(0.167)	(0.168)	(0.174)	(0.169)
Ajloun # Rural	0.825	0.835	0.833	0.830
	(0.175)	(0.176)	(0.178)	(0.179)
Karak # Rural	0.816	0.817	0.822	0.825
	(0.133)	(0.133)	(0.137)	(0.135)
Tafileh # Rural	0.870	0.876	0.885	0.918
	(0.150)	(0.151)	(0.155)	(0.158)
Ma'an # Rural	0.992	0.967	0.983	1.048
	(0.182)	(0.176)	(0.183)	(0.190)
Aqaba # Rural	1.134	1.160	1.142	1.141
	(0.206)	(0.212)	(0.210)	(0.202)
Have a son	0.786***	0.792***	0.780***	0.777***
	(0.039)	(0.039)	(0.038)	(0.038)

	Spec. 4	Spec. 5	Spec. 6	Spec. 7
Percentage HH. Syr.		0.997		
		(0.004)		
Years and perc.. Syr. int.				
2005-2009 # Perc. HH Syr.		0.992		
		(0.005)		
2010-2015 # Perc. HH Syr.		0.998		
		(0.005)		
Years and ed. int.				
2005-2009 # Basic			0.847	0.915
			(0.086)	(0.249)
2005-2009 # Secondary			0.845	1.406
			(0.097)	(0.433)
2005-2009 # Higher Education			0.722**	1.128
			(0.076)	(0.313)
2010-2015 # Basic			0.791*	0.676
			(0.084)	(0.170)
2010-2015 # Secondary			0.714**	0.685
			(0.085)	(0.203)
2010-2015 # Higher Education			0.622***	0.565*
			(0.066)	(0.137)
Parity ed. and years int.				
Basic # Marr. # 2005-2009				1.166
				(0.294)
Basic # Marr. # 2010-2015				1.510
				(0.322)
Basic # 2nd # 2005-2009				0.670
				(0.177)
Basic # 2nd # 2010-2015				1.046
				(0.256)
Basic # 3rd # 2005-2009				0.778
				(0.198)
Basic # 3rd # 2010-2015				1.060
				(0.255)
Basic # 4th+ # 2005-2009				0.707
				(0.161)
Basic # 4th+ # 2010-2015				0.764
				(0.166)
Secondary # Marr. # 2005-2009				1.412
				(0.397)
Secondary # Marr. # 2010-2015				2.272**
				(0.578)
Secondary # 2nd # 2005-2009				0.396**
				(0.119)
Secondary # 2nd # 2010-2015				1.303
				(0.373)
Secondary # 3rd # 2005-2009				0.700
				(0.204)
Secondary # 3rd # 2010-2015				0.980
				(0.264)
Secondary # 4th+ # 2005-2009				0.572*
				(0.147)
Secondary # 4th+ # 2010-2015				1.089
				(0.300)
Higher Education # Marr. # 2005-2009				1.250

	Spec. 4	Spec. 5	Spec. 6	Spec. 7
				(0.308)
Higher Education # Marr. # 2010-2015				2.297***
				(0.476)
Higher Education # 2nd # 2005-2009				0.639
				(0.163)
Higher Education # 2nd # 2010-2015				1.280
				(0.313)
Higher Education # 3rd # 2005-2009				0.655
				(0.174)
Higher Education # 3rd # 2010-2015				1.308
				(0.336)
Higher Education # 4th+ # 2005-2009				0.728
				(0.172)
Higher Education # 4th+ # 2010-2015				1.482
				(0.328)
Years parity and time since marr. or last birth	Yes	Yes	Yes	Yes
N obs.	45028	43551	45028	45028
N individuals	8778	8570	8778	8778

Coefficients are hazard ratios
Standard errors in parentheses (clustered at individual level)
*p<0.05; **p<0.01; ***p<0.001