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EMPLOYMENT'S ROLE IN ENABLING
AND CONSTRAINING MARRIAGE
IN THE MIDDLE EAST AND NORTH AFRICA

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Abstract

This paper makes use of a series of comparable surveys to investigate the role of employment in enabling and constraining marriage for young men and women in Egypt, Jordan and Tunisia. It draws on several key strains of theoretical literature, including the global and regional life course transitions literature and the literature on the economics of marriage, both globally and in the Middle East and North Africa. Three key empirical questions about the role of employment in enabling or constraining marriage are examined: (i) How do different labor market statuses affect the timing and probability of marriage? (ii) How much of the effect of employment statuses on marriage are mediated through different qualities of the job, such as the security and prestige of jobs or earnings and ability to save? and (iii) Does searching for a longer time for a formal job pay off as a strategy for accelerating marriage? Our findings confirm previous research which shows that for men both employment and the quality of that employment matter for the timing of marriage. The effect of public sector employment on raising the hazard of marriage increases after accounting for endogeneity in Egypt and Tunisia. For women, the results suggest that employment is endogenous to the timing of the marriage decision and once endogeneity is taken into account, we find that public sector employment substantially increases the hazard of marriage in all three countries. We also found that, from a perspective of speeding up marriage, it may be worthwhile for young people to remain in the unemployment state longer if that leads to obtaining a higher quality job.

JEL Classifications: J12, J16, N35, J45, J46

Keywords: Economics of marriage; labor markets; employment; age at marriage; adulthood; Middle East and North Africa

ملخص

تستفيد هذه الورقة من سلسلة من الدراسات الاستقصائية القابلة للمقارنة لدراسة دور العمالة في تمكين وتقييد الزواج بين الشباب والشابات في مصر والأردن وتونس. وتعتمد الورقة على العديد من السلالات الرئيسية من الأدبيات النظرية، بما في ذلك الحياة العالمية والإقليمية ومسار التحولات الأدبية حول اقتصاديات الزواج، على الصعيد العالمي وفي منطقة الشرق الأوسط وشمال أفريقيا. ويتم بحث ثلاثة أسئلة تجريبية رئيسية عن دور العمالة في تمكين الزواج أو تقييده: (1) كيف تؤثر أوضاع سوق العمل المختلفة على توقيت واحتمال الزواج؟ (2) ما مدى تأثير حالات العمالة على الزواج بوساطة من خلال صفات مختلفة للعمل، مثل أمن وهيبة الوظائف أو الأرباح والقدرة على الادخار؟ و (3) هل البحث لمدة أطول للحصول على وظيفة رسمية تصلح كاستراتيجية لتسريع الزواج؟ وتؤكد نتائجنا بعض البحوث السابقة التي تبين أنه بالنسبة للرجال كلا من العمالة ونوعيتها مسائل هامة في توقيت الزواج. ويزداد تأثير العمالة في القطاع العام على زيادة خطر الزواج بعد حساب التجانس في مصر وتونس. وبالنسبة للنساء، تشير النتائج إلى أن العمالة هي ذات صلة بتوقيت قرار الزواج، وبمجرد أخذ التجانس في الاعتبار، نجد أن العمالة في القطاع العام تزيد إلى حد كبير من خطر الزواج في البلدان الثلاثة جميعها. ووجدنا أيضا أنه من منظور تسريع الزواج، قد يكون من المفيد للشباب البقاء في حالة البطالة لمدة أطول إذا أدى ذلك إلى الحصول على وظيفة ذات جودة أعلى.

1. Introduction

As is the case in other parts of the world, the various life course events constituting the transition to adulthood for youth in the Middle East and North Africa (MENA) are highly interdependent. For instance, the transition into marriage and family formation is contingent upon the transition into employment, particularly for men (Assaad, Binzel, & Gadallah, 2010; Assaad & Krafft, 2015a, 2015b; Salem, 2016a). Concerns about protracted transitions to adulthood, or “waithood,” link poor employment prospects to delays in marriage (Dhillon, Dyer, & Yousef, 2009). This paper examines the role of employment in the transition to marriage, both by comparing the experiences of youth in a number of countries (Egypt, Jordan, and Tunisia) and by examining multiple dimensions of the employment and marriage relationship.

For men, finding appropriate employment is necessary both to generate the savings required for marriage and to signal one’s future earning potential to prospective spouses and their families (Hoodfar, 1997; Singerman & Ibrahim, 2003; Singerman, 2007). For women, work may be a key strategy for generating the savings needed to cover the bride’s side marriage costs (Amin & Al-Bassusi, 2004; Sieverding, 2012). Working (temporarily) prior to marriage may particularly assist women whose families would otherwise struggle to accumulate the resources necessary for an acceptable marriage. To account for these gender differences in the employment and marriage nexus, we clearly distinguish between the employment to marriage trajectories pursued by young men and young women. Other elements that may affect the transitions to work and marriage are also incorporated, such as educational attainment and enrollment status, place of residence, and socio-economic status, as measured by parental education and occupation.

This paper draws on several key strains of theoretical literature. First, the global and regional life course transitions literature (Amer, 2014, 2015; Assaad & Krafft, 2014; Gebel & Heyne, 2014, 2016; Lloyd, 2005; Mortimer & Shanahan, 2003; Sommers, 2012) provides an important theoretical framework for understanding individuals’ transitions into adult roles and how transitions vary by gender and socioeconomic status. Secondly, we draw on the economics of marriage literature, both globally and in MENA (Adachi, 2003; Assaad & Krafft, 2015a, 2015b; Becker, 1973, 1974; Bergstrom & Bagnoli, 1993; Hoodfar, 1997; Smith, 2006), to understand the underpinnings of marriage market behavior, including features such as utility maximization, uncertainty and information problems, and strategic and game theoretic behaviors. In maximizing their lifetime utility, individuals and their families face a number of constrained strategic choices in the labor and marriage markets.

A number of specific features of MENA marriage markets make analyses from within the region crucial to understanding market behaviors and marriage patterns. Marriage is the sole socially acceptable route to a number of adult roles, including independent living, socially sanctioned sexual relations, and childbearing. In the marriage market, the bride side’s bargaining power is greatest up front, due to the unequal rights accorded to husbands and wives within marriage in countries that follow Sharia law as the basis for their family law (Assaad & Krafft, 2015b). Divorce is uncommon and particularly damaging to women (El Feki, 2013; Hoodfar, 1997). Marriage is therefore a high-risk endeavor, and the bride’s side tries to secure up front both as much certainty about the spouse and as much assurance in terms of living conditions as possible (Assaad & Krafft, 2015b). For instance, in Egypt, it would take a groom eight years of his total salary to save for the full cost of marriage (Assaad & Krafft, 2015a). These features of the marriage market mean that both theoretical and empirical research from other regions may not be directly applicable.

In MENA labor markets, there are also a number of distinct features of importance to the transition to marriage. Youth unemployment rates are high, in part because MENA labor markets are not

dynamic and the first job youth obtain plays a decisive role in their lifetime employment prospects (Amer, 2014, 2015; Assaad, Binzel, & Gadallah, 2010; Yassine, 2015). Unemployment is often a strategic queuing behavior, in the spirit of the Harris-Todaro model (Harris & Todaro, 1970), where youth remain unemployed in hopes of obtaining a formal or government job, jobs which offer better benefits and wages as well as greater social prestige (Assaad, 1997; Assaad, 2014a; Barsoum, 2015; Groh, McKenzie, Shammout, & Vishwanath, 2014). Female labor force participation is very low (Assaad, Ghazouani, & Krafft, 2016; Assaad & Krafft, 2015c; Assaad, 2014a; Mryyan, 2014; World Bank, 2013) and the work women undertake is limited to activities that are considered appropriate for women in a conservative social setting (Assaad & El-Hamidi, 2009; Assaad, Hendy, & Yassine, 2014; Assaad & Krafft, 2015d). The combined distinctive features of the MENA labor and marriage markets make within-region theoretical and empirical research crucial to understanding individual behaviors and designing effective policy.

To date, there is limited empirical evidence on how employment shapes the transition to marriage in the MENA region. Evidence is available primarily for the case of Egypt (Amin & Al-Bassusi, 2004; Assaad, Binzel, & Gadallah, 2010; Assaad & Krafft, 2015a; Salem, 2016a), with a single study on Jordan (Gebel & Heyne, 2016), and one on Iran (Egel & Salehi-Isfahani, 2010). Work to date has also focused primarily on the issues of being employed at all and also on having ‘good’ jobs (i.e. formal work) without distinguishing between other aspects of employment, such as earnings and savings behavior, that might contribute to employment’s role in the marriage transition. This paper adds substantially to our understanding of the role of employment in constraining or enabling marriage in MENA by exploring additional dimensions of work, such as the relative importance of earnings versus job security and other non-pecuniary aspects of jobs in enabling the transition to marriage. The efforts of this paper to instrument for the potentially endogenous employment and its characteristics also substantially advance the rigor of research on this topic.

Three key questions about the role of employment in enabling or constraining marriage are examined by this paper, with separate analyses for men and women:

1. How do different labor market statuses (different types of employment, unemployment, or remaining out of the labor force) affect the timing and probability of marriage?
2. How much of the effect of employment statuses on marriage is mediated through different qualities of the job, such as the security and prestige of jobs, earnings, and savings?
3. Does queuing (i.e. waiting in unemployment for a formal job, or a public sector job) pay off as a strategy for accelerating marriage?

The paper is structured as follows. The methods used are discussed in section 2. The data used are described in section 3. Results are presented in section 4. Section 5 discusses the implications of our findings for facilitating life course transitions in the MENA region.

2. Methods

In order to assess the timing of marriage and its relationship with labor market statuses and characteristics, survival analysis methods are used to model age at marriage. These methods, also called duration analysis or event history analysis, take into account the fact that many individuals are not yet married (i.e. are right-censored on their age at marriage). Because age at marriage is recorded in years, we take a discrete-time approach that allows for tied observations at each age. Marrying at a particular age, t , can be denoted as T_t . Our outcome of interest is the probability of marrying at a particular age if one has not yet married, which is given by the discrete-time hazard function, h_{it} (Jenkins, 1995):

$$h_{it} = \Pr(T_t | T_t \geq t) \quad (1)$$

Kaplan-Meier survival (and failure) functions are used to present the proportion married by any given age descriptively. For the multivariate models, a discrete-time proportional hazards model is used, namely the complementary log-log model. Both discrete-time logit and complementary log-log models can be used for discrete-time survival analysis (Jenkins, 1995). While the logit model can be interpreted in terms of proportional odds and odds ratios, the complementary log-log model has a proportional hazards interpretation, akin to the continuous time Cox model. An additional advantage of survival analysis methods is that they allow each individual to have time-varying (such as whether or not an individual has a job or a formal job) as well as time invariant characteristics (such as the level of education ultimately attained), which predict when and whether or not they will get married. To facilitate the use of time-varying covariates, the data are structured such that an observation is a unique combination of an individual and a year of age (e.g. age nineteen) ending with the age at which an individual marries or his/her current age if still unmarried. In all of our models, we include controls, as described below, for employment and other characteristics that are likely to affect the timing of marriage, such as education and socio-economic status.

Denoting the covariates as X_{it} , we specifically estimate the complementary log-log model as (Jenkins, 1995):

$$h_{it} = 1 - \exp\{-\exp[\theta(t) - \beta X_{it}]\} \quad (2)$$

or

$$\log(-\log(1 - h_{it})) = \theta(t) + \beta X_{it} \quad (3)$$

The term $\theta(t)$ is a series of dummies for the years of age the individual went through since the time they began to be exposed to the hazard of marriage up to the age of marriage or the current age, if still unmarried. The estimated coefficients, β , when transformed as $\exp(\beta)$ can be interpreted as hazard ratios, describing the relationship between a one-unit increase in a covariate and the hazard of getting married. When the covariates are set to zero, equation (2) can be used to estimate the baseline hazard function from $\theta(t)$, the probability of getting married at each age for the reference case.

In examining the questions about the mechanisms that mediate the effect of employment statuses, we incorporate data on past earnings and job characteristics to assess the relative contributions of these different factors to accelerating or delaying marriage. In a subset of models that are estimated exclusively on the married sample, we examine the effect of savings behaviors by looking at the effects of the share of different parties' contributions to marriage costs, including the individual him or herself and his or her family's share, with the remaining share being the share of the spouse and his or her family. We also look at the effect of total costs of marriage on the timing of marriage, keeping in mind the potential biases that could be introduced by excluding those who never married. The investigation of the relative returns from remaining longer in the unemployment state to search for a good (e.g. public sector) job relies on the parameters of the complementary log-log proportional hazards model. Simulations are generated to compare the effects of unemployment on marriage timing to those of obtaining a public-sector job or private informal wage job (for men) or remaining out of the labor force (for women). This allows us to identify the tradeoffs in the marriage market between finding any job early and searching longer to find a good job. Models are estimated separately for men and women and by county, as we expect labor market statuses to have different effects by gender and in different country contexts.

