

# **Pathways to Marriage in Egypt: How Men's Marriage Timing is Affected by their Labor Market Trajectory**

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**Work in progress**

## **Abstract**

There has been a great deal of concern in recent years about the rising age at marriage for young men in the Middle East and North Africa region. While the high cost of marriage has been documented for Egypt, there has been no evidence about young men's changing ability to afford these costs in a context of rising expectations for independent living arrangements at marriage. Using detailed life-course data from the Egypt Labor Market Panel Survey of 2006, this paper analyzes the economic determinants of the timing of marriage for men by estimating a discrete-time hazard model with gamma frailty and a non-parametric baseline hazard specification. The key explanatory variables, each lagged 1, 3, and 5 years, are variables that indicate the onset of first employment and the timing of a "good" job, defined in relation to a job quality index for waged and non-waged workers. Findings from our estimations and simulation analysis indicate that the timing of marriage for young men is strongly affected by their labor market trajectory.

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# 1 Introduction

Marriage constitutes the sole socially-accepted institution of family formation in the Middle East and North Africa (MENA) region and is widely perceived as the main marker of adulthood. Nonetheless, the region has experienced a significant delay in male age at first marriage that makes it stand out among other world regions. While female age at marriage has also gone up, the trend there is comparable to trends elsewhere in the world, but the increase in male age at marriage and the continuing large age gap between spouses appears to be specific to MENA (Mensch 2005). This seemingly involuntary postponement of marriage by young men may have the same major social and political implications of the better documented effects of a “surplus” unmarried male population in China resulting from unbalanced sex ratios (Hudson and Den Boer 2001, 2004). While the high cost of marriage has been documented for Egypt (Singerman 2007, Singerman and Ibrahim 2001), an in-depth analysis of the causes of the significant delay in men’s age at marriage is still lacking. Using detailed life-course data from Egypt, this paper fills this gap by analyzing the determinants of delayed marriage. These include the timing and quality of jobs they are able to get, their educational attainment, the socioeconomic background of their parents, the performance of regional labor markets, and the prevailing sex ratios in their region of residence. The data we use come from the Egypt Labor Market Panel Survey 2006 (ELMPS 06), which constitutes the second wave of a panel survey started in 1998. In total, 8,349 households, or 37,140 individuals, were interviewed in the first three months of 2006, including 3,685 households first interviewed in 1998, 2,168 households that resulted from splits from these original households and 2,498 households from a refresher sample.

Our findings, based on discrete-time duration models, suggest that not all male cohorts are equally affected by this delay in marriage. In fact, some of the younger cohorts have experienced a slight reduction in the age at marriage relative to those born around 1970.<sup>1</sup> Controlling for cohort effects, we also find that the timing of marriage is also strongly determined by an individual’s employment situation and the trajectory he follows in the labor market. The paper is structured as follows. After describing changes in the Egyptian marriage and labor markets over the past three or four decades in Section 2, we review in Section 3 the literature on the

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<sup>1</sup> Assaad and Ramadan (2008) attribute the reversal of the delaying trend to housing policy reforms that have made market-rent rental housing more plentiful.

determinants of age at marriage including earlier research on Egypt. In Section 4, we discuss the methodology we use and present our results on the determinants of the timing of marriage among men in Egypt. To better illustrate these results, we used our estimates to conduct simulations of the effect of the timing of the first job, and the first “good” job, if any, on the timing of marriage. The simulations are presented in Section 5. We conclude by highlighting the implications of our results and suggesting directions for further research.

## **2 Recent Trends in the Egyptian Marriage and Labor Markets**

We present in this section a brief overview of trends in the Egyptian marriage and labor markets. On the basis of these trends we argue that the observed delay in male age at marriage in Egypt can be attributed to a number of factors including:

- rising expectations about living standards – including aspirations for nuclear family living arrangements after marriage – combined with significant difficulties in finding housing to realize these aspirations
- an increase in the unemployment rates among post-secondary and university graduates (Amer 2007, Assaad 2008), and
- an increase in the share of informal employment and decline in the quality of jobs for new labor market entrants (Assaad 2008, Assaad and Roushdy 2008)

We argue that as a result of these trends, young men and their families are finding themselves increasingly unable to afford the high costs associated with marriage in Egypt or to adequately signal their eligibility for marriage to potential brides and their families.

We should note that many of the questions related to marriage in the ELMPs 06, such as the costs of marriage and who bears these costs, are asked to ever-married women aged 16 to 49 and relate to their first marriage. Consequently, this information can only be assigned to those married men in the sample who were, at the time of the survey, still married and living together with their first wife. Luckily, this condition applies to almost 97 percent of married men aged 18 to 39 who are the objects of analysis here.

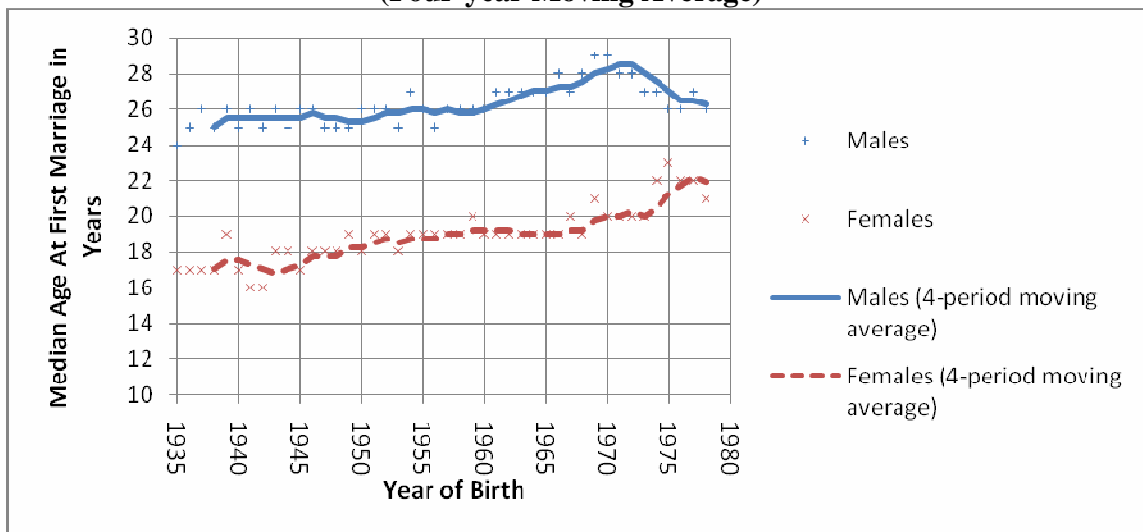
### **2.1 Men’s Delayed Marriage**

As mentioned earlier, the Middle East and North Africa is no different from other world regions with regards to the delay in women’s age at marriage. Generally, this delay has been attributed to the “autonomy-enhancing effect” of women’s increased educational attainment

(Mensch 2005). Together with former Soviet Asia, MENA is the only world region to have experienced a significant delay in male age at marriage and consequently the persistence of a fairly large age gap between spouses (Mensch et al. 2005). The significance of this observed delay is compounded by the fact that men in MENA are already marrying at comparatively old age in the Middle East (Amin et al. 2006).

Egypt conforms very well to the general Middle Eastern trend on the timing of marriage. Both men and women are now marrying later in Egypt. Figure 1 shows the median age at first marriage for men and women. The numbers plotted in the figure are computed using life table analysis that takes into account that some members of each cohort had not yet married at the time of the survey. As Figure 1 shows, the delay in male age at first marriage started with the cohorts born by the end of the 1950s and continued through those born in the early 1970s. The delay for women began somewhat earlier and continued uninterrupted through the cohorts born in the late 1970's.<sup>2</sup>

**Figure 1: Median Age at First Marriage by Year of Birth and Sex (Four-year Moving Average)**



Source: ELMPS 06.

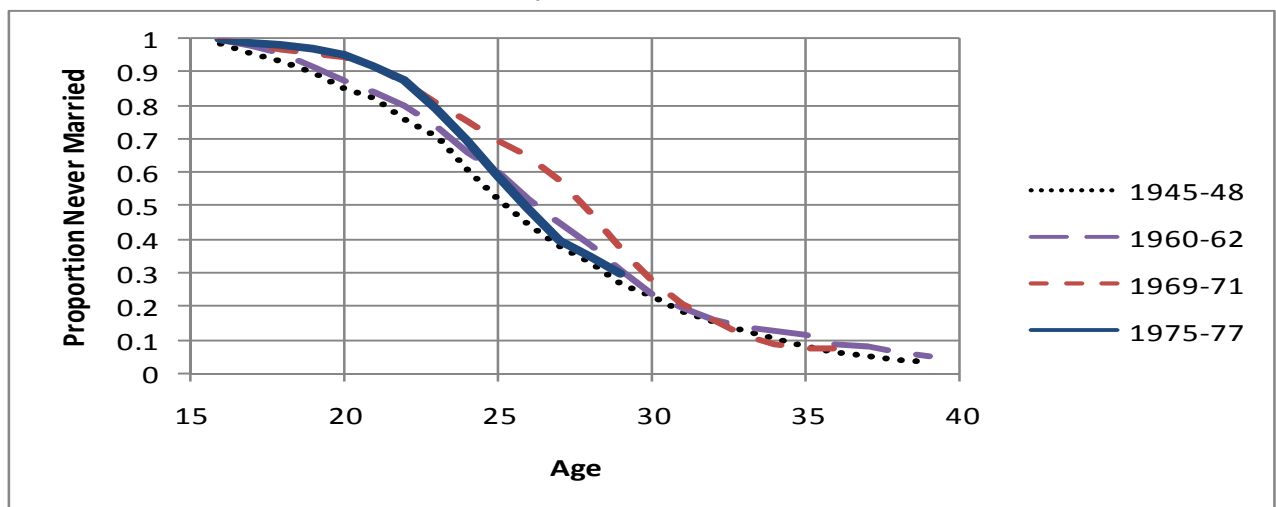
As a result of this pattern, the age gap between spouses remained fairly constant at 8 to 9 years and only started to narrow for males born after 1975. The main novelty here, which runs counter to either conventional wisdom or recent qualitative studies, is that male median age at first marriage has started to decline in recent years after reaching a peak of 29 for those born in

<sup>2</sup> It is not possible to calculate the median age at marriage for cohorts born after that because less than 50 percent of these cohorts are married.

1970. Assaad and Ramadan (2008) attribute this recent decline to housing law reform passed in 1996 that made it easier for young couples to acquire market-rate rental housing.

The delay in the age of marriage for young men and its subsequent reversal can also be seen by looking at the entire distribution of age at marriage by birth cohort and not just at the median. As shown in Figure 2, the delay in the age at marriage from the 1945-48 birth cohort to the 1960-62 birth cohort was very slight, with the median age shifting by at most one year from 25 to 26. By the 1969-71 birth cohort, the median had reached about 28. Seventy percent of that cohort had not yet married by age 25 and 30 percent had not married by age 30. The reversal in the delay in age at marriage is readily apparent for the 1975-77 birth cohort compared to the 1969-71 cohort. Although very early marriages (before age 23) were equally rare for these two cohorts (less than 20 percent), the median age at first marriage drops from 28 to 26, right back where it was for the 1960-62 cohort. Finally, it is clearly apparent from Figure 2 that marriage for men in Egypt is virtually universal by age 40.