Endogeneity is likely to be a problem in estimating the role of employment in enabling or constraining marriage. There may be omitted variables, for instance unobservable features of individuals such as their work ethic, which may affect both individuals' employment prospects and their marriage prospects directly. Reverse causality might also be an issue. For instance, women who know they have few marital prospects may be more likely to work in the meantime. We therefore need instruments for employment and employment characteristics. We chose to focus our endogeneity-corrected estimates on the impact of public sector work on marriage timing, not only because public sector work is highly valued by youth (Barsoum, 2015) but also because an instrument is readily available for public sector work, namely the proportion of adults that are working public sector jobs in the local labor market each year, which we obtain by aggregating the labor market histories of the survey by governorate and urban/rural location in a given year.¹ Such government employment opportunities are centrally allocated, affect the probability of obtaining a public sector job, but should meet the exclusion restriction for use as an instrument in examining the effect of employment on marriage. We use the information on the governorate of birth rather than that of current residence to avoid any possible endogeneity associated with the decision to migrate. We use governorate of birth and urban/rural dummies and their interactions to capture any time-invariant aspects of localities related to employment opportunities. We also lag government employment opportunities at the local level by one period, and include both the lagged and current variables, to be able to account for both stock and flow dynamics in the labor market. Previous research has demonstrated that, at least in Egypt, public sector employment is not strongly related to other local social or economic conditions that might drive results (Krafft, 2016). All our instruments are assessed, below, in terms of both their statistical power and whether they meet the exclusion restrictions.

The challenge we face in applying instrumental variables approaches is that both our endogenous regressor (probability of public sector work) and outcome of interest (age at marriage, a duration outcome) are inherently non-linear. Our initial goal is to instrument for the probability of an individual being employed in the public sector, a binary outcome. Using a non-linear first stage in two-stage least squares estimation is not recommended (indeed, it is often referred to as “the forbidden regression” (Angrist & Pischke, 2009)). One approach to resolving this problem is to do essentially a three-stage procedure with a two-part first stage (Adams, Almeida, & Ferreira, 2009; Angrist & Pischke, 2009; Wooldridge, 2002). A non-linear model (as is common, we use a probit) can be used to estimate the endogenous time-varying binary outcome of interest, D_{it} , (public sector employment in our case) as a function of covariates X_{it} and instruments Z_{it} . The predicted probability of public sector employment, namely $\hat{D}_{it}$, can then be used as an instrument in an OLS linear probability model for D_{it} with covariates X_{it} , which generates the predicted probability $\hat{p}_{it}$. If our outcome of interest were linear, we could then just run OLS on that outcome with $\hat{p}_{it}$ and X_{it} as covariates, essentially two-stage least squares, but for the instruments being $\hat{D}_{it}$.

An additional complication arises from the fact that our outcome of interest is age at marriage, which is being modeled as a duration through a complementary log-log proportional hazards model. When the outcome is inherently non-linear and cannot be readily approximated with OLS, using a control function approach, also referred to as two-stage residual inclusion (2SRI), is recommended (Terza, Basu, & Rathouz, 2008; Wooldridge, 2015). Simulations have shown better performance for 2SRI than alternatives when outcomes are non-linear, including in survival analysis settings (Carlin & Solid, 2014; Terza, Basu, & Rathouz, 2008; Terza, Bradford, & Dismuke, 2008). Instead of the predicted probability $\hat{p}_{it}$, the original outcome D_{it} is included along

¹ To preclude survivor bias in the local labor market conditions, we restrict our data to the 30 years preceding each survey.

with the residual from the preceding stage, namely $1-\hat{p}_{it}$. Thus, the approach we take combines the methods of three-stage instrumental variables, using the predicted values of our endogenous dummy of interest as instruments in the intermediate stage, and two-stage residual inclusion. We therefore refer to it as “three stage residual inclusion” (3SRI). Using this method, the statistical significance of the residual embodies a test of the exogeneity of public sector employment. Bootstrapped standard errors clustered at the PSU level are used to address the fact that analytical standard errors will be understated in the presence of a predicted regressor and that some regressors are computed at the community rather than individual level.

3. Data

Data are needed on both the timing of marriage and employment histories in order to assess how employment facilitates or constrains marriage. Given the data requirements, the study is able to examine three MENA countries: Egypt, Jordan and Tunisia. The study uses data from the Egypt Labor Market Panel Survey (ELMPS) of 2012, the Jordan Labor Market Panel Survey (JLMPS) 2010 and Tunisia Labor Market Panel Survey (TLMPS) 2014.² All of the datasets include detailed labor market histories for those who ever worked as well as information on the timing of first marriages. This allows for the creation of synthetic panel data of individuals’ labor market states and marital status on an annual basis, going back a number of years. Some of the analyses on mechanisms for facilitating or constraining marriage require panel data, specifically those that require earnings prior to marriage since past earnings data are not available in the retrospective data. These analyses are restricted to the Egyptian data, as the Jordan and Tunisia surveys only have one wave of data to date. The ELMPS had preceding waves in 2006 and 1998, and we make use of previous wave data to assess why employment characteristics matter, in terms of job security, earnings, or savings behavior.

As discussed above, we aim to achieve causal identification of the impact of employment on marriage by using exogenous variation in employment opportunities and characteristics. We use the labor market history data from the different LMPSs to estimate employment opportunities in a cell defined by governorate and urban/rural location and year.³ Our sample consists of individuals 15-59 at the time of each survey (as these are the individuals with detailed retrospective data in the questionnaire).⁴ This sample totals 24,490 individuals in Egypt, 12,323 individuals in Jordan, and 4,714 individuals in Tunisia.

As mentioned in the methods section, controls are also included for a variety of individual characteristics that theory or past research indicate are likely to affect the timing of marriage (Assaad & Krafft, 2015a, 2015b). Individuals’ current labor market statuses are characterized as (1) public sector work (2) private sector formal wage work, which involves either a contract or social insurance coverage (3) private informal wage work (4) non-wage work (i.e. being self-employed, an employer, or an unpaid family worker) (5) unemployment or (6) being out of the labor force (OLF). Although previous work has demonstrated a potentially important role for migration in delaying marriage (Assaad, Binzel, & Gadallah, 2010; Assaad & Krafft, 2015a), sufficient observations and information on migration were only available in Egypt, and are omitted for comparability. Education ultimately attained is included categorically, along with a time-

² For more information on the ELMPS 2012 see Assaad and Krafft (2013). For more information on the JLMPS 2010 see Assaad (2014b). For more information on the TLMPS 2014 see Assaad, Ghazouani, Krafft, and Rolando (2016).

³ The Jordanian data does not distinguish between urban/rural areas of birth in the retrospective residential location data.

⁴ Because our primary covariate of interest is employment and employment histories are only available starting at age 15, we start our analysis of marriage timing from age 15, excluding those (very few) individuals married prior to that age. Missing data on age at marriage also limits the size of the sample, particularly in Tunisia.

varying covariate for whether an individual is currently enrolled in school. Mother's education and father's education are included categorically as well. Because few mothers worked, no controls are included for mother's employment status. Father's employment status and occupation when the individual was 15 are included as important measures of socio-economic status. The various LMPSs capture this information even when the parent is not in the household through a series of questions on these issues. Further family controls include the number of brothers and sisters, collected retrospectively, to account for any resource competition. Time trends are captured with a series of five-year-period dummies. Region (of birth) is incorporated, along with urban/rural location at birth⁵ (in combination with region in Egypt (as is typical)).

In the 3SRI models, public sector work versus all other statuses is examined. For 3SRI estimation, the categorical regions are further broken down to be on the level (typically governorate and urban/rural⁶) at which the instrument was estimated, and controls are included for each year (rather than in five-year categories as before) to further ensure the instrument's (conditional) exogeneity. As mentioned previously, all models include a series of dummies for the different ages to model the baseline hazard of marriage at each age. Because the hazards are very low at very young and old ages (sometimes, in the sample, zero), ages less than 18 are combined with the dummy for eighteen, and ages greater than 35 are combined with the dummy for age 35, but no observations are dropped.

For the panel analyses, we draw on the fact that we have wage data in 1998 and 2006 for a subset of individuals who were observed in the ELMPS 2012 round. We calculate a standardized log-wage variable measured in standard deviations from the mean to center the data and reduce the influence of outliers. We treat those who do not have wages as falling at the mean (zero, since the variable is standardized).⁷ Thus, the impact can be interpreted as being an atypically high or low wage earner. So long as an individual remains in the same employment status as with their 1998 or 2006 waged job, we map wages forward and backward in time under the assumption that (relative) earnings are fairly constant over time.

In additional models, we further exploit the data we have on marriage costs for those who have married to try to disentangle whether employment and earnings are primarily facilitating savings for marriage. For married individuals 18-39 in the 2012 ELMPS, data are available on a number of elements of the costs of marriage, which we transform into total costs, as well as the share of the bride, the groom, the bride's family, and the groom's family in contributing to the costs. We transform total costs into log total costs, and identify the contributions of the bride, groom, and their families in terms of "own" contributions (bride if female, groom if male) and family contributions (the remainder being the contributions of the spouse and her or his family). For married women ages 15-60 in the JLMPS, data are also available to estimate total costs. Because of traditions around who pays for what elements of the marriage in Jordan, information on cost shares is only available for housing, and on the bride's side only for the bride's family, on the assumption that the bride herself does not contribute anything. Furthermore, in the Jordan survey, marriage costs are only collected from women, whereas in Egypt, we have information from both men and women. For both Egypt and Jordan, it is important to keep in mind that these results

⁵ Not available in Jordan.

⁶ In Tunisia because of small sample sizes a number of neighboring governorates are combined.

⁷ Because we are controlling for labor market status (including being non-waged), the impact of not having a wage will be absorbed by labor market status, and setting the non-waged to have the mean (zero) wage will not drive the wages coefficient.

pertain only to those who had married by the time of the survey, and thus those who married early are disproportionately represented in this sample.

4. Results

In presenting the results, we first present descriptive results on the structure and evolution of employment and the level and evolution of age at marriage. We then present the hazard models for the timing of marriage, followed by investigations of potentially mediating factors, such as wages. Subsequently the 3SRI models that account for the endogeneity of public sector employment are presented. These models are followed by simulations of the potential tradeoffs in relation to the timing of marriage involved in queuing in unemployment to obtain better (public sector) jobs versus an informal job (for men) or remaining out of the labor force (for women).

4.1 Structure and evolution of employment

There are a number of important differences in how the labor markets of Egypt, Jordan, and Tunisia are structured. There are different patterns of participation in the labor market in each country, particularly for women. Figure 1 shows, at the time of each survey, the labor market status for individuals aged 15-59 who were not in school by sex and whether they had ever married. The majority of males are employed in all three countries, particularly once they are married (from 86% in Jordan to 96% in Egypt). Being out of the labor force and especially being unemployed is more common among unmarried than married men. While a small share (1%-3%) of married men are unemployed, higher shares of unmarried men are unemployed (9% in Egypt up to 18% in Tunisia). Note that these numbers are *not* unemployment rates but unemployment to population ratios. Jordan has a high share of married men out of the labor force (10%), likely due to patterns of early retirement among males in Jordan (Al Hawarin, 2014). These patterns corroborate the fact that men must transition into work before they can transition into marriage.

Women, in contrast, are primarily out of the labor force in all three countries, and more so once they are married. Comparing across the three countries, 25% of unmarried women in Egypt are employed, compared to 33% in Jordan and 35% in Tunisia. Once married, just 13% of women are employed in Jordan, followed by 20% in Egypt and 21% in Tunisia. Thus, women sometimes work before marriage, but work is still undertaken by a minority of women, even before marriage. A substantial share of unmarried women is also unemployed, ranging from 12% in Jordan to 15% in Tunisia. Once married, women are primarily outside of the labor force. Thus, overall, the typical role for adult men is employment, whereas adult married women are most commonly homemakers.

Among the employed, there are some common relationships in terms of employment status by sex and marital status (Figure 2). Here we distinguish between public sector employment, private formal wage work (with either a contract or social insurance), private informal wage work, and non-wage work. For unmarried men, the most common status in Egypt is private informal wage work (58%), which is also relatively common in Jordan (38%) and Tunisia (41%). Jordan has the largest share of public sector work for men (34% for married, 35% for unmarried), whereas fewer men and especially fewer unmarried men work in the public sector in Egypt and Tunisia, reflecting the curtailment of public sector hiring in these countries since the 1980s. Among men, private formal wage work is rarest in Egypt (11% among the unmarried and 14% among the married). The remaining men are most commonly engaged in non-wage work, around a quarter of men except unmarried men in Jordan (8%).

Among the women who work, in Egypt, public sector employment is the most common type of work for both unmarried (35%) and married (54%) women. While 25% of employed unmarried women in Egypt engage in private formal wage work, and 23% in private informal wage work,

almost no married women do so (4% in private formal, 8% in private informal). The remainder of employed married women in Egypt are in non-wage work (34%). In contrast, in Jordan and Tunisia, although around a quarter of unmarried women are in public sector wage work, the most common status for unmarried women is private formal wage work (43% in Jordan, 35% in Tunisia), followed by a quarter in private informal wage work (similar to Egypt). More employed married women, around a fifth, engage in private formal wage work, and more (12%-16%) are in private informal wage work in Jordan and Tunisia compared to Egypt. However, public sector work is still the most common form of work for employed married women in both Jordan (56%, similar to Egypt) and Tunisia (33%). Tunisia has more employed married women in non-wage work (27%, similar to Egypt) than Jordan (12%). Overall, employed married women are concentrated in public sector work, with fewer in private wage work, especially in comparison to unmarried women, and particularly so in Egypt. Women who cannot obtain public sector work are particularly likely to decide not to work at all, or to obtain private informal jobs before marriage but leave that kind of work at marriage (Assaad, Krafft, & Selwaness, 2016). A few in Egypt and Tunisia can engage in self-employment or unpaid family work after marriage, but this is quite uncommon in Jordan.

The structure of employment has evolved substantially over time in all three countries, in ways that may affect the ability of youth to transition into adult roles. Figure 3 shows how the distribution of first jobs has been changing by year of entry into the first job. Especially in Egypt and Jordan, and even more so for women, the public sector was historically a large employer, and has provided a declining share of first jobs. For instance, more than 60% of women in Jordan who obtained their first job in 1970 worked in the public sector; by the 2000s this was only around 30%. In Egypt, it has largely been private informal wage work, and very little private formal wage work that has substituted for the shrinking public sector; around 60% of men in the 2000s had first jobs that were private informal wage work. Jordan also experienced a rise in private informal wage work as public sector work declined, but was more successful in growing private formal wage work, particularly for women who end up working. In Tunisia, the public sector did not historically play such an outsize role, and private informal wage work was (and continues to be, for men) the sector of first employment. Private formal wage work became more common for women, but then declined during the global financial crisis, revolution, and post-revolutionary periods, with private informal wage work supplanting private formal wage work for women during these periods. Overall, the relatively higher quality formal or public sector jobs that are preferred by youth, and especially women (Barsoum, 2015), have become distinctly rarer in Egypt, stagnant for men in Tunisia but rising and falling for women, and have shifted from public to private formal for Jordan.

4.2 Timing and universality of marriage

Before discussing how employment affects marriage for men and women in MENA, we first examine the patterns of marriage, both in terms of the universality of marriage and its timing, as well as how the timing of marriage has evolved over time. Figure 4 shows the Kaplan-Meier functions for the proportion of men and women married by each age, by country, using the sample of individuals ages 15-59 at the time of the survey. In terms of the prevalence or universality of marriage, in Egypt, marriage remains essentially universal for both men and women, with more than 95% ultimately marrying by age 40. In Jordan, marriage is nearly universal for men, but not so for women, 15% of whom remain unmarried at 40 and beyond. In Tunisia, marriage is less than universal for both men and women, with around 20% of men still unmarried at 40 and 22% of women. These proportions continue to fall very slowly beyond the age of 40 for both men and women, but never approach a level that could be considered universal.

The timing of marriage varies substantially by gender, as well as by country. The groups that marry the earliest are women in Egypt, with a median age at marriage of 21, and women in Jordan, with a median age at marriage of 22. The median age of marriage for men in both Egypt and Jordan is 27. Both countries have a substantial age gap between men and women. There is also an age gap in Tunisia, but later marriages as well, with a median age of marriage of 27 for women—the same as men in Egypt and Jordan—while men there have a median age of marriage of 33. The relative similarities or disparities represented in the median ages at marriage persist throughout the distributions, after accounting for differences in the universality of marriage (Figure 4).

In Figure 5, we present the baseline hazards corresponding to marriage at each age and the confidence intervals from a hazard model with only ages and no covariates. Recall that the hazard is the probability of marrying at a particular age, conditional on not yet having done so and thus the hazards sum to more than one. Hazards for eighteen and below are estimated together and likewise for 35 and above. Consistent with Figure 4, the hazard of marriage is low early for men in all three countries and rises steadily. While the hazard remains essentially constant and high from age 30 onwards for men in Egypt and Tunisia, the hazard peaks at 29 and then falls somewhat for men in Jordan. Women in all three countries experience hump shaped hazards that rise early, with hazards peaking earlier in Egypt (25) and Jordan (24) than in Tunisia (29), where marriages are later. Essentially in all three countries men continue to marry at later ages, but women who reach their mid-30s are no longer likely to marry, probably because of the value the marriage market places on the remaining width of the reproductive window.

The patterns of marriage timing have varied over time in each of the countries, with a number of important differences in how marriage timing has evolved. In Figure 6, the median age at marriage by year of birth is examined by sex for each country. Starting with the 1960 birth cohort, men and women had slow and small increases in the median age at marriage in Egypt. The increase in the median age at marriage reversed in Egypt, with median ages falling beginning with men born in the early 1970s and with women born in the late 1970s (consistent with the six-year age gap). The median age at marriage has now fallen substantially for men in Egypt, from 28 for those born around 1970 to 26 for those born in the mid-1980s. Reforms to the housing market increasing the availability of market-rate rentals may have played an important role in falling ages at marriage in Egypt (Assaad, Krafft, & Rolando, 2016; Assaad & Krafft, 2015a; Assaad & Ramadan, 2008). While women in Jordan have experienced increasing and then flattening median ages at marriage, for men the trend has been flat or only slightly increasing. Tunisia, in contrast, has experienced larger increases in the median age at marriage since the 1960s birth cohorts, with women's median age increasing from around 23 to almost 28 before flattening or falling very slightly for the most recent birth cohorts. Likewise, Tunisian men have had rising median ages from 28 to almost 33 before a similar flattening. The recent trend towards earlier marriages in Egypt, and to a lesser extent Jordan and Tunisia, has intriguing economic and social implications, as it may increase fertility (Krafft & Assaad, 2014) and represent either improving abilities to achieve the economic pre-requisites to marriage, or diminished expectations for those pre-requisites.

4.3 Determinants of marriage timing

Although the age of marriage has, at least, stopped increasing in all three countries, there is still considerable public anxiety around the institution of marriage and the ability of young people to marry in a timely fashion in the region (Salem, 2014, 2015, 2016b; Singerman, 2007). In this section, we explore a number of factors that may determine the timing of marriage, with a particular focus on the role of employment and the characteristics of employment in facilitating or delaying the transition to marriage, and thus adulthood, for young men and women. Initially, we

present the discrete time proportional hazards models for marriage timing with a large number of covariates as controls, but do not account for the potential endogeneity of work and its characteristics. We then explore what aspects of employment may drive the impact of different job types, specifically job characteristics versus wages and savings behavior, exploiting the Egyptian panel data. In the subsequent section, we work to examine and account for the potential endogeneity of employment and specifically high-quality (public sector) employment.

Table 1 presents the discrete time proportional hazards models, showing hazard ratios. Hazard ratios are centered at one, and can be interpreted as a relative risk, that is, how much more (or less) likely an individual is to get married, compared to the reference (baseline hazard) individual. Hazards greater than one indicate an individual is more likely to marry at each age; hazards less than one indicate an individual is less likely to marry. The transformed standard errors are presented based on the delta method, and can approximately be used to evaluate significance in terms of deviations from one. So, for instance, in Egypt the hazard ratio for males for having a public-sector job is 1.369; this means that having a public-sector job increases the chance of marrying at each age by about 37%, compared to the omitted category of private informal wage work. As in Egypt, men in the other two countries have a significantly higher probability of marrying at each age if they obtain a public-sector job, by about 28% in Jordan and 41% in Tunisia. Private formal wage jobs significantly increase the hazard of marriage in Egypt for men by 19%, suggesting the formality and security of these jobs is valued on the marriage market, although not so much as public sector employment. There are not significant differences for men engaged in private formal wage work compared to informal work in Jordan or Tunisia, although the hazard ratio in Tunisia is positive and of a similar magnitude to Egypt. Non-wage work is not significantly different from private informal work for men, but being unemployed and especially out of the labor force significantly reduces the hazard of marrying for men, compared to private informal wage work. Overall, for men, being employed is a more important factor than the type of work one does. However, being employed in the public sector particularly speeds up the transition to marriage compared to other types of work. The benefit of public sector work in speeding up marriage is not solely due to its formality, as private formal work has a smaller but also significant impact in Egypt.

For females in all three countries, compared to the “default” of being out of the labor force, women engaged in public sector wage work are significantly more likely to marry at each age, by 12% in Egypt, 31% in Jordan, and 97% in Tunisia. For Egyptian women, compared to a reference category of being out of the labor force, private formal wage work and especially private informal wage work are associated with a lower hazard of marriage. Private informal wage jobs have a particularly low hazard ratio for Egyptian women, 0.401, a nearly three-fifths reduction in the probability of marrying. Non-wage work has a significant but smaller delaying effect for Egyptian women, but there is no difference between being unemployed or out of the labor force. For Jordanian women, there are smaller reductions in the hazard of marrying for private formal work as compared to being out of the labor force, but also large reductions related to private informal wage work (0.509 hazard ratio) as in Egypt. Non-wage work has a similar but insignificant hazard ratio as in Egypt, while being unemployed significantly reduces the hazard of marriage for females in Jordan, as compared to being out of the labor force. In Tunisia, private formal wage work and private informal wage work are associated with small and insignificant reductions in the hazard of marriage, non-wage work is similar to being out of the labor force, and being unemployed significantly increases the hazard of marrying. Overall, for women, public sector work is associated with earlier marriage, as with men, but other types of work, especially private wage work, are associated with later marriage compared to being outside the labor force. This may be because women only undertake

these forms of work when they need to help pay for marriage or when they have limited marriage prospects available.

Other covariates are as expected; those in school have a significantly lower hazard of marrying. Compared to illiterates, those with education have a lower hazard of marrying, typically to an increasing extent with additional education, although differences vary by sex and country. Family socio-economic background is important but complicated. Having more educated parents is associated with later marriage, suggesting greater aspirations for a better marriage match, but certain paternal employment statuses and occupations are associated with faster marriage, which may be due to access to greater resources to finance marriage. Some sibling competition for resources appears to occur, with patterns particularly driven by the number of sisters. In all three countries even after controlling for other characteristics, there are strong cohort trends, displaying the same sort of rise and fall in the age at marriage we saw in the descriptive data for Egypt, along with later but potentially stabilizing ages at marriage in Jordan and Tunisia.⁸ Compared to the capital regions of each country (namely Greater Cairo, Central Jordan, and Northern Tunisia), other regions in Egypt tend to have higher hazards of marriage, while other regions in Tunisia and Jordan have a mix of relationships.

4.3.1 Dynamics of employment and marriage timing

In the following sections, we work to better understand the relationship between employment and marriage. We begin in this section by investigating the dynamics of employment and marriage timing. Specifically, in Table 2 we include both concurrent labor market status and lagged labor market status, to investigate whether it is obtaining a job, or having held a job (likely for some time) that drives the employment relationships we see. It must be kept in mind that because labor market statuses are highly persistent, multi-collinearity can be expected to inflate the standard errors. Notably in Egypt and in Jordan it appears to be the concurrent effect of obtaining a job in the public sector that is associated with faster marriage for men. In Tunisia, it appears to be having held a public-sector job that drives the relationship, rather than obtaining one that year. This suggests that the future benefits of such work drive its impact in Egypt and Jordan, whereas in Tunisia public sector work may enable the accumulation, over time, of the resources necessary for marriage. For women, almost all concurrent employment statuses have a significant negative effect on the changes of marrying. In contrast, having held a job previously significantly increases the probability of marrying for most types of work. This corroborates the hypothesis that, for women, work is a resource accumulation strategy. Being in work, especially informal wage work, is related to a lower chance of marriage, but having undertaken that work previously enables marriage. This result also further underlines the likely reverse causality relationship for women; the fact that women are less likely to marry when they currently hold a job but more likely to marry when they have held a job in the past means women may work while seeking partners and accumulating resources, and then quit in advance of marrying.

4.3.2 Wages, job characteristics, and savings as drivers of marriage timing

Job security, prestige, higher wages, or other benefits associated with public sector or formal jobs may be beneficial for signaling readiness for marriage, particularly for men. In this section, we try

⁸ To further investigate changes over time in the marriage market, we interacted a “1990+” dummy, as an important structural break in the labor market, with employment statuses. For men in Egypt, private formal wage work pre-1990 was equivalent to private informal wage work. While the effect of public sector work remained the same, in the 1990 period onwards private formal wage work accelerated marriage. In Egypt, pre-1990 non-wage work accelerated marriage, but there was a negative and significant interaction between being a non-wage worker and the 1990+ period. There were not clear or significant patterns in Jordan and Tunisia for men (possibly driven by smaller sample sizes). For females, the only significant interaction was in Egypt where 1990+ informal wage work delayed marriage to an even greater extent than in the pre-1990 period.

to unpack these alternative explanations, exploiting the Egyptian panel data and retrospective information on marriage costs in Egypt and Jordan. In the “wage” models of Table 3 we include previous round wage data from Egypt to see if it changes the impact of different employment types relative to Table 1. Essentially none of the employment effects appear to be mediated through wages, as hazard ratios remain similar. Notably, wages have a hazard ratio slightly below 1 and are insignificant for males. For women, higher wages accelerate the timing of marriage, with a hazard ratio of 1.253, suggest that a one standard deviation increase in wages is associated with a 25% increase in the hazard of marriage. It may be that when costs and savings are a barrier to marriage, higher wages in work can help women marry sooner.

The “sample” columns of Table 3 are restricted to married individuals 18-39 in Egypt and married women 15-60 in Jordan due to the fact that data on costs of marriage and cost shares are only available for those who were ever married. While there are slight shifts in the hazard ratios of labor market status for men (which appears to be driven by the sample), the results are nearly identical for women as in previous models. Among the married sample, the impact of wages for women becomes insignificant and smaller. Notably, higher total costs of marriage delay marriage significantly for both men (hazard ratio of 0.792) and women (hazard ratio of 0.847 in Egypt and 0.094 in Jordan). Greater aspirations for living conditions at marriage are likely to be embedded in these costs. This interpretation is borne out by reductions in the delaying effects of better family socioeconomic status (not shown). Once costs (aspirations) are accounted for, a better socioeconomic background does not delay marriage as much.