**Figure 2. Kaplan-Meier Survival Function for Distribution of Age at First Marriage Men by Cohort of Birth**



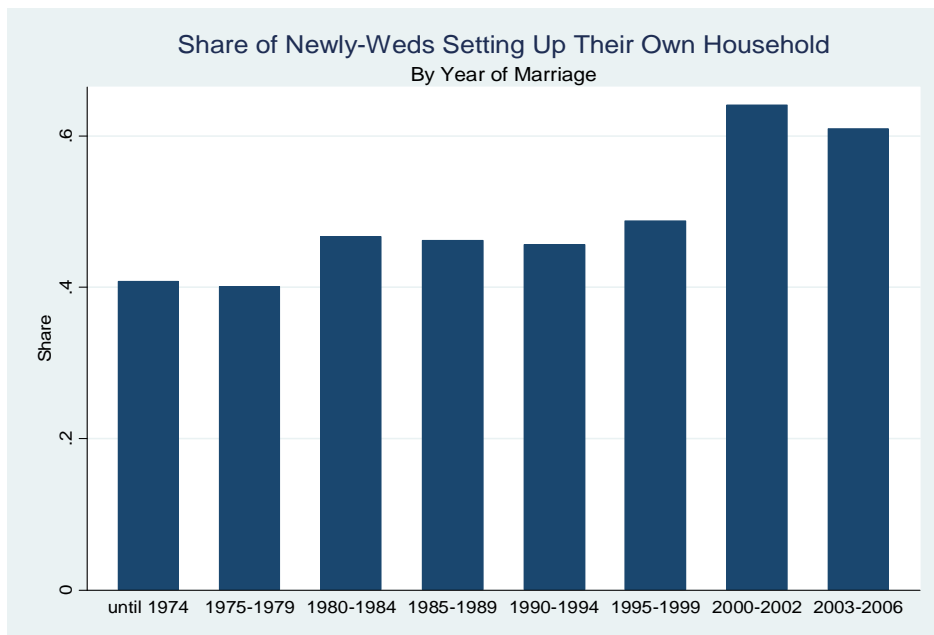
Source: ELMSP 06.

## 2.2 The Financial Burden of Marriage

Marriage in Egypt entails high costs. It is an “occasion for a major intergenerational transfer of wealth, larger in many cases than the inheritance following a parental death” (Singerman and Ibrahim 2001: 80). Singerman and Ibrahim (2001) estimate that marriage costs average 4.5 times Egypt’s GNP per capita and 11 times per capita household expenditure.

Qualitative studies and anecdotal evidence (e.g., Amin and Al-Bassusi 2003) suggest that living standards have risen and that young people nowadays have higher aspirations of nuclear living arrangements upon marriage. That newly-weds actually do set up their own household upon marriage more frequently is captured in Figure 3. As shown in the figure, the share of newly-weds setting up their own household directly after marriage has increased from under 40 percent in the 1970s to 60 percent in the 2000s. The jump that occurred from 1995-99 to 2000-02 coincides with the passage of the new housing law in 1996, which aimed at deregulating landlord and tenancy relationships and, as such, resulted in greater availability of market-rate rental housing (Assaad and Ramadan 2008). According to the ELMPS 06, the number of rooms of furniture purchased by newly-weds has increased over the period from 2.08 rooms on average among those married between 1980 and 1990 to 2.37 rooms on average among those married between 1995 and 2005.

**Figure 3: Share of Newly-Weds Setting up their Own Household, by Marriage Cohort**



Source: ELMPS 06

Housing expenses as well as the cost of electrical appliances are traditionally borne by the groom and his family in Egypt. With expectations rising on the one hand, and the difficulty and costs of obtaining housing on the other hand (notwithstanding the new housing law), the main financial constraint on marriage is believed to be on the groom's side. However, as shown in Table 1, the structure of the cost of marriage for those married between 1980 and 1990 and those

married between 1995 and 2005 has not changed significantly over time.<sup>3</sup> Housing expenses have increased only slightly relative to other marriage costs, while expenses for furniture and electrical appliances have decreased.

**Table 1: The Structure of Marriage Costs  
(Responses by Ever-Married Women aged 16-49)**

	Married 1980-1990	Married 1995-2005
Dowry and bride price	4.3	2.6
Payment upon divorce	8.6	10.1
Value of jewelry presented to the bride	7.7	8.8
Furniture and Electrical Appliances	36.2	33.4
Housing	24.1	25.3
Other parts of the bride's trousseau and wedding preparations	13.5	14.5
Marriage celebrations	5.6	5.4
<b>Total Costs (N=6069)</b>	<b>100.0</b>	<b>100.0</b>

Source: ELMPS 06.

Using the same data, Singerman (2007) finds that the average total costs of marriage have decreased in real terms over the period 1975-79 to 1995-99. However, one needs to be cautious in interpreting these results as they are based on women recalling their costs of marriage from up to thirty years earlier. It is possible that some may be reporting amounts in current prices or at least somehow 'adjusted' rather than in the original prices they paid. If we can assume that recall problems are not linked to specific cost items, the relative structure of costs should not be affected by such recall errors. Moreover, as the section on the marriage costs in the ELMPS questionnaire is administered married women only, there might be some misreporting of the groom's contribution. This concern is somewhat allayed by the fact that, in Egypt, the different financial contributions to the total costs of marriage are agreed upon by the two families involved and are closely monitored by all parties (Hoodfar 1997 and Singerman and Ibrahim 2001).

Table 2 shows the contribution of the groom and his family to the different cost items. The dowry and the jewelry are not included in the tables as their costs are completely assumed by the groom and his family. The two tables indirectly provide evidence for an increase in the financial burden on the groom over the last decades. Although the groom himself is still expected to contribute a significant share of the costs of marriage, his share has declined somewhat as that of his family has increased. This is particularly true for the amounts spent on housing, furniture

<sup>3</sup> Note that the payment upon divorce is a contractual commitment not an actual cost at the time of the marriage.

and electrical appliances. It therefore appears that parents' are having to increasingly step in financially in order to get their sons married.

**Table 2: Percentage of Groom's and Groom's Family Contribution to Each Item of Marriage Cost (responses by ever-married women aged 16-49).**

<i>Groom's Contribution</i>	Married 1980-1990	Married 1995-2005
Furniture and Electrical Appliances	47.8	45.0
Housing	60.6	55.8
Furnishings, silverware, etc	21.32	19.7
Marriage celebrations	50.4	47.9
Total Marriage Costs (Average)	45.0	42.1

<i>Groom's Family Contribution</i>	Married 1980-1990	Married 1995-2005
Furniture and Electrical Appliances	20.9	23.3
Housing	31.2	36.5
Furnishings, silverware, etc	10.6	10.9
Marriage celebrations	26.7	30.3
Total Marriage Costs (Average)	22.4	25.2

Source: ELMPS 06

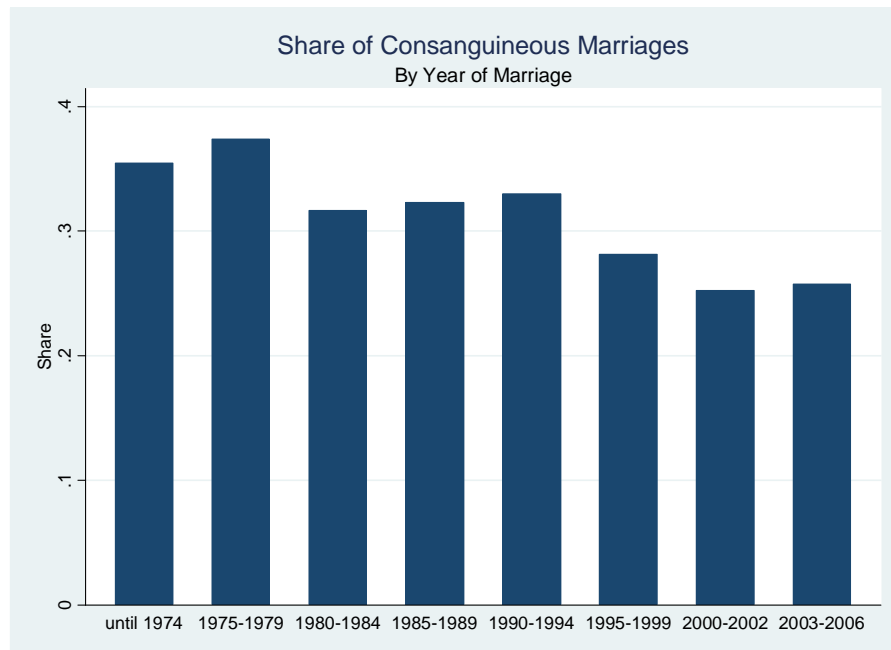
Finally, indirect evidence about the need to keep a lid on the costs of marriage may be garnered from the fact that the share of consanguineous marriages has remained relatively high, despite the fact that other traditional aspects of marriage, such as extended family living and early marriage, have declined. When marriage is between unrelated families, all aspects of the marriage arrangement are negotiated in advance and the groom must be ready with the entire package upon signature of the marriage contract. In contrast, marriages within the same extended family would presumably involve greater trust, allowing for some of the household formation expenses to be postponed and thus reducing the initial cost of marriage.<sup>4</sup> Thus consanguineous marriages can be seen as a strategy to reduce the initial costs of marriage. And indeed, if we compare total marriage costs between consanguineous and non-consanguineous spouses, the latter are significantly higher by, on average, 40% (ELMPS 06). As shown in Figure 3, the share of consanguineous marriages has remained at above 30 percent through the 1990-94 marriage

<sup>4</sup> See Casterline and El-Zeini, 2003 and Weinreb, 2008 for a more detailed discussion of consanguineous marriage in Egypt.



cohort. The observed decline starting with the 1995-99 marriage cohort may be hinting at some improvements in the Egyptian “marriage market.”

**Figure 3: Share of Consanguineous Marriages by Marriage Cohort (responses by ever-married women aged 16-49)**



Source: ELMSP 06

## 2.3 The Deteriorating Labor Market Prospects of Young Men

Because the deteriorating labor market prospects for young male new entrants are fairly well documented elsewhere (see Assaad 2008, Amer 2007, Assaad and Gaddalah 2008), we will limit ourselves here to a fairly brief discussion of these trends. It is fairly well established that youth unemployment in Egypt has been quite high and that the vast majority of the unemployed (81 percent) are new entrants to the labor market and 83 percent are between the ages of 15 and 29 (Amer 2007). After a sharp increase in youth unemployment from 1988 to 1998, there was a decline from 1998 to 2006, but the decline did not extend to university graduates, especially those living in urban areas.