As expected, greater family contribution to the costs of marriage speeds up marriage for both men and women in Egypt: an increased hazard of 0.3% to 0.4% for each percentage point increase in family contributions. In Jordan, an increase in a woman’s family’s share of housing costs delays marriage, but because own share is not available this may be driven by the bride and her family having to contribute. The hazard ratio of own share is insignificant for men in Egypt, but less than one and significant for women in Egypt. Brides typically contribute little of their marriage costs, and may only do so in situations where marriage has been delayed due to shortfalls in the resources contributed by others. Overall, savings and wages may play some role in mediating the impacts of marriage, but the prestige and other benefits of public sector jobs appear particularly important, an issue we explore further in correcting for endogeneity in the subsequent section.

4.3.3 Determinants of marriage timing accounting for the potential endogeneity of employment

A major concern with considering the impact of work on marriage timing is the endogeneity of work. Omitted variables such as aspirations for adulthood or gender role attitudes may drive both employment status and marriage timing. Reverse causality may occur when individuals change labor market statuses in anticipation of marriage. We therefore estimate our 3SRI models, with the share of public sector work in the local labor market and its lag as instruments. To start, we show the first stage of the 3SRI models in Table 4, specifically the probit marginal effects of the two instruments on the probability that the individual is working in the public sector in a given year. As before, the data are in the form of individual-year observations. A percentage point increase in local public sector work increases an individual’s probability of public sector work between 2.4 and 11.7 percentage points (p.p.). The marginal effects for males are similar across countries, ranging from 6.6 p.p. in Tunisia to 7.7 p.p. in Jordan. For females, the instrument has insignificant predictive power in Jordan, but predicts 11.7 p.p. higher chances of public sector work for women in Egypt and 6.8 p.p. higher in Tunisia. Unsurprisingly given the dynamics of public sector

employment, the lagged local public sector work opportunities tend to be negative, smaller in magnitude, and usually significant.

A concern with any model using an instrument, regardless of whether two- or three-stage methods or residual inclusion or predictor substitution methods are used, is the strength of the instrument. Because a probit model is used initially in the first stage, the resulting test statistic for local public sector employment opportunities and their one period lag is a Chi-square statistic. Table 5 presents the chi-square statistics from this first stage test for each of the countries, by sex. The second stage, using the predicted value from the first stage in an OLS regression, generates an F-statistic, which is also presented. In most cases, particularly for males, the instrument is strong, with p-values for the Chi-square statistic less than 0.001 in Egypt and Jordan and a p-value of 0.009 in Tunisia. For females, while the instrument is strong in Tunisia and Egypt ($p < 0.001$), it is weak in Jordan ($p = 0.216$). The F-tests in the second stage are all large (the smallest F-statistic, for females in Jordan, is 52) and all have p-values less than 0.001. In the case of weak instruments, if endogeneity was biasing results, the estimates resulting from the application of the weak instruments will still be biased towards the uncorrected estimates. This caution must be kept in mind when considering the results shown in Table 5.

The key results of the 3SRI model, namely the impact of public sector work on employment and its endogeneity (as captured by the residual), show a number of interesting differences from the results of the simple discrete time proportional hazards model (see Table 6). We present first a series of models (“restricted sample”) that compare public sector work, as a dummy, to all other statuses, restricted to the same sample as is used for the 3SRI models. In every case, public sector work has a statistically significant hazard ratio greater than one, indicating that public sector work speeds up marriage relative to other statuses. For men, the hazard ratios are higher than in the basic discrete time proportional hazards model presented in Table 1, since being unemployed and out of the labor force, which delay marriage, as well as other employment statuses are aggregated in the reference group. For women, the hazard ratios are generally similar to those in Table 1, since not working does not have the same delaying effect on marriage as it does for men. These “restricted sample” models have not been corrected for endogeneity and can be compared to the 3SRI model, which uses the 3SRI method to correct for endogeneity, in Table 6.

After instrumenting, for males, only in Egypt does public sector work significantly accelerate marriage (hazard ratio of 8.881). The residual is less than one and also significant, indicating that the men who obtain public sector jobs would, for unobservable reasons, otherwise marry later. The residual is essentially a test of endogeneity; public sector work for men in Egypt is endogenous to marriage decisions. Although we have controlled for social class to some extent with parents’ education and father’s employment, since public sector jobs are increasingly linked to better socioeconomic status in Egypt (Assaad & Krafft, 2014), this relationship may be driving the endogeneity of public sector work for men in Egypt. For males in Jordan, the hazard ratio for public sector work is less than one (0.797) and insignificant; the hazard ratio on the residual is greater than one but insignificant. Public sector work does not aid marriage in Jordan nor is it endogenous. In Tunisia, while the hazard ratio for public sector work is greater than one (2.002) and the residual less than one, suggesting a similar pattern to Egypt, neither is statistically significant.

For women in all three countries, the hazard ratio on public sector work is greater than one and is substantially larger in the 3SRI models than the uncorrected models. Hazard ratios on public sector work range from 6.912 in Egypt to 13.631 in Jordan. The residual is less than one, suggesting the unobservable characteristics, potentially including gender role attitudes and aspirations for adult

living conditions, that predispose women towards public sector work lead them to delay marriage. The hazard ratio on public sector work is significant, using the bootstrapped standard errors, in Jordan ($p < 0.001$) and Tunisia ($p = 0.019$), but not quite in Egypt ($p = 0.102$). The residual is significant only in Jordan ($p < 0.001$) but not in Egypt ($p = 0.114$) or Tunisia ($p = 0.061$). Although of mixed significance, the results suggest that public sector work accelerates marriage, to a substantial extent, for women in the region, and that the decision to work is endogenous to the decision to marry.

4.4 Does queuing for public sector work pay off in the marriage market?

In seeking their preferred type of employment—public sector work—youth may queue in the unemployed state. There is a great deal of evidence that unemployment in the Middle East and North Africa is largely attributable to eligible youth searching and waiting for formal employment, and in particular public sector employment, when they first enter the labor market (Assaad, 2014a). Furthermore, we have seen in this paper that in many cases public sector work may pay off in signaling readiness for marriage. In this section, we explore how queuing for public sector jobs by remaining unemployed longer may (or may not) pay off in the marriage market. Specifically, we use our preceding models to simulate the median age at marriage for youth depending on how long they spend in unemployment and if they obtain a public-sector job. Both the probability of obtaining such a job and how long youth would have to queue to obtain it will affect whether queuing pays off in the marriage market.

The simulations are run for a secondary graduate, who was in school until age 18, has a secondary-educated mother and secondary-educated father, and whose father is a self-employed professional. The individual is located in Cairo for Egypt, Amman for Jordan, and Tunis for Tunisia. She or he has two brothers and two sisters and was born 35 years before the survey round. We use the predicted probabilities from the various models over ages 15 up to 40 as the hazards to simulate a survival function, and identify the median age at marriage based on that survival function. The results using the discrete time proportional hazards models are presented in Figure 7, while the results using the 3SRI model are presented in Figure 8. In the discrete time proportional hazards model, if the individual queues but does not obtain a public-sector job and at some point “gives up,” we assume that a man gets a private informal wage job and a woman remains out of the labor force. For the 3SRI model obtaining a public-sector job is compared to not obtaining such a job (including both working and non-working statuses). The 3SRI model residual is set to zero (the mean). The profiles we simulate spend between zero and six years unemployed, the latter being on the high end of queuing, but not uncommon in Tunisia (Assaad & Krafft, 2016), before they may or may not succeed in attaining a public-sector job.

Looking first at the simulations from the discrete time proportional hazards model without correction for the endogeneity of employment, two comparisons are important. First is the impact of immediately getting a public-sector job versus getting an informal job (for men) or leaving the labor force (for women), after zero years unemployed (the first set of columns in each panel of Figure 7). For men immediately getting a public-sector job allows them to marry at a median age of 29 in Egypt, 28 in Jordan and 29 in Tunisia. Immediately getting an informal job would raise the median age of marriage to 30 in Egypt, 29 in Jordan and 31 in Tunisia. For men, informal wage work is assumed to be readily available as an alternative to queuing, so queuing pays off as a strategy in the marriage market only if it accelerates the timing of marriage relative to immediately obtaining informal wage work. In Egypt, men can spend up to six years unemployed and still marry at the same age (30) as those who immediately transition to informal wage employment so long as the queuing ends in a public-sector job. Queuing slightly accelerates the marriage process, to age

29, if a public-sector job is obtained within five years. In Jordan, a similar pattern pertains. Jordanian males can remain unemployed up to three years and still marry at the same median age (29) as those who immediately accept informal employment if their unemployment eventually leads to a public-sector job. For men in Tunisia, the median age at marriage for ending up in private informal work, regardless of queuing, is 31. The median age for those who queue for 0-2 years in the unemployment state and then get a public-sector job is 29 and for those who queue 3-6 years it is 30. Thus, from the perspective of marrying earlier, it always pays to queue in Tunisia if there is some assurance that the queuing will result in a public-sector job.

For women in Egypt, immediately obtaining a public-sector job or ending up out of the labor force result in a similar median age at marriage of 24. Remaining unemployed for up to 4 years does not raise the median age of marriage so long as it ends in a public sector job, but eventually long unemployment durations for women raise the median age by one year.⁹ For women in Jordan, getting a public sector job immediately predicts a median age of marriage of 21, compared to 22 for being out of the labor force, but the profiles converge thereafter to marrying at 22 or 23. For women in Tunisia, because both unemployment and being in the public sector accelerate marriage compared to being out of the labor force, there is a diminishing gap in median age at marriage as time spent unemployed increases. There is a median age of 23 for obtaining a public-sector job throughout, and for being out of the labor force, the median age falls from 26 years (zero years unemployed) to 23 (4-6 years unemployed). From a perspective of accelerating the transition to adulthood, queuing for public sector jobs multiple years is a viable strategy, especially for men, so long as queuing actually results in a public-sector job. However, all of these results are without endogeneity corrections and, particularly for women and men in Egypt, may be driven by reverse causality or omitted variables.

Turning now to results from the endogeneity-corrected 3SRI models in Figure 8, note that because the results are comparing public sector work to everything else, the comparator individual who does not obtain public sector work has the same median age at marriage regardless of how many years he or she is without public sector work. This somewhat exaggerates the effect of public sector work, particularly for men in Egypt. As a strategy, queuing accelerates marriage for both men and women in Egypt, even if they spend up to a six-year spell spent in unemployment but eventually obtain public sector employment. For men who obtain a public-sector job immediately after graduating, the median age at marriage is 24, compared to 32 for not obtaining a public-sector job. Obtaining a public-sector job even after six years of unemployment still results in a lower age at marriage (27) compared to not obtaining public sector employment. For women, the median age at marriage for those who never obtain public sector employment is 25. If they immediately obtain such employment, it goes down to 21, and rises steadily to 25 if they must wait 5 or 6 years for such employment. In Jordan, where the 3SRI estimates were insignificant for men and showed public sector work slightly delaying marriage, those who obtain a public-sector job marry at 30, those who do not at 29, regardless of queuing. For women in Jordan, those who obtain public sector jobs immediately have a median age of marriage of 20; this age goes up to 21 for all other profiles. In Tunisia, the median age at marriage is 33 for men who do not obtain a public-sector job, and 29 for those who must queue for up to 2 years for such a job. The median age goes up to 30 for those who must queue 3-6 years, still well below those who never obtain such work. For women in Tunisia, those who never obtain public sector jobs marry at 26, while those who get a public-sector job immediately or within one year have a median age of marriage of 21. For

⁹ Again, the direction of causality here is not clear. Women who do not marry soon for other reasons may simply remain among the ranks of the unemployed longer. Those who marry generally leave the unemployment state by exiting the labor force altogether.

Tunisian women who eventually obtain public sector employment, the median age of marriage rises steadily with queuing time, but it takes up to six years of queuing to reach the median age of marriage of those who never obtain such employment. Thus, the endogeneity corrected estimates suggest that in all cases except that of males in Jordan, queuing for public sector employment, even for as long as six years, may be a viable strategy for accelerating marriage so long as there is some assurance of obtaining such employment after queuing.

5. Discussion and Conclusions

Marriage in the Middle East and North Africa is a critical stage in the life course marking the completion of a young person's transition to adulthood. There has been considerable public anxiety about the delays in marriage that young people experienced in recent years. In Tunisia, the median age at marriage had risen to 33 among men and 28 among women, before stabilizing or falling slightly very recently. Marriage in Tunisia is no longer universal among either men or women. Median ages at marriage had been rising sharply in Egypt as well, reaching a maximum of 28 for men born in the early 1970s but falling back to 26 for men born in the 1980s. This reversal occurred for women in Egypt as well, but was less pronounced than for men. In Jordan, the increase in male age at marriage was more moderate, but female age at marriage rose substantially. While the increase in female age at marriage is fairly typical in other regions of the world experiencing modernization and development, the increase in the male age at marriage is more specific to MENA (Lloyd, 2005). Although these increases can be partly attributed to rising educational attainment and growing aspirations among young people for independent living arrangements and more modern lifestyles at marriage, they have also been explained by the growing difficulty of young men to signal their economic readiness for marriage in a changing economic environment.