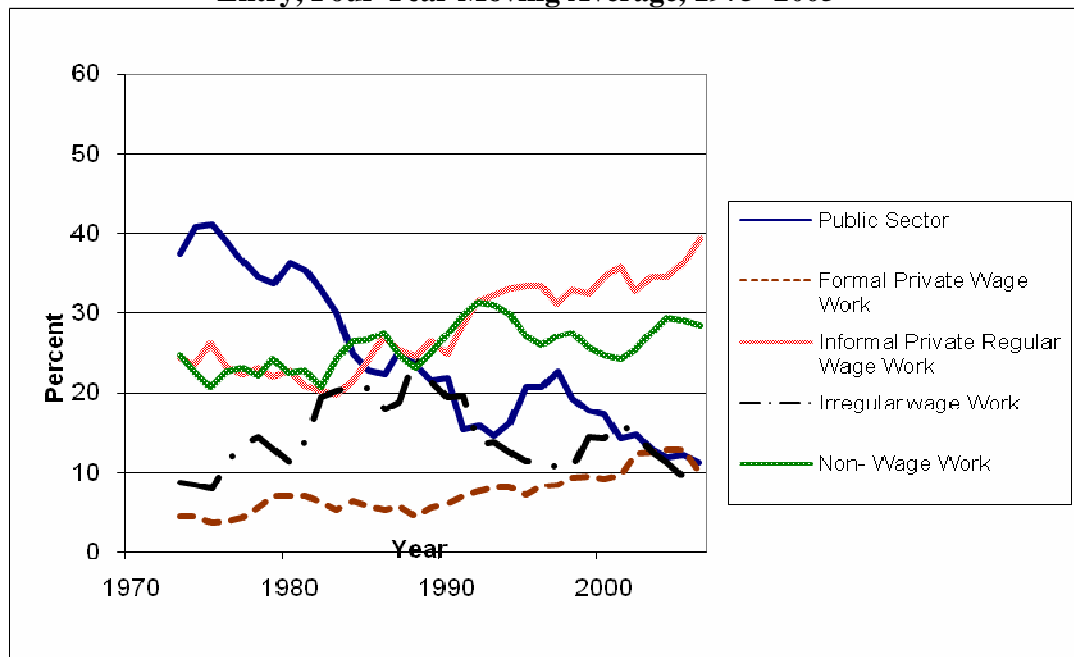
Because unemployment essentially measures the search behavior of those seeking formal sector employment, its trend may not be an adequate indicator of the overall labor market. First, it is a very inadequate measure of the labor market prospects of those with less than secondary education who have virtually no chance of obtaining formal sector work and therefore do not

seek it. Second, a decline in unemployment may simply indicate a lower expectation on the part of job seekers of getting formal employment and therefore a lower willingness to wait for such employment. This is in fact what appears to have happened in Egypt in recent years. As the probability of getting public sector work continues to decline sharply and that of obtaining formal private employment continues to be low (as shown below), many young men are simply taking whatever work they can get rather than waiting for a formal job to come along. Thus a drop in unemployment, if seen in this light, could in fact be interpreted as a deterioration in the prospects of obtaining formal jobs. As shown in Figure 4, the proportion of male new entrants who got public sector jobs as their first job dropped from about 40 percent for those who first entered the labor market in the 1970s to about ten percent for those who entered around 2005. The share of formal private employment among first jobs did increase from about 5 percent in the 1970s to 12 percent in 2005, but remains relatively small. The main forms of employment to have significantly increased among new entrants over this period are regular but informal wage employment and non-wage work, which, for new entrants, mainly takes the form of unpaid family work.<sup>5</sup> As a result of these trends, the share of informal employment or non-wage (the vast majority of which is informal) for male new entrants has increased from 55 percent in the 1970s to over 75 percent in the 2000s.

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<sup>5</sup> Informal employment is defined as employment that neither has social insurance coverage nor a formal written contract regulating the employment relationship.

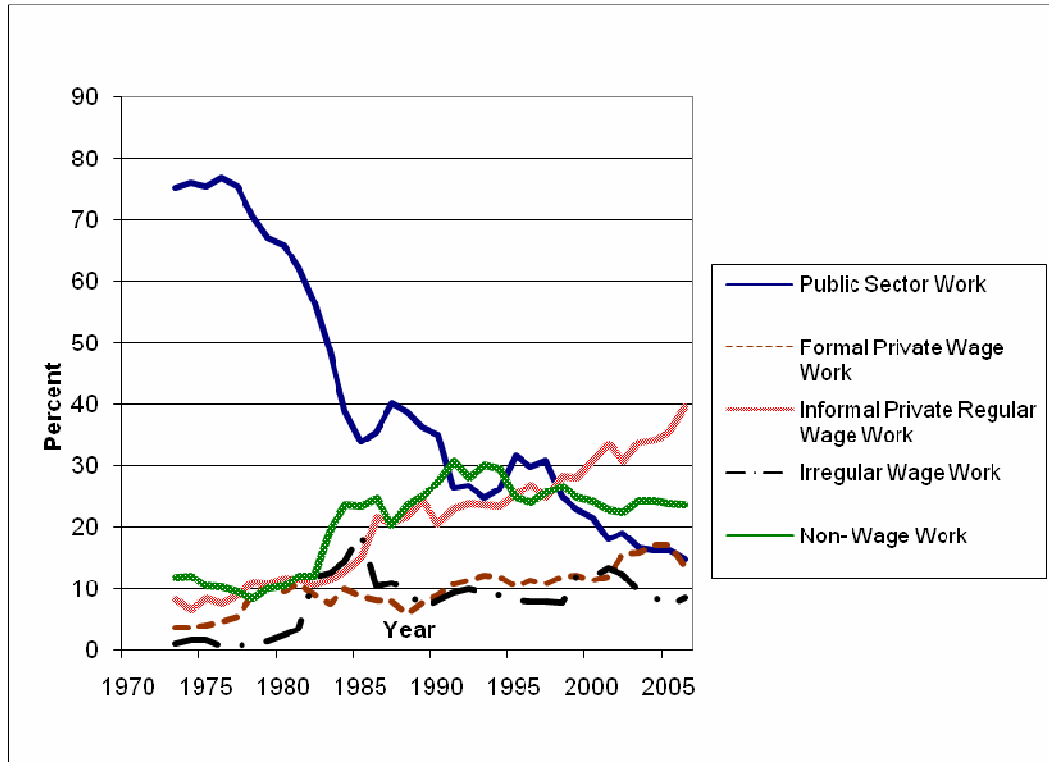
**Figure 4: Distribution of New Male Entrants by Type of First Job (Percent) & Year of Entry, Four Year Moving Average, 1975- 2005**



Source: ELMPS 06

This informalization trend is even more apparent if we focus on male new entrants with secondary education or above, the main group that is eligible for public sector employment. As shown in Figure 5, this group relied disproportionately on public sector employment as late as the second half of the 1970s, with nearly three quarters of them getting a public sector job as their first job. This proportion declined sharply for those entering in the early 1980s and continued to decline thereafter to fall under 15 percent in 2005. The share of formal private wage and salary employment is still very low at about 15 percent even for this relatively well educated group. The most likely form of employment now for educated male new entrants is regular but formal wage work, which comes with very little job security no social protection whatsoever.

**Figure 5: Distribution of New Male Entrants With Secondary and above degree by Type of First Job (Percent) & Year of Entry, Four Year Moving Average, 1975- 2005**



Source: ELMPS 06.

### 3 Literature Review

There are relatively few economic studies on the age at first marriage for young men and even fewer that link young men’s work trajectories to their transition to marriage. On the theoretical side, Keeley (1977) develops a model that incorporates search costs into Becker’s (1973, 1974) theory of marriage. Becker (1973, 1974) uses household production theory to explain the benefits from marriage, such as love and child care, and to explain spouses’ specialization in market or domestic work depending on their relative wages. Costs associated with searching for a spouse, for instance, are neglected. According to Keeley’s (1977) theory, in contrast, an individual enters the marriage market only if his/her expected benefits of search are equal to or exceed the expected costs. With regard to men’s and women’s employment status, Keeley’s (1977) model predicts that “higher-wage men and lower-wage women have greater gains from marriage and thus tend to enter the marriage market earlier” (ibid: 245) provided that

men earn more than women. Using US data from the 1967 Survey of Economic Opportunity, he finds empirical evidence in support of his theoretical model. Bergstrom and Schoeni (1996) develop a theoretical model of the marriage market that predicts a positive correlation between income and age at first marriage for men. They use the 1980 US census and regress family income and annual earnings on the age at marriage (not vice versa!). For that, they restrict their analysis to men aged 40 and above who are currently married and married only once. Estimation results confirm their theoretical model but also show a negative correlation for those in the sample who married after age 30. Similarly, Danziger and Neuman's (1999) estimation results support Keeley's (1977) hypothesis. However, they also find evidence for Bergstrom and Bagnoli's (1993) hypothesis that in traditional societies men's age at marriage *increases* with their wage rate. Bergstrom and Bagnoli (1993) argue that it takes time until a man can show his ability to earn a high wage. Hence, men who are confident in their career path will postpone marriage in order to marry a more desirable woman. Consequently, more desirable women will marry older men. Danziger and Neuman (1999) rely on data from the 1983 Israeli Census of Population and Housing and run separate regressions for Muslim and Jewish married couples. In addition, they run regressions for the following cases: non-working wife, working wife, wife's wage exceeding the husband's wage and vice versa.

Very few studies go beyond wages to measure job status or career. One exception is the study by Gutiérrez-Domènech (2008), which confirms earlier findings from Ahn and Mira (2001) that unemployment spells (non-employment spells in Ahn and Mira (2001)) and temporary contracts delay men's timing of marriage and first child bearing in Spain. Ahn and Mira (2001) also control for the likely endogeneity of education to the marriage and childbearing decision by running the models separately for each educational category. Employment status is classified into four categories: full-time continuous work, part-time or temporal work, no work and military duty. De la Rica and Iza (2005), again on Spain, exclusively focus on the role of fixed-term contracts. They show that men working under such insecure conditions, or even not working at all, delay their marriage compared to those holding an indefinite contract. Women's decision to marry remains, in contrast, unaffected by their contractual status. Finally, Oppenheimer et al. (1997) consider career transition as a process and therefore look at both current career and long-term labor-market status as determinants for marriage timing. More specifically, they use information on job type at the previous interview (non-employed, "stopgap" jobs, career (entry) positions, or military service), and work experience during the previous year expressed in

categories based on hours worked, and earnings. Using data from the National Longitudinal Survey of Youth from 1979 to 1990 and applying duration analysis, they find a strong impact of the career-entry process on men's age at marriage.

The importance of economic factors is also confirmed by studies on marriage timing in developing countries although these studies often focus on women's age at marriage. The study by Anderson et al. (1987) shows, for instance, that the wife's and husband's occupations, age and – similar to Oppenheimer et al. (1997) – ethnicity have a high influence on women's age at marriage in Malaysia. Bates et al. (2007) show that other factors also matter for rural Bangladesh, such as mother's education. Of those who (also) analyze men's marriage decision, Caltabiano and Castiglioni (2008) focus on the interrelatedness between first sexual intercourse, marriage, and cohabitation given that, in Nepal, cohabitation may be delayed up to several years after marriage. Using data from the 2001 Nepal Demographic and Health Survey (DHS), they do not, however, control for variables related to employment or job status. Admittedly, economic factors may be less important in their context as men's average age at marriage has remained relatively stable across cohorts. Furthermore, they limit their estimation to married men and women in order to include variables related to the husband's or wife's characteristics. Another study on Nepal, conducted by Ghimire et al. (2006) looks at changes in spouse choice and its association with age at marriage. They estimate hazard models for a pooled sample of men and women treating spouse choice and arranged marriage as competing risks. Employment status, however, is not taken into consideration.

To sum up, there are still relatively few studies linking the labor and the marriage market. Historically, most economic studies on marriage timing covered industrialized societies, especially the US and more recently Europe. However, with the role of marriage and the forms of family-formation changing, these studies have become more interested in related topics, such as cohabitation versus marriage and the timing of births and less on the age at marriage itself (e.g., Kreyenfeld 2000). Put differently, the role of marriage as a marker of adulthood has declined in Western societies, as have social and economic constraints on the marriage decision. With regard to marriage timing in developing countries, attention has primarily been paid to the determinants of women's delay in marriage. This corresponds to the general trend in most developing regions as described earlier, namely the increase in female age at first marriage over time and a relatively unchanged pattern for male age at first marriage. The main contribution of this paper is to build a better understanding of the determinants of men's timing of marriage, and in particular the role of

their employment status, in a developing country context. More specifically, using data from the ELMPS 06 allows us to study the impact of young men's labor market trajectories on their transitions to marriage in Egypt.

## 4 Econometric Analysis: A Discrete-Time Hazard Model of Men's Timing of Marriage

We use duration analysis in order to be able to take into account that the probability of marrying is conditional on how long the individual remains in the unmarried state and that this time dependence could be non-linear. Duration models also allow us to include in the analysis both married and unmarried men (with the latter treated as censored observations) and to include time-varying covariates. The ELMPS 06 collected information about an individuals' year of first marriage but not on the month of marriage or even the day. Hence, although marriage takes place in continuous-time, we observe spell lengths in units of one year. Our spell lengths are thus interval-censored and we have to deal with 'grouped' or 'banded' data. Consequently, we estimate discrete-time duration models rather than continuous time models. Moreover, the model we estimate allows for unobserved heterogeneity, or 'frailty' (See Jenkins 2005b). More specifically, we assume a parametric Gamma distribution of the disturbances. This is a common approach since it is a continuous distribution with a support of 0 and above, a mean of one and finite variance which provides a closed form expression for the survival function with frailty (Jenkins 2005). Consequently, the discrete-time hazard function at interval  $j$  now includes a normally distributed random variable  $\varepsilon_i$  and is given by:

$$h_j(X_{ij}) = 1 - \exp\{-\exp[X_{ij}'\beta + \gamma_j + \log(\varepsilon_i)]\}$$

where  $X_{ij}$  is a vector of covariates with observed characteristics for person  $i$  and interval  $j$ ,  $\beta$  is a vector of parameters to be estimated and  $\gamma_j$  is the logarithm of the integral of the baseline hazard over interval  $j$  (Jenkins 1997, 2005). We use the STATA program *pgmhaz8* written by Jenkins to undertake the estimation.

### 4.1.1 Data Sources

As mentioned above we rely on data from the Egypt Labor Market Panel Survey of 2006 (ELMPS 06). The survey was administered to a nationally representative sample of 8,349 households of which 3,684 were among the original 4,816 households originally interviewed in

the Egypt Labor Market Survey of 1998 (ELMS 98). An additional 2,167 new households emerged from these 3,684 households as a result of splits, and a refresher sample of 2,498 households was added in 2006. The full sample in 2006 included 37,140 individuals. Since we restrict our analysis to men aged 18 to 49, our working sample consists of 8,805 individuals, of which 4,852 were originally interviewed in 1998. Our sample actually consists of person-years rather than persons, so that each observation is an individual in a given spell year. We observe individuals from age 14 (the first age in which a marriage occurs in the sample) to age 39. Since virtually all men in Egypt (99 percent) are married by age 40, we felt it was reasonable to truncate our sample at that age so as not to be overly affected by outliers. The total number of spells we observe in this unbalanced panel is about 170 thousand, but it varies somewhat from model to model due to missing observations on some variables.<sup>6</sup>

ELMPS 06 inquires about the age at first marriage if the person was ever married. It also includes an extensive set of retrospective questions about an individual's employment history, which allow us to construct full employment trajectories for nearly all the men in our sample. There is also data on parental background and on the number of siblings for all individuals 6 and older in the sample. Since data collection started in late December 2005, we use information on their marital and employment status as of the end of 2005. The only time we rely on the panel structure of the data is when we attempt to construct wealth indices in 1998 for individuals observed in both 1998 and 2006 as an attempt to capture parental wealth prior to marriage. See below for a more detailed discussion of this issue.

#### **4.1.2 The Interval Hazard Function**

Figure 6 shows the discrete-time hazard function based on life table estimates that take censoring into account. For discrete-time survival data, the hazard function gives the conditional probability that marriage occurs in year  $t$ , given that the person had remained unmarried until that year. To derive continuous survival times, we follow the common assumption that failures within each interval occur at a uniform rate so that one essentially estimates the rate for the midpoint of each interval, the so-called "actuarial adjustment" (Jenkins 2005). The hazard function shown in Figure 6 reveals a non-monotonic relationship with age, first increasing until age 30 and then

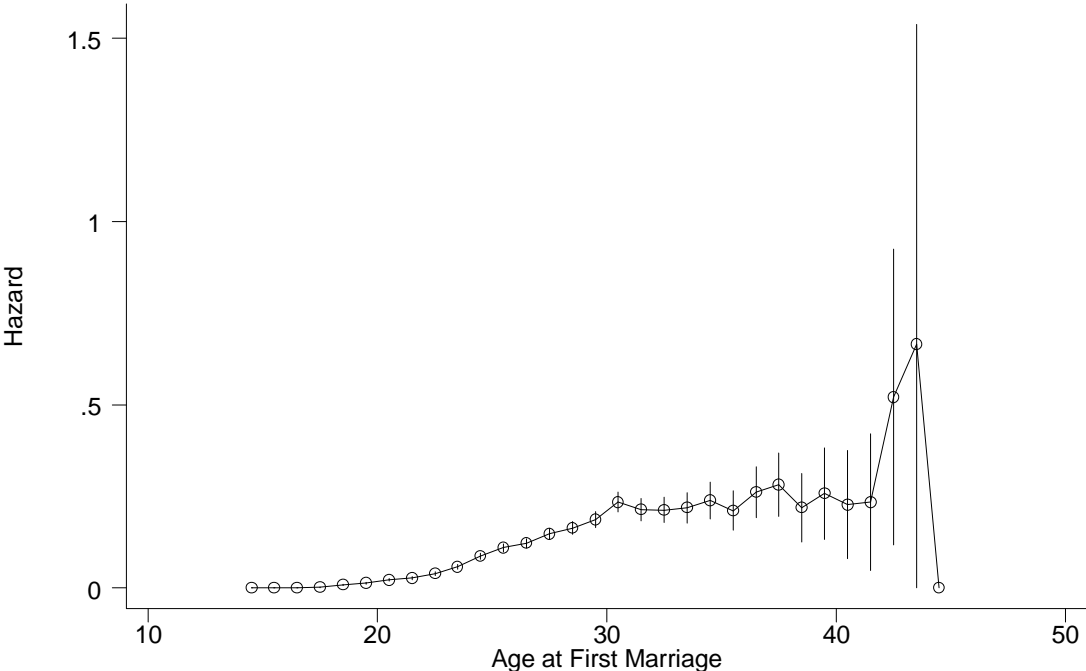
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<sup>6</sup> The number of spells drops to about 47,000 in the model that includes wealth in 1998 because this model relies on the smaller number of individuals observed in both 1998 and 2006.



remaining roughly constant for another decade.<sup>7</sup> After age 40, when 99 percent of our male sample is married, the confidence intervals become very large and the observed patterns unreliable. To avoid that our results be driven by these outliers, we truncate the sample at spell year 39.

**Figure 6: Discrete-time hazard function for first marriage (men aged 18 to 49)**



Source: Authors’ calculations based on ELMPS 06 data.  
 Note: Vertical bars indicate 95% confidence intervals

To capture the age profile shown in Figure 6 in our modeling work, the least restrictive specification of the age dependency of the hazard is a non-parametric specification that consists of including dummy variables for each spell year in which marriage occurs in our sample – in this case from spell year from 14 to 39. By excluding the dummy for spell year 32, we designate that to be the reference category. The coefficient estimates for the spell dummies are shown in Appendix Table 1.

<sup>7</sup> Although all men in the sample currently under age 18, the legal age of marriage, were never-married, several older men in the sample had indeed married before 18, with the earliest marrying at age 14.

### 4.1.3 Explanatory Variables

In discrete time survival analysis covariates can be divided into time-varying and time-invariant covariates. The value of time-varying covariates can change over the course of an individual's trajectory, whereas time invariant ones are assumed to remain constant over the duration under consideration. The principal explanatory variables upon which we focus our attention in this study are all time-varying and describe the employment trajectories of the individuals in the sample. The first is an indicator variable that switches on when the individual first takes up a job that lasts for at least six months. From the year of first employment onwards, the variable in our person-year dataset takes on the value of 1 – irrespective of whether or not the individual experiences a period of non-employment later. As shown in Table 5, the mean age of obtaining the first job is 17.7 for those who have actually started working. These constitute nearly 80 percent of the men in our sample.

The second time varying covariate attempts to capture the impact of job quality on the timing of marriage. We do that by including a variable that switches from zero to one when, if ever, an individual has obtained a “good” job. The definition of a “good” job is based on a job quality index developed by Assaad et al. (2008) using current job information from the 1998 and 2006 waves of the ELMPS 06. The index is based on the ILO concept of decent work and takes into account earnings, job security as measured by the presence and type of employment contract, social protection, paid vacation and sick leave, regularity of employment, and over and under-employment. The mean of the index for all workers is normalized to zero and the index is measured in units of standard deviations. A “good” job is defined as having an index value of at least 0.5, meaning that it is a job whose quality is at least half a standard deviation above the mean.<sup>8</sup> Only 19 percent of those who ever worked obtained good jobs and the mean age for obtaining a good job for those who did is 22.8 (Table 5).

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<sup>8</sup> Because the construction of the job quality index relies on variables that are only measured currently and not retrospectively, it is not directly measurable for the entirety of an individual's employment trajectory. To obtain an estimate of job quality throughout a worker's trajectory, we first calculate the index from current data in 1998 and 2006 and then regress this index on job-related variables available both in the current data and in the retrospective data about previous jobs. These variables include (2-digit) occupation, (2-digit) economic activity, contractual status, social insurance coverage, sector of ownership, and regularity of employment. Separate regressions are estimated for males and females and for wage and nonwage workers. Job quality is then predicted at every point on a worker's trajectory on the basis of this regression. An individual is then determined to be in a good job or not in every spell year in which he is observed on the basis of this predicted job quality index. See Assaad and Mokhtar 2008 for more details about the estimation of job quality throughout an individual's employment trajectory.