Previous research on Egypt and Jordan has shown that access to employment does enhance the ability of youth to marry and that higher quality employment accelerates it even more (Assaad, Binzel, & Gadallah, 2010; Gebel & Heyne, 2016; Salem, 2016a). In this paper, we expand on past work in several ways. First, we extend the analysis to another MENA country, Tunisia. Second, and most importantly, we tackle the issue of the endogeneity of employment to the marriage timing decision, an issue that was not addressed in the earlier work. While the exogeneity of employment is a plausible assumption for males, who are likely to try to get the best job they can and then that determines their ability to marry, it is much more implausible for women whose employment decisions are likely to depend much more directly on their decisions regarding the timing of marriage. In either case, unobservable variables that affect both the employment decision and the timing of marriage can confound the relationship.

Our findings for Egypt confirm the previous research, which shows that, for men, both employment and the quality of that employment matter a great deal for the timing of marriage. Public sector employment in particular significantly raises the hazard of marrying in Egypt and this effect is substantially increased when endogeneity is taken into account. A similar finding is obtained for Jordan when there is no correction for endogeneity, but the finding is reversed and insignificant when endogeneity is taken into account. However, the insignificant residuals in the Jordan equation indicate that the endogeneity of public sector employment is not confirmed in that context, so that the results which treat employment as exogenous are likely to be valid. In Tunisia, like in the other two countries, having a job, and, in particular a public-sector job, significantly speeds up marriage for men. When endogeneity is taken into account, the point estimate shows that public sector employment does accelerate the transition to marriage for men in Tunisia, but the results are measured with imprecision. Like in Jordan, the insignificant residuals indicate that the endogeneity of employment for men is not supported in the data.

For women, the results suggest that employment may indeed be endogenous to the marriage timing decision. Once endogeneity is taken into account, we find that public sector employment substantially increases the hazard of marriage in all three countries, albeit with a statistically insignificant hazard ratio in Egypt. Men may place a high value in the marriage market on women's future earnings and status as public sector employees. At the same time, the unobservables associated with access to public sector employment for women appear to be reducing the hazard of marriage. This means that if endogeneity is not taken into account for women, the impact of public sector employment on the timing of marriage would be understated.

While we are only able to instrument for public sector employment, the results from the models that are not corrected for potential endogeneity for the other employment statuses are also suggestive. In Egypt and Jordan, it appears that women currently in informal private sector wage work transition to marriage at slower rates than either women in better quality employment or those who are unemployed or out of the labor force. However, previously working in informal wage work accelerates marriage. These results suggest that rather than enhancing women's value in the marriage market, informal wage work allows women to marry earlier by helping them to save and contribute to the costs of their marriage. In other work (Assaad, Krafft, & Selwaness, 2016), we find that women in Egypt leave private sector (mostly informal) wage work at very high rates upon marriage, although they remain in public sector wage work and in non-wage work. In Jordan and Egypt, we identified important relationships between costs and cost contributions and the timing of marriage, however explicitly controlling for wages, marriage costs, and cost contributions did not explain away the entire impact of employment statuses on marriage timing. In Egypt, private formal wage work was associated with faster marriage for men, but to a lesser extent than public sector work. The effects of both public-sector employment and private sector employment on the timing of marriage for women in both Egypt and Jordan remain unchanged after correcting for marriage costs and family share, suggesting that the role of employment in allowing women to contribute to the costs of marriage is a fairly minor influence on the timing of their marriage.

We also examined in this paper whether it was worthwhile from a marriage timing perspective to remain unemployed longer if such extended search and queuing increases the probability of obtaining a public-sector job. We explore the possible tradeoff between longer unemployment and job quality using simulation models based on our discrete time proportional hazards models. Using the models that are not corrected for endogeneity, we find that, in all three countries, men can search for public sector work for a number of years, remaining unemployed, and still marry earlier (if they succeed in obtaining public sector work) than if they had gone straight into private informal work. When endogeneity of public sector employment is taken into account, queuing even up to 6 years appears to be worthwhile in terms of speeding up marriage for men in both Egypt and Tunisia, but not in Jordan. Queuing for public sector work is a viable strategy for women in all three countries based on the results of the 3SRI models, subject of course to obtaining public sector work as a result of such queuing.

These findings have considerable implications for the future trajectory of the transition to adulthood in MENA. The continued informalization of labor markets and the reduced role of public sector employment will continue to limit men's ability to signal their economic readiness for marriage and this could contribute to further increases in the age at marriage. If that is the case, however, how can we explain the reversal in the rise of the age at marriage in Egypt and the slowdown of the rise in Tunisia in recent years? The reversal in Egypt has actually been linked to developments in the housing markets resulting from a change in housing policy that made rental

housing more available in Egypt (Assaad, Krafft, & Rolando, 2016; Assaad & Krafft, 2015a; Assaad & Ramadan, 2008). It could also be that the increasing scarcity of public sector jobs is causing expectations about what it takes to be economically ready for marriage to change. Marriage markets may be adjusting to the changing economic situations of young men. This complex interaction between changing expectations in the marriage market and the objective economic situation of young men makes the prognosis of future trends highly uncertain.

Finally, our findings have important implications with regards to the differential role employment plays in influencing the timing of marriage by gender. While men need to become economically ready before they can marry, women are essentially waiting for their partner of choice to become ready. Because the endogeneity of employment decisions is likely to be an issue for women, the results that do not take such endogeneity into account should be interpreted with caution due to the possibility of reverse causality and confounding by unobservables. We find that women in public sector employment marry earlier, once endogeneity is taken into account. This may be partly due to the fact that marriage markets place a premium on the future economic resources and prestige such women bring to their households, but it could also mean that working in the public sector is a favorable and socially accepted arena to meet eligible men. Further research is necessary to disentangle these varying interpretations.

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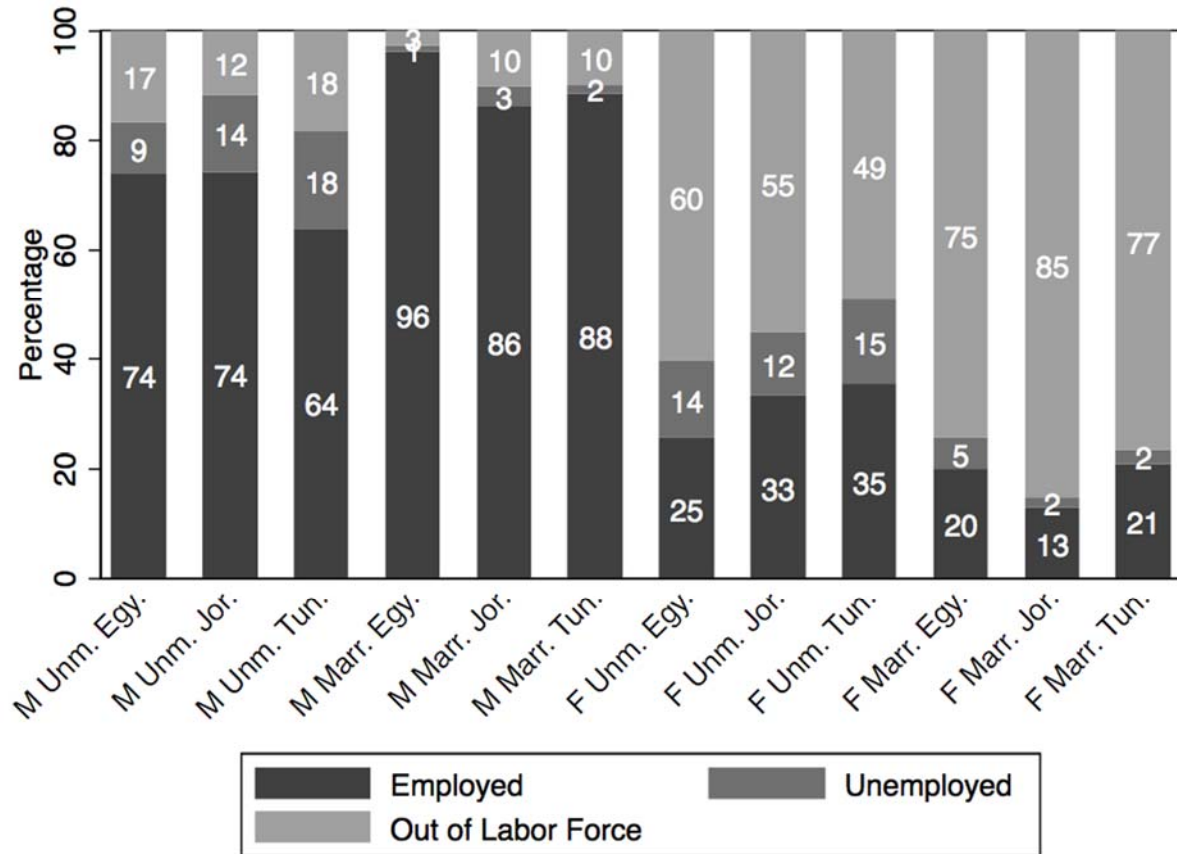
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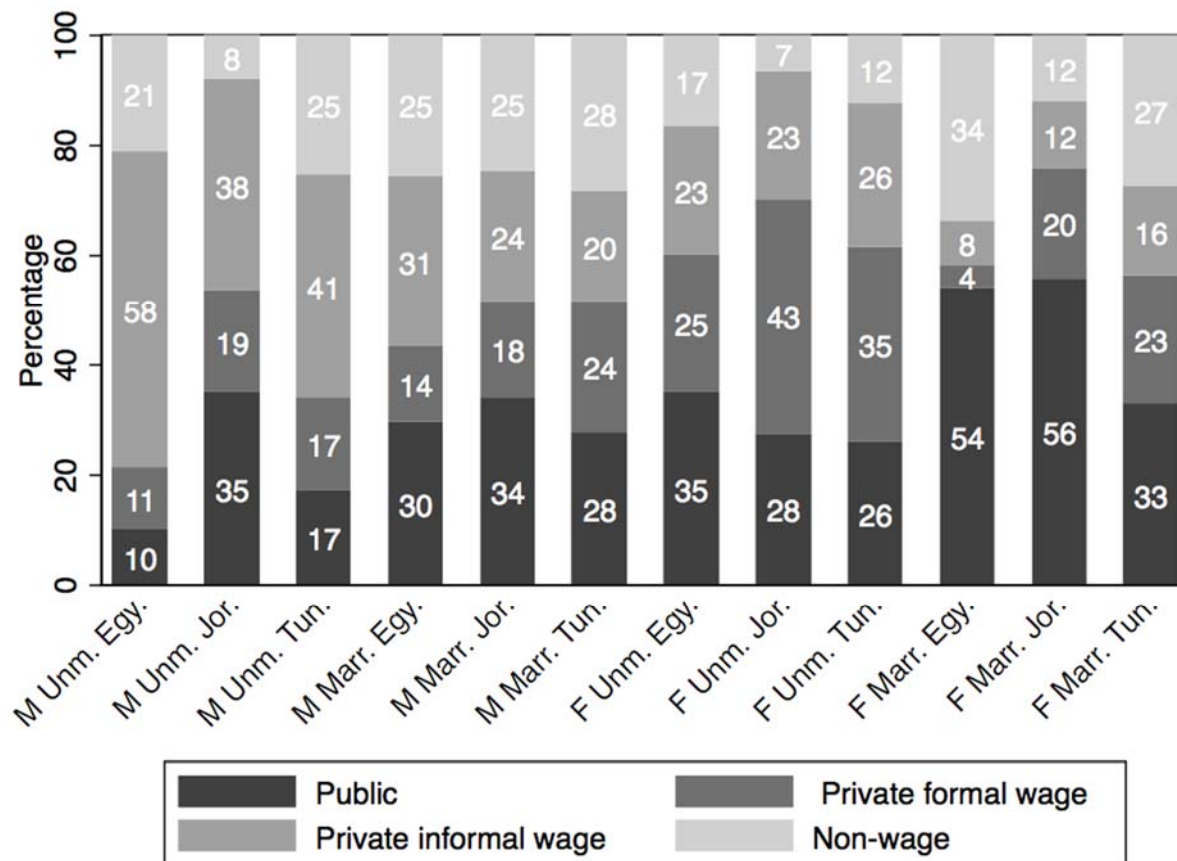
Figure 1: Labor Market Status by Sex, Ever Marrying, and Country, Ages 15-59, Not in School



Note: Employment excludes subsistence work.