The third employment-related time-varying covariate relates to a young man's experience with international migration. There is ample qualitative evidence that young men often use temporary international migration as a strategy to raise the necessary capital for marriage (Singerman 1995, Hoodfar 1997). Migration experience may also help them get better jobs after returning to Egypt. We use the migration history module of the ELMPS 06 to determine young men's experience with international migration. We assume that an individual who departed abroad after age 15 left in order to work. Our time varying migration variable turns on when an individual returns from migration. We also include a time invariant variable that indicates how long he was away for in total. Since we are only interested in the effects of migration on the timing of marriage, we ignore migration that occurs after marriage. Only 1.7 percent of the men in our sample migrated prior to marriage. The mean duration of migration for those who did was 5.2 years and the mean age upon return was 28.2.

The practice in the literature is to lag the employment-related time-varying covariates by one year (see for example Gutiérrez-Domènech 2008). The argument is that the decision to marry and marriage itself usually occur with a certain time-lag. The disadvantage of this approach is that it assumes the length of the lag rather than allows it to be determined from the data. Since it may take longer than one year for a change in employment status to affect the hazard of marrying, a more complex lag structure may be justified. We therefore initially estimate several models with a one-year lag, but then include a version of our preferred model with a more complex lag structure for the time-varying employment variables, namely one, three and five-year lags. The combined effect of these lagged variables can tell us about the speed with which the hazard of marrying responds to changes in employment or migration status.

The final time-varying covariate we use indicates the individual's enrollment status in school in each spell year. It takes on the value of 1 if the individual is enrolled in an educational institution in any given year and the value of zero if he is not. For individuals who have never been to school the variable is always 0. Similar to Ghimire et al. (2006), we also include time invariant dummy variables indicating an individual's ultimate school attainment, which include: (i) primary or preparatory degree, (ii) secondary degree (both general secondary and technical secondary of either 3 or 5 years), and (iii) post-secondary and university degrees. "No educational certificate" is the omitted educational attainment category. For those who are still enrolled, we assume that they will eventually obtain the degree toward which they are studying. Since less than 20 males were still studying in the year they married, we can assume that, at the

time when the decision to marry was made, all parties involved had correct expectations about their final educational attainment. Eighty two percent of the men in our sample have ever gone to school. The mean age of school completion for those who have been is 17.5. Twenty seven percent of our sample completed a post-secondary degree or higher, 37 percent completed a secondary degree and 16 percent completed a primary or preparatory degree.

The final explanatory variable we include in model (1), our simplest model, is the number of sisters a young man has. Since a young man in Egypt is obliged to step in financially should his parents or sister(s) have difficulties in accumulating the required capital for the sisters to marry, we expect men with a higher number of sisters to marry later. The mean number of sisters for men in the sample is 2.2.

In Model (2) we add a series of additional time-invariant variables that control for parental education and employment status. These education variables include years of schooling and years of schooling squared based on the highest educational certificate the parents obtained.<sup>9</sup> Fathers had 3.2 years of schooling, on average, and mothers had 1.7. The parental employment states include (i) government employee, (ii) regular wage or salary worker outside government, (iii) irregular wage worker, (iv) employer or self-employed worker, and (v) unpaid family worker. The reference category is “non-worker”. With very few fathers in unpaid family work and very few mothers in regular or irregular wage employment outside government, we merged these categories with the reference for fathers and mothers respectively. The most predominant employment categories for fathers were government employment (38 percent) and self-employment (38 percent). The vast majority of mothers did not work.

Parental employment characteristics are measured at the time the individual was 15. If either parent were absent at the time of the survey, the individual was asked about his parents’ employment situation when he/she was aged 15. If the parents are present, employment-related information about them was drawn from their job history modules, going back to a point in time 20 years after the respective parent was married, which should correspond roughly to the time when the individual was 15. Since the mobility section suffers from inconsistencies due to recall errors, some of these variables contain missing values, albeit less so for mothers who seldom participate in the labor force. As a result, the number of person-years included in the models

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<sup>9</sup> We assume zero years of schooling for those with no educational certificates, 6 years for primary certificates, 9 for preparatory certificates, 12 for secondary certificates of all types, 14 for post-secondary 2-year degrees, and 16 for all university degrees and above.

which contain parental information is lower than for Model (1), which does not include such information.

Because we only have information about the composition of the household in which the individual currently lives rather than the one in which he was living prior to being exposed to the risk of marriage, we do not control for household characteristics such as number of unmarried women living in the household or whether or not the household is (was) headed by a woman. However, since parental wealth is likely to be quite an important determinant of an individual's timing of marriage, we make an attempt to include a "native household" wealth variable in Model (3). For this we rely on the panel aspect of the data and return to the individuals' household wealth in 1998. On the assumption that most men who were 18 to 49 in 2006 would have been still unmarried in 1998 and living with their parents, a wealth variable constructed from 1998 data should closely approximate "native" household wealth. Since we have rely exclusively on individuals observed both in 1998 and 2006, our sample size for this model is significantly smaller.

The wealth variable is determined using an asset index computed along the lines suggested by Filmer and Pritchett (2001). It is a continuous index constructed at the household level that is a standardized score with mean zero and units of standard deviations. As wealth is assumed to be held differently in urban and rural areas, separate wealth indices were calculated for urban and rural households and these wealth indices are entered into the regression interacted with the respective urban/rural dummy in the regression model.

In Model (4), we drop the wealth variables because of the potential pitfalls discussed above and add a set of variables that control for socio-economic conditions in an individual's wider community that can affect the timing of marriage. Using data from 1996 Population Census, we have the possibility to control for the ratio of men to women in relevant age groups at the district level. Data were available for groups of males and females in five year age groups. Bearing the age gap of about 6-7 years between spouses in Egypt, sex ratios were calculated by dividing the number of males in a given age group by the number of females in the younger age group in the individual's district of residence. For example, men aged 25 to 29 were related to women aged 20 to 24. Men in the sample were assigned the sex ratio corresponding to their age in 1996. The average district-level sex ratio for individuals in the sample was 0.85 (Table 5).

To capture the potential impact of recent changes in the housing market on male age at marriage, we also include in Model (4) a community-level variable indicating the proportion of

dwellings at the district level subject to the “new rent” regulations on rental housing. “New Rent” contracts were introduced in a 1996 housing policy reform that allowed new housing contracts signed since that date to be of definite duration and to allow for market rate rents, reversing many of the rent control laws of the 1960s (see Assaad and Ramadan 208 for more details on this subject). The average district-level percentage of “new rent” housing for individuals in the sample was 6.4 percent, but the range went from 0.4 percent to 48 percent.

Given the prevailing ages at marriage, we expect the “new rent” law, which was passed in 1996, to affect housing availability for those who were born in 1973 and later. We thus include an interaction term between the proportion of new rents in the district and a dummy indicating whether the individual was born in 1973 or later. We would expect a positive effect of this interaction term on the hazard of marrying since the availability of “new rent” housing should make it easier to access housing for these cohorts. The proportion of “new rent” units at the district level is obtained from the 2006 Population Census, which included this category among the answers to a question about the form of housing tenure.

Regional dummies are also included in Model (4), with the Greater Cairo Region as the reference category. The other regions are Alexandria and Suez Canal, rural Lower Egypt, urban Lower Egypt, rural Upper Egypt and urban Upper Egypt. In order to reflect changes in the marriage age over time, we could either include year dummies as in Anderson et al. (1987) or dummies for grouped birth cohorts. We opted for the latter with men born from 1958 to 1962 as reference category.<sup>10</sup> The distribution of the sample across regions and across cohorts is shown in Table 5. Model (5) is similar to Model (4) except for the inclusion of the full lag structure on the time-varying employment and migration variables.

#### **4.1.4 Estimation Results**

In Table 6 we report the hazard ratios or exponentiated coefficients for the various discrete-time duration models we estimated. Assuming that a proportional hazard model applies to the underlying continuous time data, we can interpret the model for our grouped data as a discrete-time proportional hazard model (Jenkins 2005). The exponentiated coefficients can therefore be interpreted as hazard ratios relative to the baseline hazard. Incorporating time-

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<sup>10</sup> The reference cohort group is slightly larger than the other cohort groups (see Table 5 in the Appendix). Looking at Figure 1 suggests, however, that on average, the median age at first marriage did not change over this period. Moreover, as a result of the high population growth in Egypt, older cohorts are less numerous than younger ones.

varying covariates into the model relaxes the proportionality though, which becomes evident from our simulations below (Rabe-Hesketh and Skrondal 2008).

In discussing the results shown in Table 6, we will focus on Models (4) and (5), our most comprehensive models, and will point out differences with other models, if any. We start with an examination of the results relating to the impact of a young man's employment trajectory on his hazard of marrying. Since we return to these variables when we present the simulation results, we limit ourselves here to the direction and rough magnitude of the effects. We first note that based on Model (4), getting a first job increases the hazard of marrying by nearly two and a half times. As model (5) suggests, however, this effect is spread out over more than five years, with the coefficients for all three lagged variables having a positive and significant effects. Getting a good job almost doubles the hazard of marrying, but unlike the first job, the effect is almost immediate. The 3-year and 5-year lagged version of the variable have insignificant effects in Model (5). The results on the employment variables are fairly consistent across all four models where they are entered with only a single period lag.

Similarly migrating abroad and returning from such migration has a fairly large positive effect on the hazard of marrying, with those returning from migration having more than one and the half times the hazard of marrying that those who did not migrate at all. Again the impact of returning from migration is fairly immediate and raises the probability of marriage one year after returning. We get a surprising negative impact of returning from migration on the hazard of marrying five years later, but that effect is not statistically significant. Finally, it turns out that the length of the duration an individual spends abroad does not appear to affect the hazard of marrying.

Like most previous studies (e.g., Yabiku 2005, Ghimire 2005) we find that being enrolled in school significantly reduces the hazard of marrying. Unlike Yabiku (2005) who finds that school attainment in Nepal increases the hazard of marriage, we find that higher educational attainment, correcting for enrollment status, significantly delays marriage. This may be due to the fact that educated men are more likely to marry educated women and that these women and their families are more likely to insist on having independent living arrangement upon marriage and higher standards of living within marriage, both of which raise the cost of marriage and may therefore delay it.

The number of sisters a man has does not have the expected negative effect of his hazard of marrying. It would have probably been preferable to have the number of unmarried sisters as

that would have better indicated the burden the individual is actually bearing, but that variable is not only hard to get but is also likely to be endogenous.

Based on findings in the literature (Bates et al. 2007) and studies on social class and mobility in Egypt (Nagi 2001), we expect indicators related to social class, such as parental background, to have important effects on the hazard of marrying. An increase in the father's years of schooling, like in one's own education, appears to reduce the hazard of marrying, but at a decreasing rate. This may again be due to higher expectations for the kind of marriage one wants to achieve at higher socio-economic strata. Mother's years of schooling has no additional impact. After correcting for education, father's employment status seems to have no additional impact on a young man's hazard of marrying. Self-employment or unpaid family work on the part of the mother appears to raise the hazard of marrying. This may again be the result of the fact that these employment statuses are associated with low socio-economic status in Egypt, thus low expectations in marriage.

Having controlled for these other socioeconomic characteristics, the 1998 urban and rural wealth indices included in Model (3) are only mildly significant and of opposite signs. Whereas higher than average wealth in urban areas is associated with a higher hazard of marrying, it is associated with a lower hazard of marrying in rural areas. We should keep in mind, however, that an individual from an urban household of average wealth in 1998 has a twenty percent lower hazard of marrying than one from an average rural household. As discussed earlier, our wealth variables measure parental wealth with some degree of noise given that some men may have already been married with their own independent households in 1998.

Consistent with the literature, we find that living in a district with a 'surplus' of men relative to women of the appropriate age, i.e. a sex ratio greater than 1, has a strong negative impact on the hazard of marrying (Models 4 and 5). A doubling of the sex ratio from one to two would reduce the hazard of marrying by nearly 36 percent. As hypothesized, the proportion of "new rent" housing in the district of residence in 2006 has a positive impact on the hazard of marrying for those born in 1973 or later, but the effect is only significant at the 5 percent level. A One percentage point increase in the proportion of "new rent" housing raises the hazard of marrying by one percent. The fact that the impact is nearly non-existent for those born prior to that date shows that the greater availability of housing made possible by the change of the housing laws in 1996 significantly helped those coming of age after that date to marry earlier.



In accordance with earlier descriptive findings, we find that controlling for other factors, men in rural areas, especially in Upper Egypt, have higher hazard ratios and therefore marry earlier. Also men living in urban areas of Lower Egypt have higher hazards of marrying compared to the reference category, the Greater Cairo Region, but the effect is only significant at the 5 percent level. Those living in Alexandria and the Suez Canal cities do not differ significantly from those living in Greater Cairo. This confirms our expectation that more metropolitan, urbanized areas have later ages at marriage, which may be due in part to the availability and cost of housing.

Finally, cohort effects confirm the tentative findings we presented earlier, namely, that there was a delay in marriage for those born in the 1960's and early 1970s relative to those born in 1958-62, but that this delay was reversed for those born after 1972. In fact, those born post-1972 have hazard rates comparable to those born in the 1950s once other variables are taken into account. Put differently, our results suggest that young men's delay in marriage is less a time-or cohort-related issue but rather a matter of individual characteristics and experiences: the more educated and those affected by changes in the labor market experience greater delays in marriage.

#### **4.1.5 Shape of the Baseline Hazard and Unobserved Heterogeneity**

The non-parametric specification we use gives us the most flexible fit for the baseline hazard. The estimates on the exponentiated coefficients of the spell dummies shown in Appendix Table 1 provide a fairly consistent picture across all the models we estimate of the shape of the baseline hazard. The hazard rises monotonically until about age 30, when it flattens. There is a slight downward trend starting at age 38, but it is not statistically significant.

We tested whether our model is subject to unobserved heterogeneity or frailty by re-estimating Model (5) with the inclusion of a normally-distributed frailty term. The variance of that term turned out to be significantly different from zero, but the results were qualitatively similar to the model without frailty. (REVISIT THIS)

## **5 Simulations**

Our simulations are based on the estimation results from Model (5), the last model in Table 6. The model includes all the time-varying and time invariant covariates, except for the urban and rural wealth indices. We define a reference individual as follows: He is a 32 year-old man (born in the 1973-1977 cohort) who lives in the Greater Cairo Region. He left school at age

18 with 12 years of education and holds a 3-year general or technical secondary degree. His father and mother have the mean years of schooling in the sample. When he was 15, his father was a government employee while his mother was not engaged in any market work. The sex ratio in his district is at the mean for the Greater Cairo Region. He has had a period of joblessness of 1 year after leaving school at age 18 and therefore obtains his first job at age 19. He does not manage to obtain a “good” job by the time of his marriage.

To see how the employment situation of young men affects their transition to marriage, we simulate the following scenarios:

**Scenario 1 (“job entry effect”)** compares the reference case with the four alternatives relating to the timing of first-time job entry, namely not obtaining a job at all, and delaying job entry into employment to the ages of 21, 24, and 27.

**Scenario 2 (“Timing of first-time job entry vs. timing of getting a good job”)** examines the impact of obtaining any job versus obtaining a “good” job, while varying the timing of both eventualities. The main idea here is to compare a situation where an individual waits to find a “good” job at the expense of entering into employment late, with a situation where he enters early but gets any job. To get at this possible trade-off we simulate the following cases and compare them to our reference case: early job entry (at age 19) while directly obtaining a “good” job, early job entry (again at age 19) while obtaining a good job only comparatively late (at age 27) and finally two cases of waiting for a good job, i.e. not taking up just ‘any’ job at an early age but waiting to get a “good” job at age 24 and at age 27.

**Scenario 3 (“Incidence of migration and timing of return from migration”)** compares the impact of migrating abroad and returning at different ages to starting work early in the domestic labor market in a good job and in a fair or poor job.

Figures 6a and 6b show our simulation results for scenario 1. Figure 6a shows the effect of different timings of first-time employment on the hazard of marrying and Figure 6b shows the same for the probability of remaining unmarried by a certain age. As expected from our estimations in the previous section, scenario 1 demonstrates a relatively strong negative effect of a delay in job entry on the hazard of marrying, shifting it significantly downward. A reference individual who never gets a job has about half the hazard of marrying as one who gets one at age 19. Getting a job at age 21 is only minimally different from getting a job at 19 since the hazard of marrying at those early ages is extremely low anyway. Getting a job at 24 shifts the hazard of marrying upward toward that of those who got jobs early, but it does so over the course of several

years, catching up only at age 29. Getting a job at 27 also shifts the hazard up, but it only catches up with the hazards of early entrants only by age 32.

From a policy perspective, it is more interesting to see the impact of the labor market variables on the probability of being still unmarried at any given age and the median age at marriage (the age at which this probability equals 50 percent). Figure 6b shows that there is practically no difference between getting a job at 19 or 21 in terms of the median age at marriage. In either case, the median age at marriage is about 29 for the reference individual. If one enters the first job at 24, the median is pushed back by about a year to 30. If one gets the first job by age 27, it is pushed back by two years to 31. If one never gets a job, the median age at marriage is pushed to 32.

Model 5 suggests that getting a “good” job as opposed to any job further increases the hazard of marrying, but is it worth waiting for a good job from a marriage timing perspectives if such waiting enhances the probability of getting a good job? This is what Scenario 2 is meant to investigate. Figure 7a shows that for two individuals entering jobs at age 19, one who enters into a good job has between one and half and two times the hazard of marrying as one who gets a fair or poor job. If one gets a first job at 19 and a good job at 27, the hazard of marrying shifts immediately from the “no good job” hazard to the “good job” hazard within a year of getting that good job. If one delays entry into a first job until age 24, but then gets a good job at that age, the hazard of marrying is initially lower than if one took any job at 19, but then catches up with it within a year (at age 25) and then exceeds it to catch up with the “good job” hazard by age 29. Someone who waits until age 27 to enter the job market and find a good job at that age has a lower hazard of marrying until age 28 than someone who takes any job at 19. Their hazard only catches up with those who got good jobs earlier only by age 32.

Figure 7b shows the effect of these scenarios on the probability of remaining unmarried by a certain age and the median age at marriage. A reference young man who gets a good job immediately at 19 has a median age at marriage of 26, more than three years earlier than someone who starts working at 19 but never gets a good job and three and a half years earlier than someone who waits until age 27 to enter directly into a good job. The median age of marriage for someone who waits to enter the job market until age 24 but gets a good job at that age, at 28 is about a year earlier than for someone who enters earlier and never gets a good job. The probability of getting married for someone who waits until age 24 to get a good job but lands a good job at that age is almost identical after age 27 to someone who enters at 19 but only gets a

good job at age 27. It is higher, however, than for someone who enters early, but never finds a good job. It is beyond the scope of this paper to examine whether waiting actually enhances the probability of getting a good job, but, if it does, some waiting may pay off in terms of a young man's ability to marry earlier. Waiting until age 24 could be justified if that spells the difference between getting a good job or not getting one, but waiting until age 27 is not justified at least from the perspective of marriage timing.

The final scenario we examine in our simulation (scenario 3) relates to the incidence of international migration prior to marriage and the timing of return from such migration. Our results indicated that the actual duration of migration seems not to matter, so we refrain from investigating its effect. As shown in Figure 8a, the effect of international migration on the hazard is bounded by the hazard of staying in the domestic market, starting to work at 19 and never getting a good job and staying and immediately getting a good job at age 19. Returning at 21 appears to shift the hazard up from the "no good job" hazard to the "good job" hazard, but only temporarily. If the person hasn't married by age 26, his hazard returns back to the "no good job" hazard. This suggests that if the savings accumulated from migration are not used for marriage within a couple of years, they are spent on other things and the hazard of marrying drops again. The same happens if the person returns at 24, but the positive impact on the hazard in this case lasts until age 28. Finally returning at age 27, shifts the hazard up at age 28 and the positive effect lasts through age 31.

These temporary shifts in the hazard of marrying due to international migration have permanent shifts on the probability of marrying by a certain age and thus on the median age at marriage. As shown in Figure 8b, the probability of marrying at any age is highest for those who enter don't migrate, enter the domestic job market earlier and get a good job immediately. These people are the ones who don't need to migrate. Those who migrate and return by age 21 get an immediate bump in their probability of marrying, but the effect wears off in a few years. Because of the transient nature of that effect, a reference individual who returns at 21 actually has a slightly higher median age at marriage than someone who returns at age 24 who spends the same amount of time abroad. Those who return at 27 don't see much of a positive effect on the ability to marry compared to those who return at 21 or 24. They do however fare better at older ages than those who never migrate and never get a good job on the domestic market.

## 6 Conclusions

Our results show that a person's labor market trajectory strongly affects their timing of marriage. A five-year delay in initial job entry can push the median age at marriage by about one and a half years and an eight-year delay by two and a half years, if these delays do not lead to a better job once one enters. Getting a "good" job right away can advance the median age at marriage by three years compared to someone who never gets a good job or by two years for someone who gets one fairly late. Delaying entry into employment until one can get a good job could be worthwhile strategy for some people, if such waiting increases the probability of getting a good job. Remaining non-employed until age 24 and then getting a good job has the same effect on the median age at marriage as starting to work immediately and getting a good job at 27 and is a better strategy than starting early and never getting a good job. Such a conclusion must be tempered by the fact that it is still not clear from this analysis that waiting does raise the probability of getting a good job and that marriage timing is probably not the only consideration in deciding to wait or not to wait. In any case, our results show that too much waiting, say until age 27, does not pay off in terms of advancing the age at marriage.

From a timing of marriage perspective, international migration seems to be a substitute, albeit a temporary one, to getting a good job in the domestic job market. If an individual is not able to take advantage of the savings he accumulates from migration to get married within three years, the positive impact of international migration dissipates. Thus, given the prevailing age at marriage, it is best not to return either too early or too late. Surprisingly, the duration actually spend abroad did not seem to matter for the timing of marriage, once the age of return was controlled for.

The results we obtain on the other covariates mostly conform to expectations. School enrollment delays marriage as expected and so does higher school attainment. The latter effect is presumably due to the higher expectations of the kind of match one can obtain at higher levels of education. A higher number of sisters did not result in delayed marriage as hypothesized. As in the case of own schooling, higher levels of schooling for the father delayed marriage as well, but no effect was found for mother's schooling. The opposite was true of parental employment status. Father's type of employment did not seem to matter once father's schooling was taken into account, but mother's unpaid and/or self-employment speeded up marriage. This is probably

because such employment for mothers is an indicator of lower socio-economic class and lower marriage expectations.