Source: Authors' calculations based on ELMPS 2012, JLMPS 2010, and TLMPS 2014

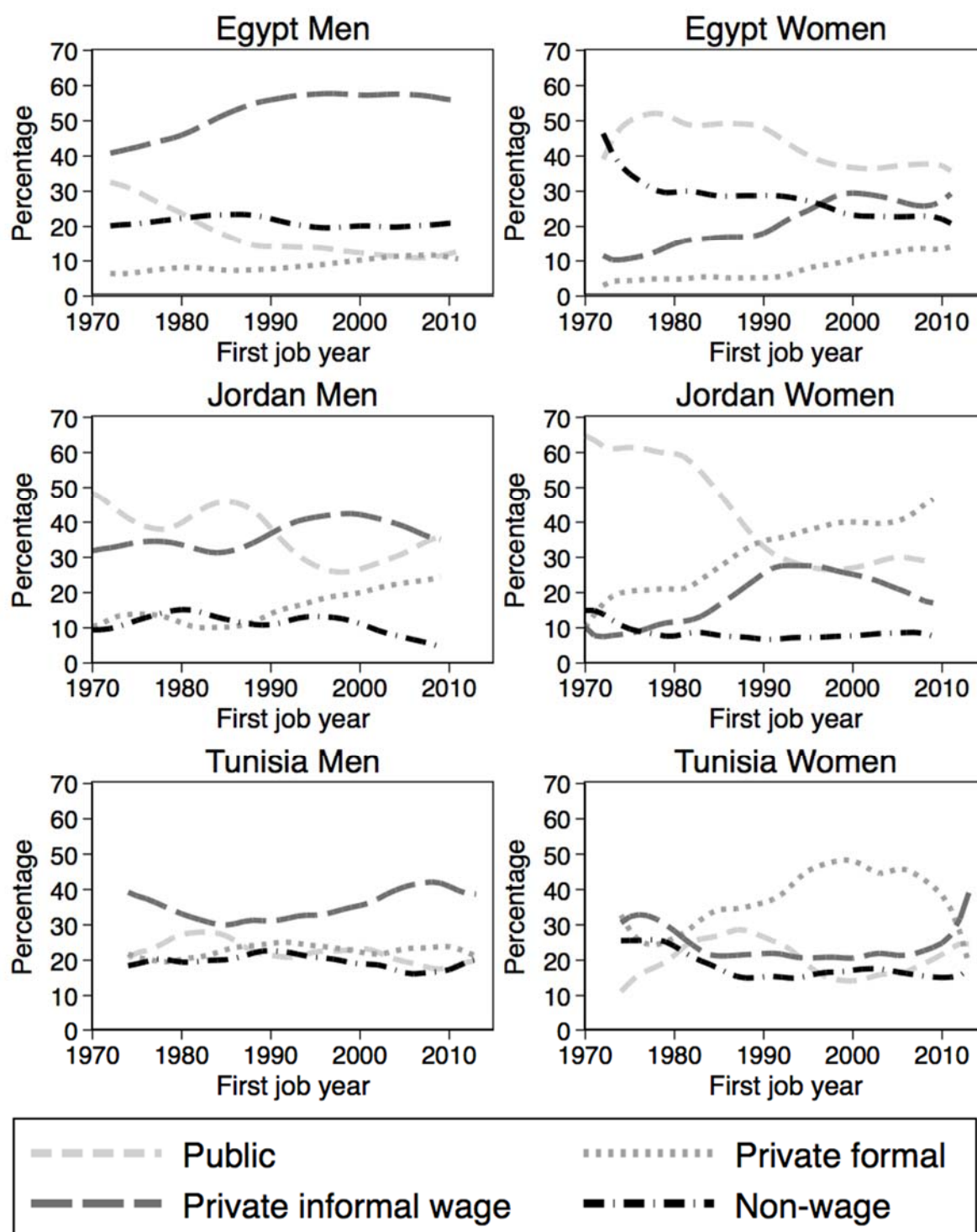
Figure 2: Employment Status by Sex, Ever Marrying, and Country, Employed Individuals Aged 15-59, Not in School



Note: Employment excludes subsistence work.

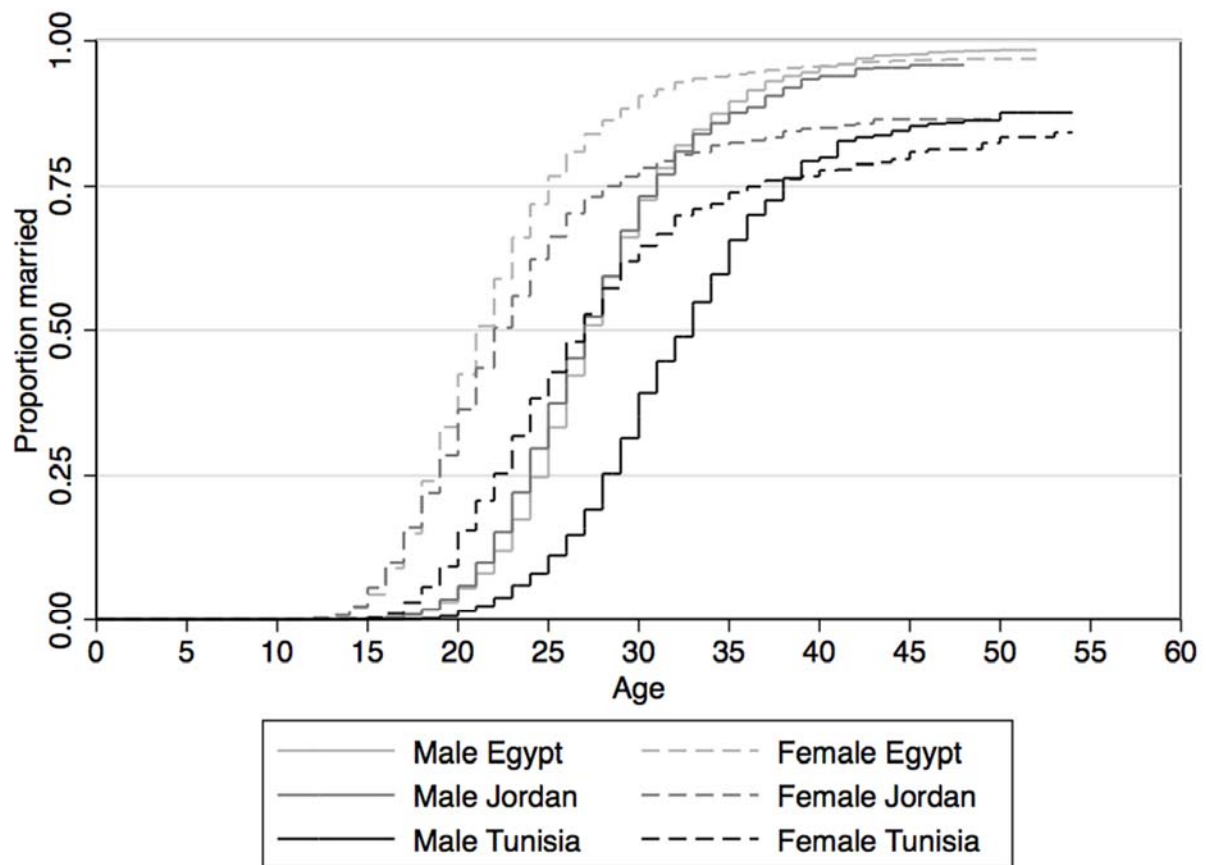
Source: Authors' calculations based on ELMPS 2012, JLMPS 2010, and TLMPS 2014

Figure 3: Evolution of First Jobs by Year of First Job, Country, and Sex



Notes: Lowess smoothed with bandwidth 0.4. Restricted to first jobs in the 40 years preceding each survey
 Source: Authors' calculations based on ELMPS 2012, JLMPS 2010, and TLMPS 2014

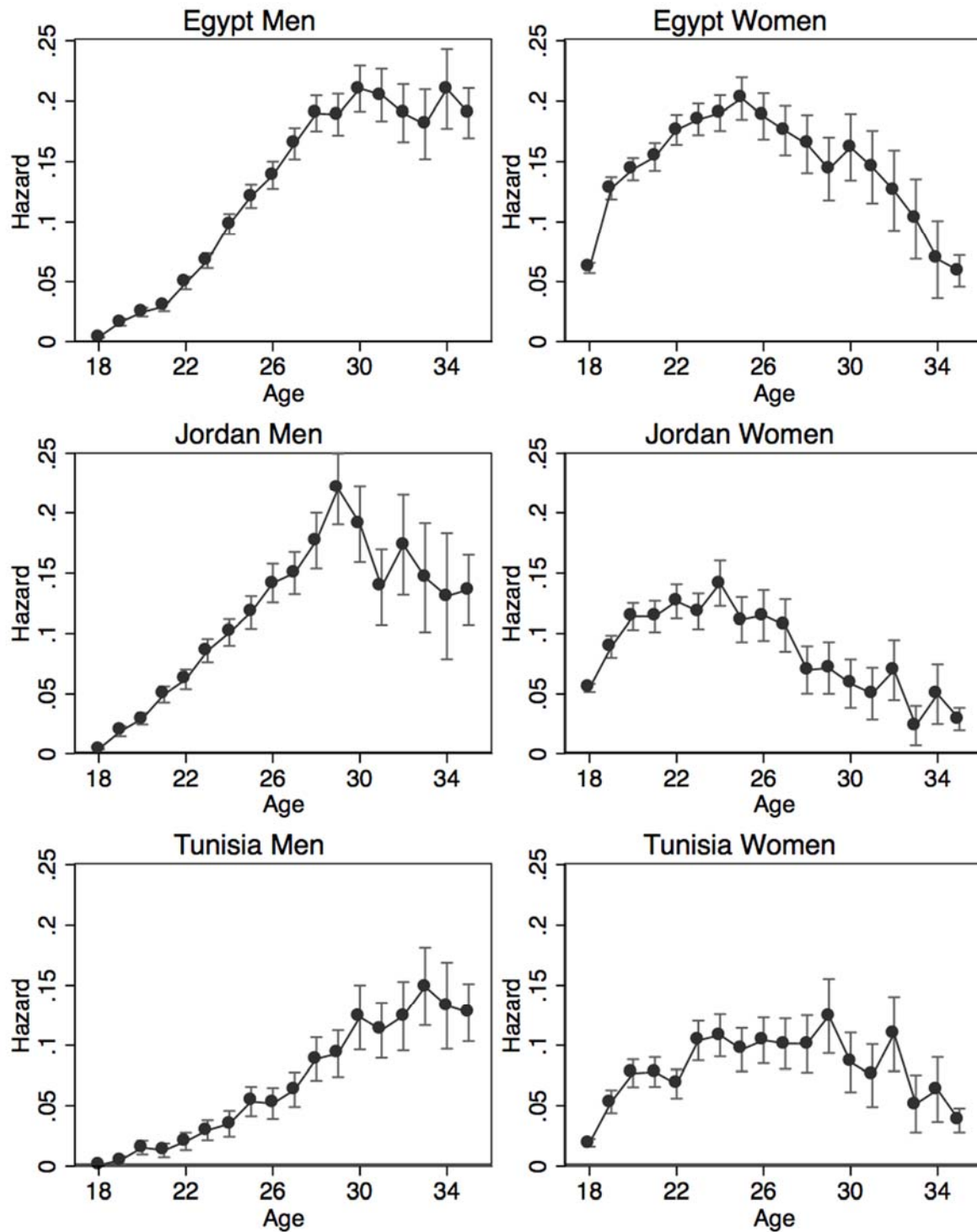
Figure 4: Proportion Married at Each Age by Sex and Country, Ages 15-59



Notes: Kaplan-Meier failure functions

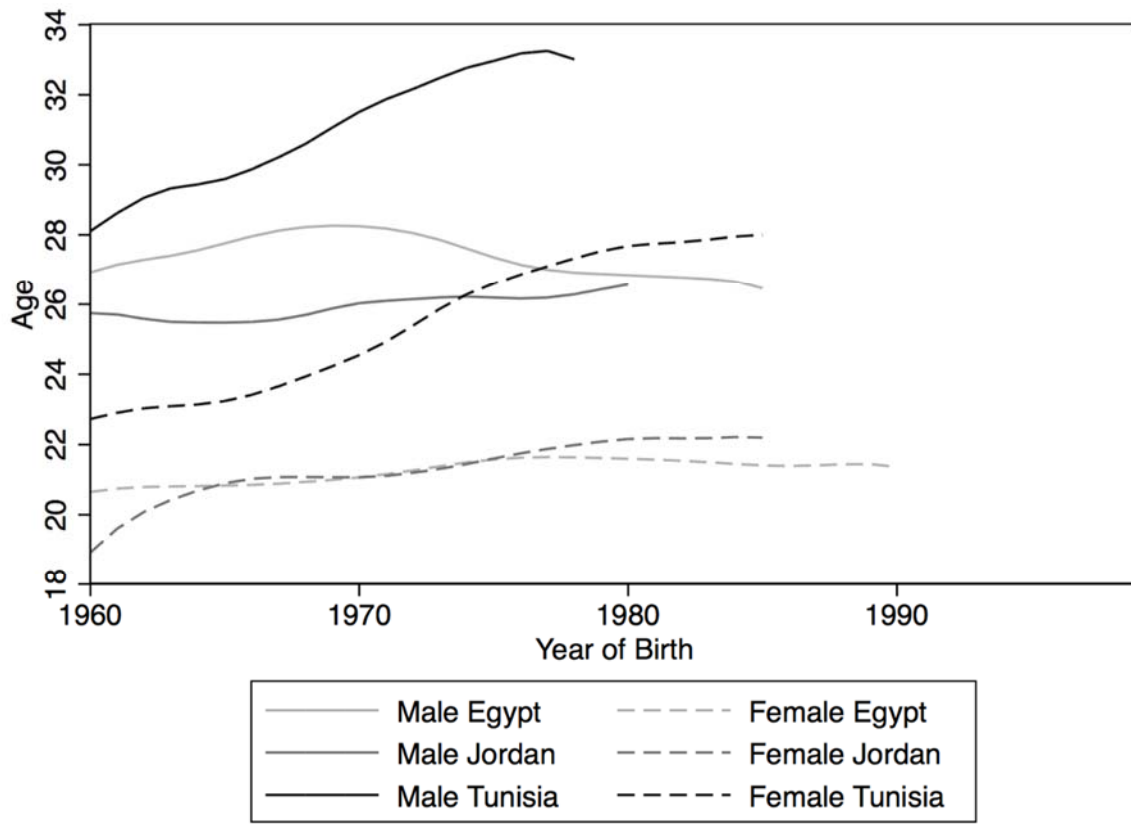
Source: Authors' calculations based on ELMPS 2012, JLMPS 2010, and TLMPS 2014

Figure 5. Hazard of Marrying at Each Age by Sex and Country, Ages 15-59



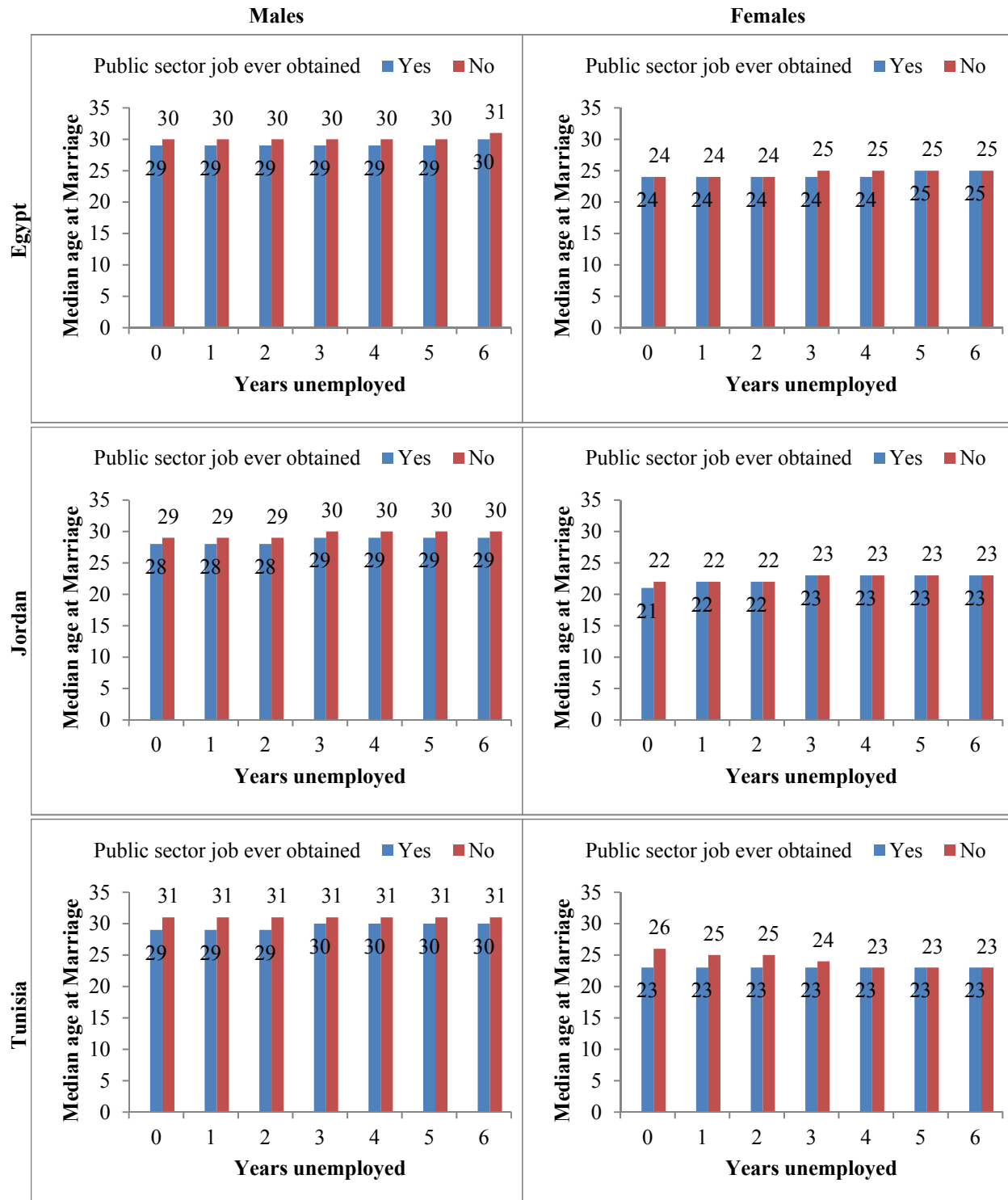
Notes: Baseline hazards from a discrete time proportional hazards model with no covariates. Bars indicate 95% confidence intervals.
Source: Authors' calculations based on ELMPS 2012, JLMPS 2010, and TLMPS 2014

Figure 6: Median Age at Marriage by Year of Birth, Sex and Country, Ages 15-59



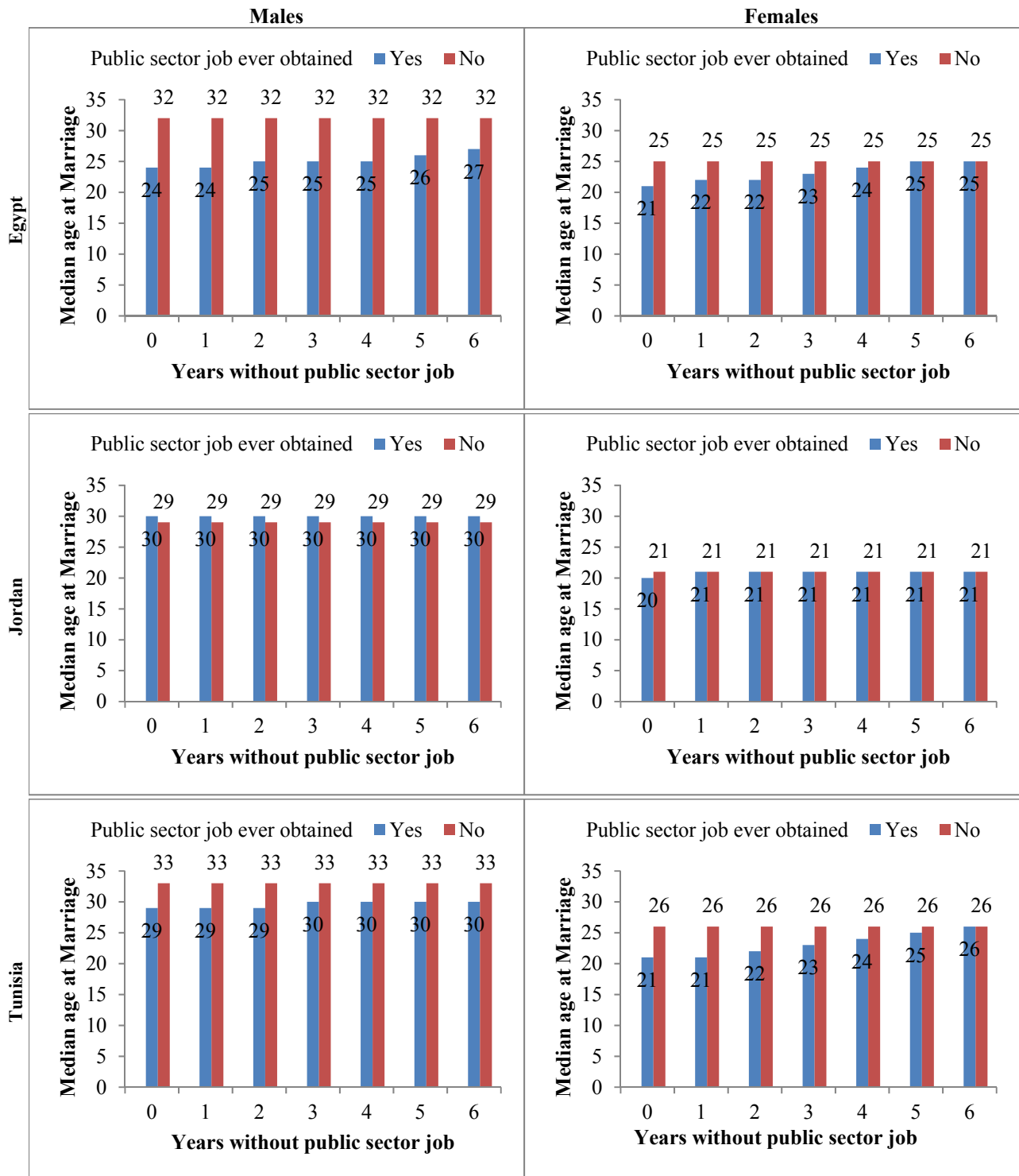
Notes: Locally weighted regression (lowess) smoother with bandwidth 0.6. Based on survival functions.
Source: Authors' calculations based on ELMPS 2012, JLMPS 2010, and TLMPS 2014.

Figure 7: Median Age at Marriage by Time Spent Queuing and Whether A Public Sector Job Was Obtained, Based on Discrete Time Proportional Hazards Models



Notes: Based on models in Table 1.

Figure 8: Median Age at Marriage by Time Spent Without A Public Sector Job and Whether A Public Sector Job Was Obtained, Based on 3SRI Discrete Time Proportional Hazards Models



Notes: Based on models in Table 6.

Table 1: Discrete Time Proportional Hazards Models of Age at Marriage, by Sex and Country

	Males Egypt	Males Jordan	Males Tunisia	Females Egypt	Females Jordan	Females Tunisia
Labor market status (M: private informal F: OLF omit.)						
Public	1.369*** (0.052)	1.277*** (0.066)	1.410** (0.162)	1.120* (0.060)	1.313*** (0.103)	1.970*** (0.405)
Private formal wage	1.192*** (0.050)	0.975 (0.061)	1.184 (0.126)	0.556*** (0.067)	0.816* (0.080)	0.901 (0.094)
Private informal wage				0.401*** (0.038)	0.509*** (0.067)	0.821 (0.134)
Non-wage	1.083 (0.046)	1.104 (0.077)	1.106 (0.097)	0.796* (0.077)	0.759 (0.161)	1.044 (0.193)
Unemployed	0.519*** (0.051)	0.486*** (0.063)	0.569 (0.181)	0.942 (0.065)	0.642*** (0.080)	1.858*** (0.241)
OLF	0.314*** (0.021)	0.279*** (0.034)	0.526*** (0.066)			
In school	0.698*** (0.050)	0.599*** (0.055)	0.847 (0.075)	0.206*** (0.010)	0.367*** (0.022)	0.787*** (0.051)
Education (none omit.)						
Read & Write	0.862* (0.058)	0.924 (0.118)	1.045 (0.128)	1.007 (0.067)	1.023 (0.107)	0.905 (0.076)
Basic Education	0.853** (0.044)	0.850 (0.099)	1.007 (0.097)	1.203*** (0.049)	1.327** (0.121)	0.979 (0.073)
Secondary Educ	0.733*** (0.034)	0.749* (0.093)	0.737* (0.092)	1.325*** (0.050)	1.133 (0.110)	0.584*** (0.071)
Post-Secondary	0.722*** (0.048)	0.819 (0.102)	0.856 (0.151)	0.940 (0.057)	1.109 (0.107)	0.495*** (0.074)
University	0.626*** (0.032)	0.652*** (0.082)	0.767 (0.120)	0.846*** (0.037)	1.155 (0.119)	0.511*** (0.065)
Post-Graduate	0.702** (0.085)	1.009 (0.158)	1.014 (0.328)	1.696*** (0.224)	1.104 (0.169)	0.742 (0.199)
Mother's education (none omit.)						
Reads and writes	0.973 (0.054)	1.053 (0.053)	0.123** (0.091)	1.150*** (0.048)	1.321*** (0.067)	0.153*** (0.069)
Basic	0.800*** (0.052)	0.190*** (0.050)	1.232 (0.173)	0.884* (0.049)	0.250*** (0.051)	1.433*** (0.129)
Secondary	0.913 (0.072)	0.682** (0.084)	1.195 (0.295)	0.907 (0.050)	1.191 (0.111)	1.675** (0.266)
Higher education	1.042 (0.121)	0.665* (0.129)	2.108 (1.110)	0.815* (0.066)	0.811 (0.099)	0.879 (0.488)
Father's education (none omit.)						
Reads and writes	0.931 (0.035)	0.956 (0.047)	0.289** (0.123)	0.996 (0.034)	1.037 (0.064)	0.370*** (0.084)
Basic	0.764*** (0.037)	0.206*** (0.054)	1.075 (0.101)	0.875** (0.039)	0.204*** (0.039)	1.294*** (0.083)
Secondary	0.895 (0.059)	0.990 (0.098)	1.462* (0.221)	0.958 (0.050)	1.050 (0.088)	1.641*** (0.229)
Higher education	0.816* (0.066)	0.929 (0.109)	1.125 (0.503)	0.870* (0.061)	0.935 (0.099)	1.852** (0.403)
Father's emp. stat. (public omit.)						
Private wage	0.939 (0.043)	0.986 (0.062)	1.333* (0.153)	0.990 (0.041)	0.982 (0.055)	1.353** (0.127)
Employer	1.005 (0.051)	1.191* (0.103)	1.408* (0.229)	0.996 (0.043)	1.150 (0.094)	1.253 (0.180)
Self-employed	0.961 (0.053)	1.038 (0.071)	1.459** (0.197)	0.960 (0.045)	1.087 (0.067)	1.456*** (0.159)
No job or DK	1.034 (0.179)	0.940 (0.354)	0.562 (0.231)	0.843 (0.190)	0.260** (0.116)	0.858 (0.442)
Father's occup. (Manager omit.)						
Clerical and sales	0.973 (0.056)	0.950 (0.088)	0.812 (0.139)	0.939 (0.045)	0.971 (0.077)	1.503** (0.219)
Skilled agricultural	1.012 (0.052)	0.938 (0.098)	0.784 (0.143)	0.994 (0.045)	0.741** (0.076)	1.676*** (0.261)
Craft and manufacturing	0.973 (0.048)	0.966 (0.096)	0.839 (0.148)	0.928 (0.044)	0.957 (0.084)	1.569** (0.245)
Elementary occupations	0.938 (0.056)	1.019 (0.129)	0.810 (0.146)	1.009 (0.050)	0.902 (0.104)	1.509** (0.221)
No. brothers (living and dead)	1.002	1.005	1.009	1.037***	1.019	1.002