A noteworthy result is that recent housing reforms that introduced the more flexible “new rent” housing contract have contributed to earlier marriages for cohorts that married after the passage of the law. We show that men born after 1972 and who could in theory be affected by the passage of the new law were in fact able to marry earlier if they lived in districts with higher than average “new rent” housing.

The results of this research have significant implications for policy. We show that getting good jobs, which are essentially formal jobs, has a profound effect on a young man’s ability to signal that he is ready to marry. The informalization of the labor market in recent years as the economy moved away from public sector employment has contributed to delayed marriage among young men and the social anxiety that is associated with it. While an opportunity to migrate internationally can serve as a substitute for getting a good job on the domestic market, its impact is more transient. By allowing for more flexible employment contracts and a lower social insurance burden, current labor market policies and ongoing reform efforts are attempting to increase the extent of formality in the Egyptian labor market. While the impact of these labor market reform efforts is not yet apparent, we can convincingly show that similar reforms that led to greater flexibility in rental markets have indeed paid off in terms of curbing the delays in marriage among young men (Assaad and Ramadan 2008). Clearly other policies that can increase the supply of good jobs in the domestic market, such as policies that lead to more rapid economic growth, would also help. Finally, we show that early entry into jobs after completing schooling is helpful. Policies and programs that encourage such early entry and reduce queuing or waiting for formal jobs would also curb delays in marriage. Examples of such programs are ones that encourage volunteerism and internships. Examples of such policies are ones that reduce the cost of hiring new entrants for employers through subsidies for on-the-job training or a temporary reductions in social insurance contributions. It is unlikely that delaying entry enhances the prospects of getting a good job sufficiently to make such waiting worthwhile.

There remains plenty of scope for further research on this topic. In keeping with previous literature (e.g., Gutiérrez-Domènech 2008, Oppenheimer et al. 1997), we assume that both the education and employment decisions are exogenous to the marriage decision. However, in making this assumption we might be ignoring the potential signaling effect a job might have in the marriage market. For instance, a man may deliberately delay entry to the job market if the

jobs available to him would be perceived to be a liability for him in the marriage market. Also, the decision to migrate might be interrelated with the decision about when to marry. Men who want to marry earlier might resort to migration in order to more quickly accumulate the capital necessary for marriage. However, given the severe constraints that most men operate under in the migration and job markets, we strongly believe that it is these markets that drive the marriage decision not the other way around.

Restricting the sample to married men only would allow us to include characteristics related to the bride and to the marriage itself like living arrangements after marriage or consanguinity. The interrelatedness between setting up a new household upon marriage and the timing of marriage could be addressed, provided that convincing instruments can be found for the choice of living arrangement after marriage. Similarly, little is known about the interrelatedness of consanguinity and marriage timing in the Arab World, i.e. whether the fact that the relatively high share of consanguinity has not declined much is related to the costs of marriage, and not to preferences or social norms. Probing further into this, however, also requires finding appropriate instruments that would allow us to endogenize consanguinity.

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**Table 5. Summary Statistics of Explanatory Variables, Males aged 18 to 49.**

<b>Explanatory Variables</b>	<b>Mean</b>	<b>St. dev.</b>	<b>N</b>	<b>min</b>	<b>max</b>
<b>individual characteristics</b>					
<i>age at leaving school (school enrollment)*</i>	17.51	4.25	7207	6	44
no educational degree***	0.21	0.41	8805	0	1
primary or preparatory degree	0.16	0.36	8805	0	1
secondary degree	0.37	0.48	8805	0	1
above secondary degree	0.27	0.45	8805	0	1
<i>age at taking up first job*</i>	17.69	5.08	7056	6	41
<i>age at taking up first good job*</i>	22.76	4.25	1352	9	37
duration of migration period**	5.21	4.1	146	0	24
<i>age at returning back to Egypt**</i>	28.20	5.14	146	17	47
number of sisters	2.15	1.52	8805	0	12
<b>socio-economic status / parental background</b>					
father: years of schooling	3.24	5.40	8799	0	19
mother: years of schooling	1.70	4.11	8803	0	19
father: government employee	0.38	0.48	8411	0	1
father: regular wage worker outside government	0.16	0.37	8410	0	1
father: irregular wage work	0.07	0.26	8464	0	1
father: employer or self-employed	0.38	0.49	8464	0	1
father: no job or working unpaid for family***	0.01	0.11	8410	0	1
mother: government employee	0.06	0.25	8753	0	1
mother: employer or self-employed	0.04	0.19	8756	0	1
mother: working unpaid for family	0.08	0.26	8756	0	1
mother: no job, waged in irregular job and regular wage work outside the government***	0.83	0.38	8753	0	1
1998 wealth index – urban household	-0.05	0.74	4833	-2.56	1.95
1998 wealth index – rural household	0.00	0.54	4833	-1.48	3.11
<b>wider socio-economic conditions</b>					
sex ratio in district of residence in 1996	0.85	0.11	8803	0.40	3
proportion of “new rent” housing in district (percent)	6.37	6.17	8774	0.70	48.4
Greater Cairo***	0.15	0.36	8805	0	1
Alexandria and Suez	0.11	0.31	8805	0	1
Lower urban Egypt	0.13	0.34	8805	0	1
Lower rural Egypt	0.25	0.44	8805	0	1
Upper urban Egypt	0.16	0.36	8805	0	1
Upper rural Egypt	0.20	0.40	8805	0	1
cohort 1956 – 1962***	0.13	0.34	8805	0	1
cohort 1963 - 1967	0.11	0.31	8805	0	1
cohort 1968 - 1972	0.13	0.33	8805	0	1
cohort 1973 - 1977	0.18	0.38	8805	0	1
cohort 1978 - 1982	0.21	0.41	8805	0	1
cohort 1983 - 1987	0.24	0.43	8805	0	1

\* provided that individuals are not censored.

\*\* provided that individuals are not censored and that migration started before year of marriage.

\*\*\* omitted category.

*italic*: time-varying covariates

**Table 6. Hazard Ratio Estimates from Discrete-Time Survival Model on the Age at First Marriage for Men aged 18-49 in Egypt, 2006.**

<b>Explanatory Variables</b>	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>	<b>Model 5</b>
<i>school enrollment</i>	0.935 (0.043)	0.906* (0.042)	0.927 (0.065)	0.878** (0.042)	0.859** (0.041)
primary or preparatory degree <sup>1</sup>	0.670*** (0.032)	0.687*** (0.034)	0.657*** (0.045)	0.700*** (0.035)	0.704*** (0.035)
secondary degree <sup>1</sup>	0.572*** (0.024)	0.607*** (0.026)	0.549*** (0.034)	0.580*** (0.025)	0.619*** (0.028)
above secondary degree <sup>1</sup>	0.429*** (0.020)	0.484*** (0.024)	0.436*** (0.032)	0.473*** (0.024)	0.533*** (0.028)
<i>job entry (-1)</i>	1.985*** (0.100)	1.880*** (0.096)	1.932*** (0.140)	1.768*** (0.090)	1.188* (0.096)
<i>job entry (-3)</i>					1.388*** (0.117)
<i>job entry (-5)</i>					1.199** (0.070)
<i>“good” job (-1)</i>	1.632*** (0.059)	1.658*** (0.062)	1.888*** (0.101)	1.887*** (0.074)	1.926*** (0.148)
<i>“good” job (-3)</i>					1.015 (0.102)
<i>“good” job (-5)</i>					0.976 (0.079)
duration of migration period	1.001 (0.014)	0.995 (0.014)	0.993 (0.026)	1.003 (0.015)	1.004 (0.015)
<i>migration (-1)</i>	1.744*** (0.227)	1.572*** (0.208)	1.651** (0.304)	1.475** (0.197)	1.726** (0.344)
<i>migration (-3)</i>					0.995 (0.295)
<i>migration (-5)</i>					0.591 (0.191)
number of sisters	1.031*** (0.009)	1.021* (0.010)	1.021 (0.014)	1.018 (0.010)	1.017 (0.010)
father: years of schooling		0.956*** (0.012)	0.967* (0.015)	0.963** (0.012)	0.963** (0.012)
father: years of schooling squared		1.003** (0.001)	1.002 (0.001)	1.002* (0.001)	1.002* (0.001)
mother: years of schooling		0.986 (0.018)	0.996 (0.025)	0.986 (0.018)	0.987 (0.018)
mother: years of schooling squared		1.000 (0.002)	0.999 (0.002)	1.000 (0.002)	1.000 (0.002)
father: government employee <sup>2</sup>		0.812 (0.118)	0.892 (0.206)	0.927 (0.132)	0.921 (0.131)
father: regular wage worker outside government <sup>2</sup>		0.827 (0.122)	0.880 (0.207)	0.929 (0.135)	0.924 (0.134)
father: waged in irregular job <sup>2</sup>		1.037 (0.157)	1.112 (0.268)	1.072 (0.159)	1.058 (0.156)
father: employer or self-employed <sup>2</sup>		0.945 (0.136)	0.960 (0.220)	1.033 (0.146)	1.017 (0.143)
mother: government employee <sup>3</sup>		1.057 (0.121)	0.974 (0.157)	0.989 (0.115)	1.000 (0.116)
mother: employer or self-employed <sup>3</sup>		1.365*** (0.118)	1.205 (0.153)	1.240* (0.109)	1.255** (0.110)
mother: working unpaid for family <sup>3</sup>		1.489*** (0.090)	1.507*** (0.138)	1.244*** (0.079)	1.233*** (0.078)

**Table 6. Hazard Ratio Estimates from Discrete-Time Survival Model on the Age at First Marriage for Men aged 18-49 in Egypt, 2006. (continued)**

Explanatory Variables (contn'd)	Model 1	Model 2	Model 3	Model 4	Model 5
1998 wealth (urban households)			1.085*		
			(0.039)		
1998 wealth (rural households)			0.920*		
			(0.038)		
urban area			0.790***		
			(0.037)		
sex ratio				0.644*	0.642*
				(0.112)	(0.111)
proportion of 'new rent' housing				0.997	0.997
				(0.003)	(0.003)
proportion of 'new rent' housing interacted with 1973+ cohorts Alexandria and Suez <sup>4</sup>				1.011*	1.011*
				(0.005)	(0.005)
				1.006	1.010
				(0.061)	(0.062)
Lwr_ur <sup>4</sup>				1.157*	1.155*
				(0.067)	(0.067)
Lwr_rur <sup>4</sup>				1.385***	1.378***
				(0.074)	(0.074)
Upp_ur <sup>4</sup>				1.122*	1.118
				(0.065)	(0.065)
Upp_rur <sup>4</sup>				1.624***	1.609***
				(0.099)	(0.098)
cohort 1963-1967 <sup>5</sup>				0.868**	0.862**
				(0.040)	(0.040)
cohort 1968-1972 <sup>5</sup>				0.981	0.976
				(0.049)	(0.049)
cohort 1973-1977 <sup>5</sup>				1.184**	1.174**
				(0.067)	(0.066)
cohort 1978-1982 <sup>5</sup>				1.364***	1.343***
				(0.087)	(0.086)
cohort 1983-1987 <sup>5</sup>				0.979	0.980
				(0.117)	(0.117)
_cons	0.139***	0.172***	0.185***	0.209***	0.184***
	(0.014)	(0.030)	(0.049)	(0.049)	(0.043)
person-years	107,701	103,088	46,740	102,634	102,634
N	8,805	8,369	4,576	8,339	8,339