	Males Egypt	Males Jordan	Males Tunisia	Females Egypt	Females Jordan	Females Tunisia
	(0.007)	(0.009)	(0.017)	(0.008)	(0.010)	(0.018)
No. sisters (living and dead)	1.041***	1.040***	1.040	1.002	1.037***	1.040**
	(0.009)	(0.009)	(0.021)	(0.006)	(0.011)	(0.015)
Year (1980-1984 omit.)						
1975-1979	1.332	1.247	0.545	0.903	1.305*	0.948
	(0.304)	(0.340)	(0.614)	(0.073)	(0.142)	(0.207)
1985-1989	0.741***	0.856	0.508***	0.941	0.883	0.659***
	(0.067)	(0.095)	(0.102)	(0.051)	(0.069)	(0.069)
1990-1994	0.650***	0.833	0.471***	0.864**	0.959	0.698**
	(0.059)	(0.087)	(0.085)	(0.046)	(0.073)	(0.078)
1995-1999	0.557***	0.640***	0.347***	0.740***	0.828*	0.514***
	(0.048)	(0.067)	(0.062)	(0.040)	(0.066)	(0.059)
2000-2004	0.755***	0.642***	0.301***	0.862**	0.835*	0.450***
	(0.064)	(0.071)	(0.059)	(0.042)	(0.070)	(0.054)
2005-2009	1.061	0.535***	0.272***	1.101*	0.721***	0.458***
	(0.090)	(0.063)	(0.053)	(0.052)	(0.064)	(0.056)
2010+	1.349***		0.281***	1.620***		0.559***
	(0.118)		(0.058)	(0.094)		(0.073)
Region of birth (Gr. Cairo omit. (Egypt) Central omit. (Jordan) North omit. (Tunisia)						
Egypt-Alx Sz C.	0.974			0.981		
	(0.090)			(0.066)		
Egypt-Urb. Lwr.	1.275***			1.213**		
	(0.084)			(0.077)		
Egypt-Urb. Upp.	1.068			1.107		
	(0.075)			(0.075)		
Egypt-Rur. Lwr.	1.488***			1.472***		
	(0.094)			(0.083)		
Egypt-Rur. Upp.	1.481***			1.398***		
	(0.106)			(0.090)		
Jordan-North		0.846**			0.884*	
		(0.045)			(0.047)	
Jordan-South		0.765***			0.781***	
		(0.059)			(0.054)	
Out of Jordan		0.960			1.186**	
		(0.062)			(0.063)	
Tunisia-North West			0.894			0.915
			(0.122)			(0.093)
Tunisia-Center East			1.062			0.794*
			(0.132)			(0.073)
Tunisia-Center West			1.310*			0.892
			(0.157)			(0.086)
Tunisia-South East			1.419*			0.887
			(0.233)			(0.103)
Tunisia-South West			0.590**			0.488***
			(0.095)			(0.076)
Rural			1.180			0.869
			(0.106)			(0.063)
Constant	0.008***	0.018***	0.002***	0.086***	0.097***	0.018***
	(0.001)	(0.004)	(0.001)	(0.007)	(0.015)	(0.004)
Age in year included	Yes	Yes	Yes	Yes	Yes	Yes
N	127458	57436	27307	87124	44230	28802

Notes: *p<0.5; **p<0.01 ***p<0.001. Standard errors (in parentheses) are clustered at the PSU level.

Source: Authors' calculations based on ELMPS 2012, JLMPS 2010, and TLMPS 2014

Table 2: Discrete Time Proportional Hazards Models of Age at Marriage Including Lagged Labor Market Status, by Sex and Country

	Males Egypt	Males Jordan	Males Tunisia	Females Egypt	Females Jordan	Females Tunisia
Labor market status (M: private informal F: OLF omit.)						
Public	1.419*** (0.134)	1.588*** (0.183)	0.976 (0.467)	0.733* (0.091)	0.871 (0.168)	1.908 (0.698)
Private formal wage	1.056 (0.108)	1.100 (0.165)	1.254 (0.456)	0.146*** (0.031)	0.411*** (0.084)	0.503** (0.125)
Private informal wage				0.130*** (0.018)	0.236*** (0.064)	0.664 (0.180)
Non-wage	1.243* (0.123)	1.121 (0.174)	1.032 (0.417)	0.464 (0.184)	0.324* (0.159)	4.156*** (1.373)
Unemployed	0.670*** (0.080)	0.705* (0.115)	0.730 (0.283)	0.648*** (0.079)	0.657* (0.133)	3.162*** (0.665)
OLF	0.405*** (0.039)	0.459*** (0.082)	0.533 (0.175)			
Lagged labor market status (M: private informal F: OLF omit.)						
Public	0.963 (0.091)	0.788* (0.094)	1.491 (0.711)	1.704*** (0.222)	1.610* (0.328)	1.061 (0.399)
Private formal wage	1.154 (0.118)	0.880 (0.131)	0.944 (0.341)	4.787*** (0.967)	2.292*** (0.444)	1.900* (0.478)
Private informal wage				3.730*** (0.364)	2.468*** (0.549)	1.264 (0.323)
Non-wage	0.859 (0.089)	0.985 (0.154)	1.077 (0.434)	1.767 (0.645)	2.433 (1.180)	0.174*** (0.066)
Unemployed	0.712** (0.075)	0.615** (0.094)	0.750 (0.301)	1.447** (0.184)	0.855 (0.185)	0.463** (0.121)
OLF	0.739*** (0.062)	0.598*** (0.088)	0.985 (0.306)			
Controls Included	Yes	Yes	Yes	Yes	Yes	Yes
N	115287	51206	25278	74805	38137	26113

Notes: *p<0.5; **p<0.01 ***p<0.001. Standard errors (in parentheses) are clustered at the PSU level. Controls included for in school, education level, mother's education level, father's education level, father's employment status and occupation, number of brothers, number of sisters, year categories, birth region and birth urban/rural, as well as for baseline hazard (age in year).

Source: Authors' calculations based on ELMPS 2012, JLMPS 2010, and TLMPS 2014

Table 3: Discrete Time Proportional Hazards Models Including Wages, Costs, And Cost Shares, by Sex and Country

	Males--Egypt				Females--Egypt				Females--Jordan		
	Wage	Marr. Sample	Sample and costs	Sample costs and shares	Wage	Marr. Sample	Sample and costs	Sample costs and shares	Sample	Sample and costs	Sample costs and shares
Labor market status (M: private informal F: OLF omit.)											
Public	1.369*** (0.052)	1.158** (0.059)	1.175** (0.059)	1.168** (0.061)	1.136* (0.061)	1.132 (0.078)	1.156* (0.077)	1.199** (0.082)	1.252** (0.097)	1.263** (0.099)	1.258** (0.099)
Private formal wage	1.193*** (0.050)	1.012 (0.049)	1.046 (0.052)	1.036 (0.052)	0.567*** (0.067)	0.667** (0.095)	0.670** (0.097)	0.691* (0.100)	0.827* (0.076)	0.835 (0.077)	0.833* (0.077)
Private informal wage					0.409*** (0.039)	0.358*** (0.043)	0.358*** (0.043)	0.363*** (0.043)	0.558*** (0.066)	0.553*** (0.065)	0.555*** (0.065)
Non-wage	1.083 (0.045)	1.072 (0.052)	1.095 (0.054)	1.075 (0.053)	0.796* (0.077)	0.896 (0.105)	0.903 (0.107)	0.901 (0.107)	0.880 (0.157)	0.872 (0.155)	0.868 (0.156)
Unemployed	0.519*** (0.051)	0.531*** (0.070)	0.535*** (0.071)	0.495*** (0.066)	0.943 (0.065)	1.056 (0.094)	1.062 (0.093)	1.063 (0.093)	0.877 (0.103)	0.897 (0.105)	0.897 (0.105)
OLF	0.314*** (0.021)	0.456*** (0.041)	0.460*** (0.040)	0.456*** (0.041)							
Standardized log wage	0.993 (0.034)	0.950 (0.032)	0.946 (0.032)	0.955 (0.033)	1.253** (0.107)	0.959 (0.080)	1.008 (0.083)	0.992 (0.078)			
Log total costs			0.792*** (0.018)	0.788*** (0.019)			0.847*** (0.014)	0.842*** (0.014)		0.904*** (0.023)	0.903*** (0.023)
Family share (percentage)				1.004** (0.001)				1.003*** (0.001)			0.995* (0.002)
Own share (percentage)				1.000 (0.001)				0.993** (0.002)			
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	127458	51242	51242	49031	87124	41909	41909	41328	23637	23637	23637

Notes: *p<0.5; **p<0.01 ***p<0.001. Standard errors (in parentheses) are clustered at the PSU level. Controls included for in school, education level, mother's education level, father's education level, father's employment status and occupation, number of brothers, number of sisters, year categories, birth region and birth urban/rural, as well as for baseline hazard (age in year).

Source: Authors' calculations based on ELMPS 1998-2012

Table 4: First Stage Probit Marginal Effects of 3SRI Model for Probability of Public Sector Work, by Sex and Country

	Males Egypt	Males Jordan	Males Tunisia	Females Egypt	Females Jordan	Females Tunisia
Local public sector work (percentage)	0.069*** (0.012)	0.077*** (0.011)	0.066** (0.022)	0.117*** (0.015)	0.024 (0.024)	0.068*** (0.019)
Lagged Local public sector work (percentage)	-0.050*** (0.012)	-0.049*** (0.011)	-0.034 (0.021)	-0.075*** (0.016)	0.009 (0.023)	-0.081** (0.029)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
N	108754	43767	21749	69618	30812	19699

Notes: *p<0.5; **p<0.01 ***p<0.001. Standard errors (in parentheses) are clustered at the PSU level. Controls included for year, in school, education level, mother's education level, father's education level, father's employment status and occupation, number of brothers, number of sisters, birth governorate and birth urban/rural along with interactions, as well as for baseline hazard (age in year).

Source: Authors' calculations based on ELMPS 2012, JLMPS 2010, and TLMPS 2014

Table 5: Chi-square Tests for Significance of Instruments in First Stage and F-tests for Significance of Instruments in Second Stage of 3SRI Model for Probability of Public Sector Work, by Sex and Country

	Chi-sq. (first stage)	p-value		F-test (second stage)	p-value	
Egypt Males	35.565	0.000	***	308.805	0.000	***
Jordan Males	51.064	0.000	***	283.566	0.000	***
Tunisia Males	9.524	0.009	**	413.558	0.000	***
Egypt Females	63.782	0.000	***	73.583	0.000	***
Jordan Females	3.066	0.216		52.387	0.000	***
Tunisia Females	15.229	0.000	***	42.874	0.000	***

Notes: *p<0.5; **p<0.01 ***p<0.001

Source: Authors' calculations based on ELMPS 2012, JLMPS 2010, and TLMPS 2014

Table 6: 3SRI Discrete Time Proportional Hazards Models for Impact of Public Sector Work on Age at Marriage, by Sex and Country

Restricted sample						
	Males Egypt	Males Jordan	Males Tunisia	Females Egypt	Females Jordan	Females Tunisia
Public sector work	1.489*** (0.053)	1.551*** (0.070)	1.672*** (0.168)	1.210*** (0.062)	1.438*** (0.113)	1.806** (0.404)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
N	108754	43767	21749	69796	32686	23009
3SRI						
	Males Egypt	Males Jordan	Males Tunisia	Females Egypt	Females Jordan	Females Tunisia
Public sector work	8.881*** (2.623)	0.797 (0.466)	2.002 (1.697)	6.912 (8.182)	13.631*** (7.522)	11.565* (12.118)
Residual	0.162*** (0.048)	1.950 (1.150)	0.832 (0.726)	0.151 (0.180)	0.098*** (0.054)	0.112 (0.131)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
N	108754	43767	21749	69796	32686	23009

Notes: *p<0.5; **p<0.01 ***p<0.001. Bootstrapped standard errors (in parentheses) are clustered at the PSU level. Bootstraps based on 400 replications. Controls included for year, in school, education level, mother's education level, father's education level, father's employment status and occupation, number of brothers, number of sisters, birth governorate and birth urban/rural along with interactions, as well as for baseline hazard (age in year).

Source: Authors' calculations based on ELMPS 2012, JLMPS 2010, and TLMPS 2014