\* p<0.05, \*\* p<0.01, \*\*\* p<0.001

*italic*: time-varying covariates

<sup>1</sup> omitted category: no educational degree

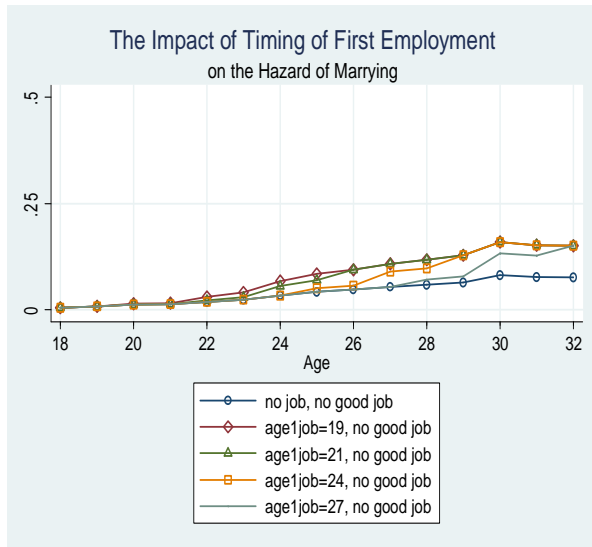
<sup>2</sup> omitted categories: no job and unpaid working for the family

<sup>3</sup> omitted categories: no job, waged in irregular job and regular wage work outside the government

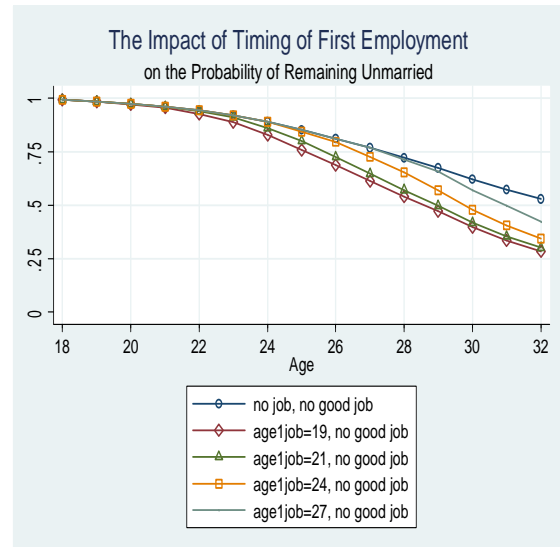
<sup>4</sup> omitted category: Greater Cairo Region

<sup>5</sup> omitted category: cohort 1956-1962

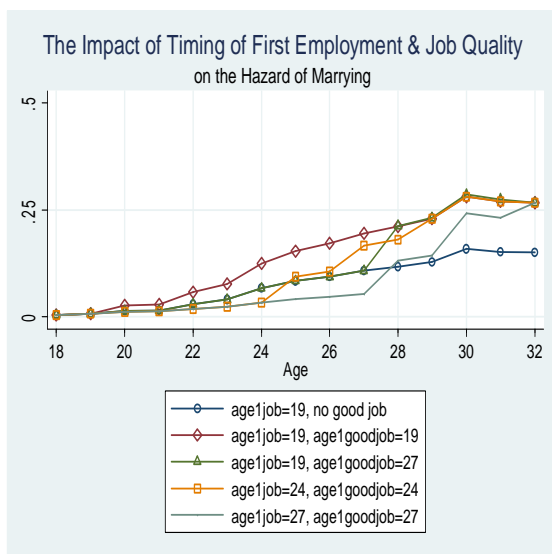
**Figure 6a. Simulated Effect of Timing of First Employment on the Hazard of Marrying for a Reference Individual.**



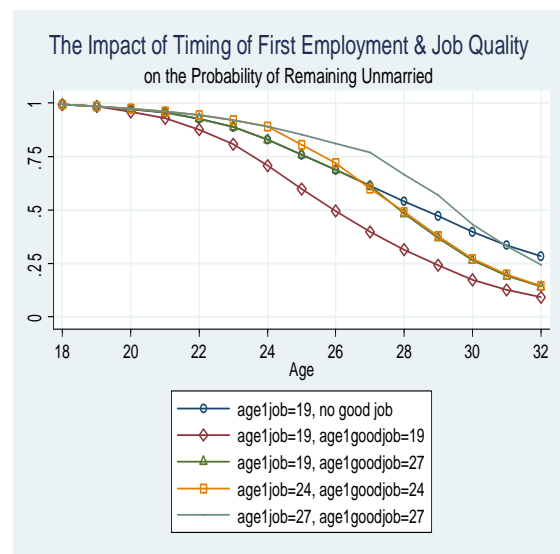
**Figure 6b. Simulated Effect of Timing of First Employment on the Probability of Remaining Unmarried for a Reference Individual**



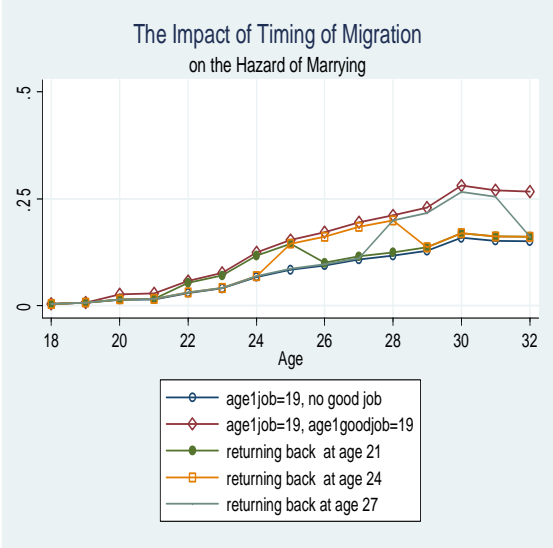
**Figure 7a. Simulated Effect of Timing of First Employment and Job Quality on the Hazard of Marrying for a Reference Individual.**



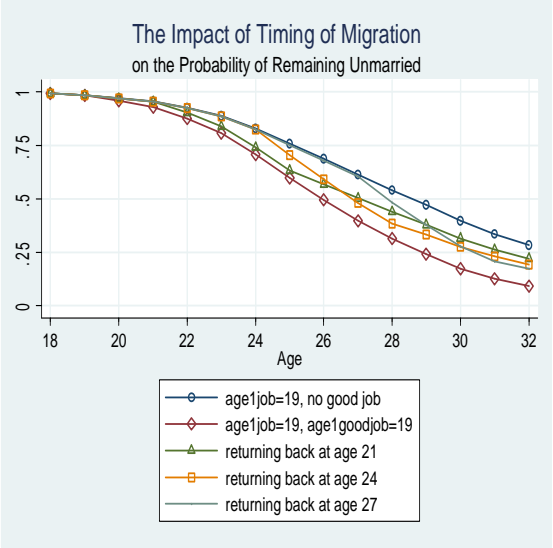
**Figure 7b. Simulated Effect of Timing of First Employment and Job Quality on the Probability of Remaining Unmarried for a Reference Individual.**



**Figure 8a. Simulated Effect of (Return from) International Migration on the Hazard of Marrying for a Reference Individual.**



**Figure 8b. Simulated Effect of (Return from) International Migration on the Probability of Remaining Unmarried for a Reference Individual.**



**Appendix Table 1: Parameter Estimates of Spell Dummies (14-39)  
Defining Shape of Baseline Hazard**

<b>Spell Dummies</b>	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>	<b>Model 5</b>
d14	0.001*** (0.001)	0.001*** (0.001)	dropped - predicts failure perfectly	0.001*** (0.001)	0.001*** (0.001)
d15	0.001*** (0.001)	0.001*** (0.001)	dropped - predicts failure perfectly	0.001*** (0.001)	0.001*** (0.001)
d16	0.006*** (0.002)	0.006*** (0.002)	0.008*** (0.004)	0.005*** (0.002)	0.006*** (0.002)
d17	0.018*** (0.004)	0.018*** (0.004)	0.018*** (0.006)	0.015*** (0.003)	0.017*** (0.004)
d18	0.074*** (0.010)	0.071*** (0.009)	0.065*** (0.013)	0.058*** (0.008)	0.067*** (0.009)
d19	0.104*** (0.012)	0.095*** (0.012)	0.086*** (0.015)	0.078*** (0.010)	0.090*** (0.011)
d20	0.167*** (0.018)	0.157*** (0.017)	0.152*** (0.023)	0.128*** (0.014)	0.146*** (0.016)
d21	0.181*** (0.019)	0.172*** (0.018)	0.172*** (0.026)	0.141*** (0.015)	0.159*** (0.017)
d22	0.256*** (0.025)	0.245*** (0.024)	0.225*** (0.032)	0.200*** (0.020)	0.224*** (0.023)
d23	0.349*** (0.033)	0.333*** (0.031)	0.306*** (0.041)	0.272*** (0.026)	0.302*** (0.030)
d24	0.485*** (0.044)	0.458*** (0.042)	0.363*** (0.048)	0.382*** (0.035)	0.422*** (0.040)
d25	0.605*** (0.054)	0.576*** (0.052)	0.541*** (0.069)	0.489*** (0.045)	0.532*** (0.049)
d26	0.654*** (0.059)	0.639*** (0.058)	0.604*** (0.077)	0.560*** (0.051)	0.599*** (0.055)
d27	0.761** (0.069)	0.734*** (0.066)	0.729* (0.093)	0.664*** (0.061)	0.695*** (0.064)
d28	0.823* (0.075)	0.797* (0.073)	0.820 (0.105)	0.740** (0.069)	0.760** (0.071)
d29	0.914 (0.085)	0.882 (0.083)	0.833 (0.111)	0.826* (0.078)	0.837 (0.079)
d30	1.141 (0.107)	1.104 (0.104)	1.158 (0.152)	1.054 (0.100)	1.058 (0.100)
d31	1.043 (0.105)	1.030 (0.103)	0.979 (0.140)	1.008 (0.102)	1.010 (0.102)
d33	1.062 (0.121)	1.044 (0.120)	0.958 (0.159)	1.067 (0.123)	1.064 (0.123)
d34	1.055 (0.130)	1.052 (0.130)	1.132 (0.193)	1.092 (0.135)	1.085 (0.134)
d35	0.883 (0.125)	0.880 (0.125)	0.916 (0.183)	0.882 (0.128)	0.874 (0.126)
d36	1.135 (0.162)	1.136 (0.163)	0.845 (0.189)	1.173 (0.169)	1.163 (0.168)
d37	1.107 (0.178)	1.101 (0.179)	1.123 (0.252)	1.144 (0.186)	1.130 (0.184)
d38	0.797 (0.165)	0.812 (0.168)	0.699 (0.216)	0.856 (0.178)	0.853 (0.178)
d39	0.717 (0.174)	0.650 (0.165)	0.507 (0.199)	0.683 (0.174)	0.683 (0.174)

Note: Spell year 32 is the reference category.